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**FIELD AND ANALYTICAL REPORT**

**FOR**

**THE INTERIM REMOVAL OF CONTAMINATED SOIL AT THE  
BUREAU OF INDIAN AFFAIRS (BIA) SITE, BETHEL, ALASKA**

*AUGUST TO SEPTEMBER 1994*

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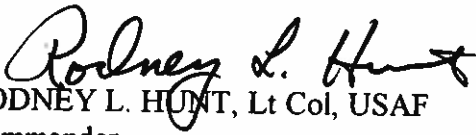
DEPARTMENT OF THE AIR FORCE  
PACIFIC AIR FORCES

MEMORANDUM FOR ALASKA DEPARTMENT OF ENVIRONMENTAL  
CONSERVATION, SOUTHCENTRAL REGIONAL OFFICE

FROM: 611 CES/CC  
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SUBJECT: Bureau of Indian Affairs Site, Bethel, AK

1. The Field and Analytical Report for the Interim Removal of Contaminated Soil at the Bureau of Indian Affairs site accompanies this letter.
2. POC is Mr. Shah Alam, 611 CES/CEOR, (907) 552-1617.

  
RODNEY L. HUNT, Lt Col, USAF  
Commander

Attachment:  
Field and Analytical Report for the Interim Removal of Contaminated Soil at the Bureau of Indian Affairs (BIA) Site, Bethel, Alaska

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*AUGUST TO SEPTEMBER 1994*

**VOLUME I - TEXT**

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## **1. INTRODUCTION**

The 611th Civil Engineer Squadron (611 CES), former 11th Civil Engineering Operations Squadron (11 CEOS), was involved in the excavation and removal of contaminated soils at the Bureau of Indian Affairs (BIA) site, Bethel, Alaska, from August to September, 1994. Public Law 102-497, 106 Statute 3260 (24 Oct 92), Section 13, requires the USAF to share response costs to remove any hazardous substance or waste from the site with the Department of the Interior.

The BIA site was constructed in 1957 by the USAF as part of the White Alice Communication System (WACS). The system was activated in 1958 and was deactivated in 1979. In 1963 the BIA acquired a 125 acre parcel from the USAF which included the old barracks, several outlying buildings, fuel tanks, water treatment plant, and sewage lagoon. In 1964 the BIA remodeled the barracks to serve as family living quarters, and a staging and operations support and maintenance facility. The BIA operated the site until 1990. The boundary of the Bethel BIA administrative site (site) was reduced in size in 1985 from approximately 275 acres to the smallest practicable tract of approximately 45 acres. In 1987, the BIA determined that site was excess to its need. An approximate 18.29-acre portion of the site will be retained in federal ownership under the jurisdiction of the US Fish and Wildlife Service (USFWS). The remaining portion of the site, approximately 27 acres, will be conveyed to the Yukon-Kuskokwim Health Corporation (YKHC).

## **2. PURPOSE AND SCOPE**

The purpose of this investigation was to delineate and remove all petroleum-oil-lubricants (POL) contaminated soils from the BIA site. An initial Preliminary Assessment (PA) was conducted in 1991 to document and provide analytical evidence of site contamination and to determine an appropriate response for the site remediation. The excavation phase included soil sampling, soil removal, and assessment of remaining soils. Once removed, contaminated soils were transported and placed into lined containment cells. As discussed in Section 6 on Site Assessments, the amount of contaminated soils encountered in the site was several times more than previous estimates. The limitations of time and resources did not allow the complete removal of all the contaminated soils. The scope of this report is limited to data collected during soil excavation in the summer of 1994.

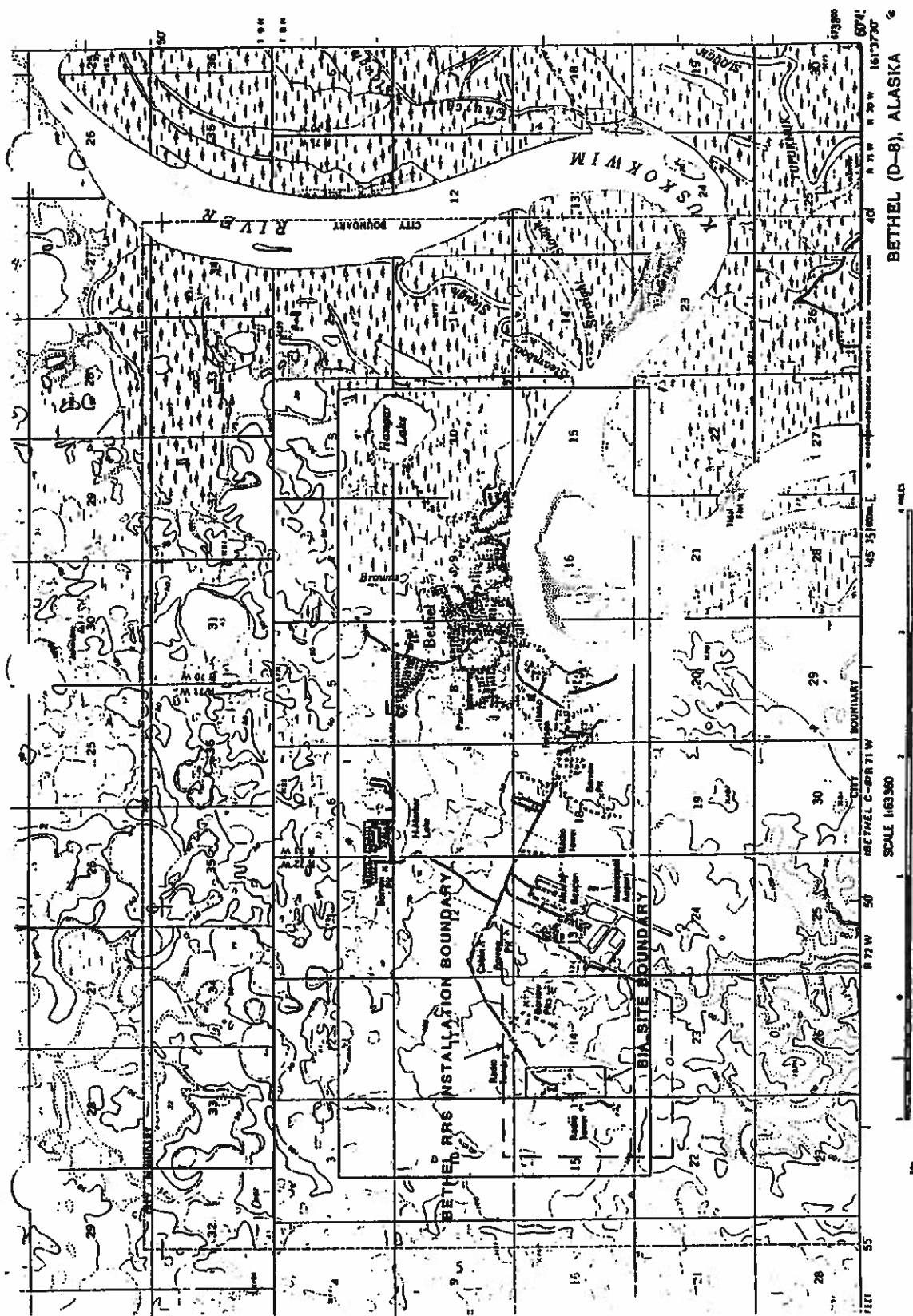


Figure 1 Surface water bodies/vicinity map

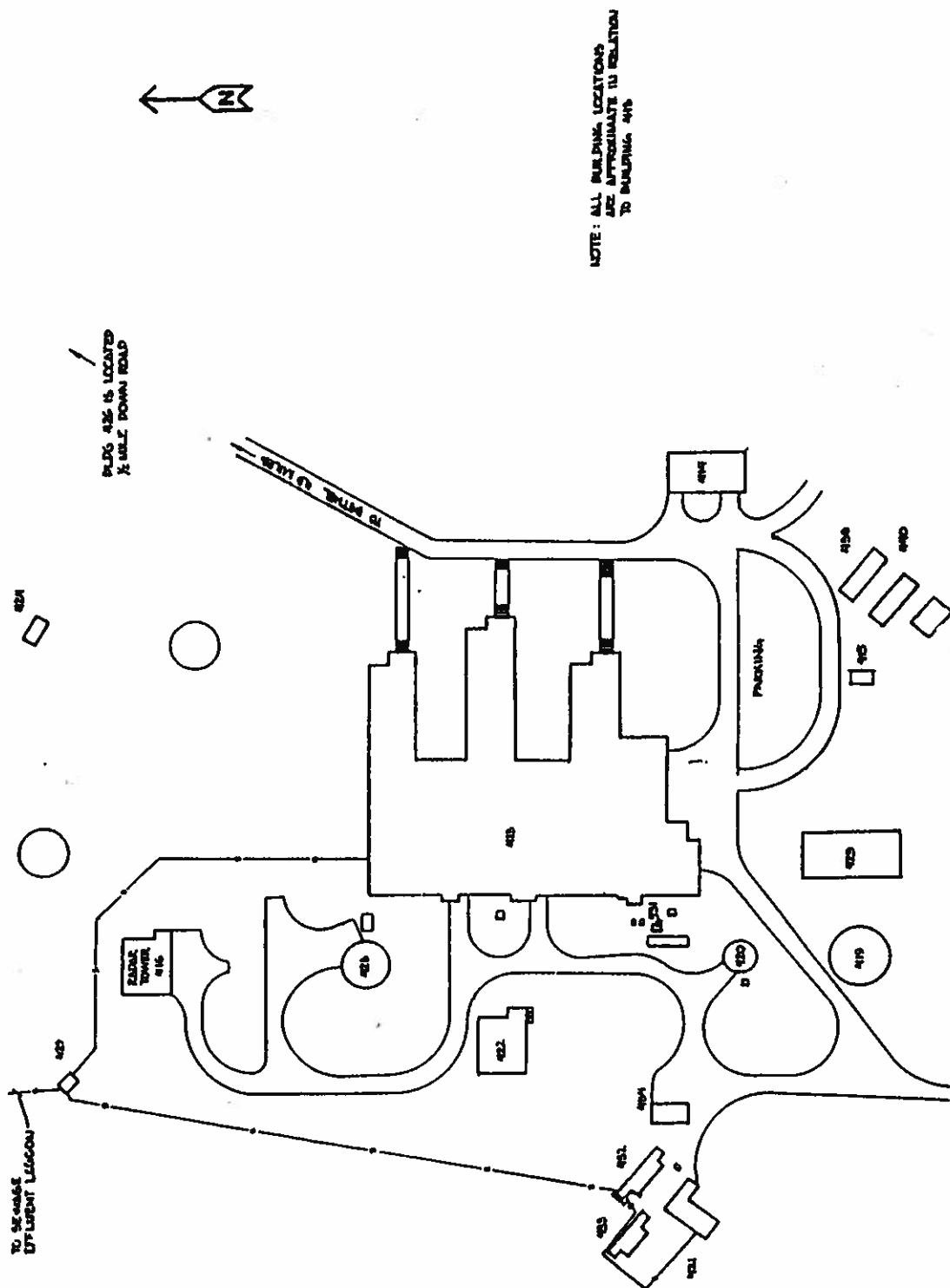
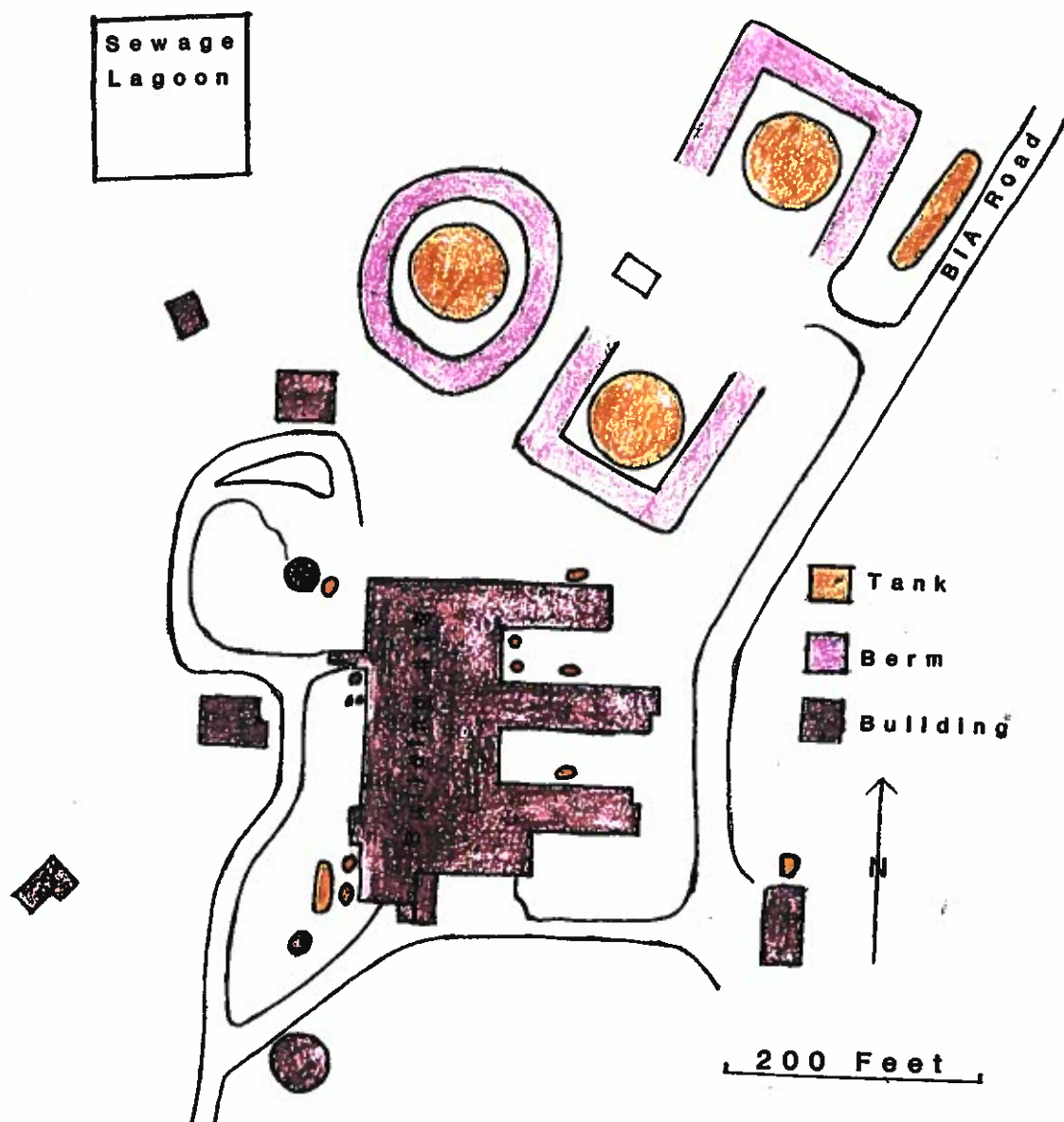


Figure 2 Site Plan, BIA site, Bethel, Alaska. Bldgs 415, 424, 425, 430, 432, 433 and 440 did not exist in the summer of 1994.



*Figure 3 Aboveground storage tanks and buildings at the BIA site in the Spring of 1994. The tanks were removed and excavation to remove the contaminated soils began in summer. Figure 5 delineates the extent while Table 19 illustrates the volumes of contaminated soils.*

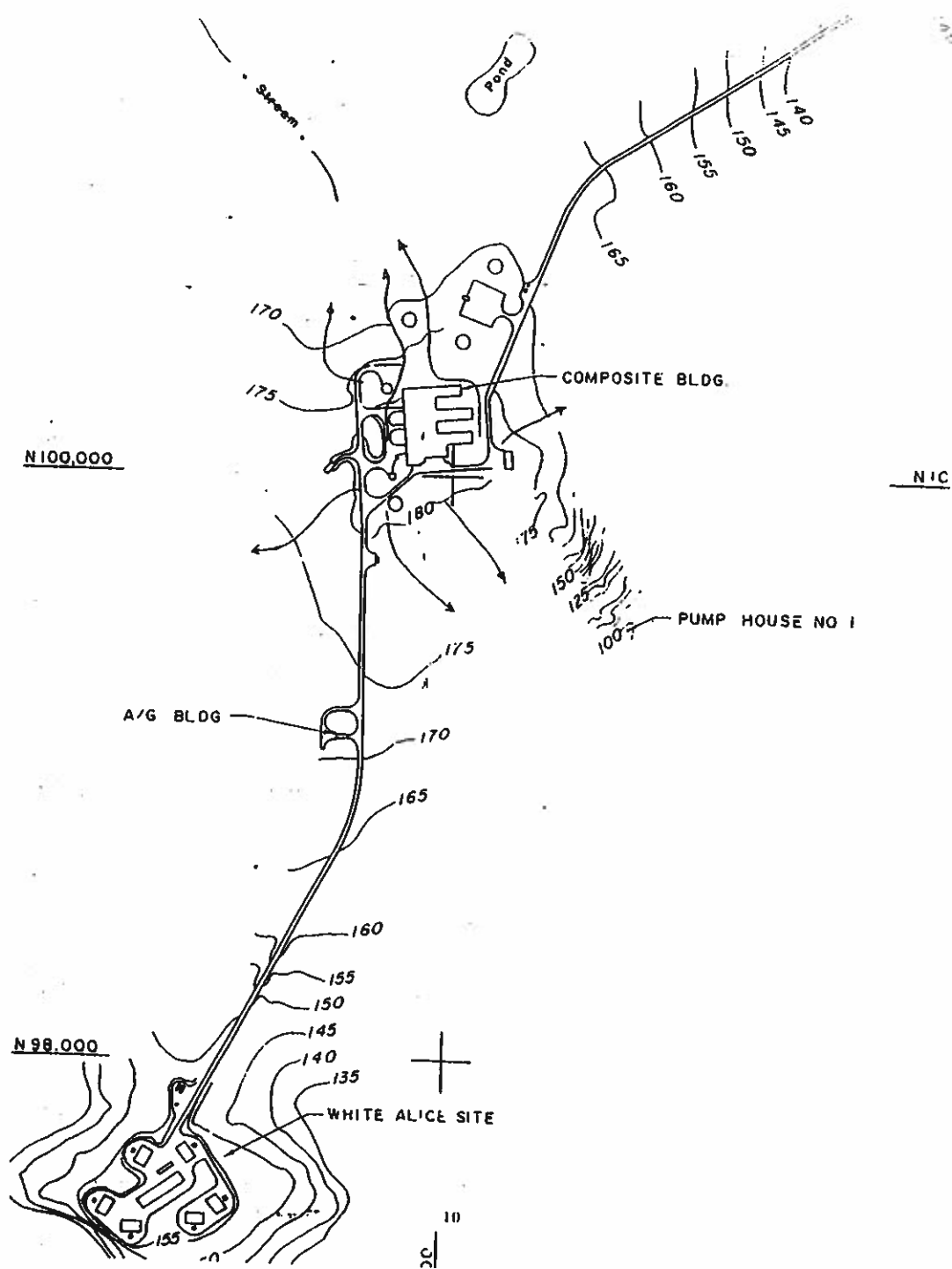


Figure 4 Drainage map, BIA site

### **3. ENVIRONMENTAL SETTING**

#### **3.1 Geographic Locale**

The BIA site is located in southwestern Alaska approximately three miles west of the village of Bethel, Alaska, and the Kuskokwim River (Figures 1-3). Access to the BIA site is by a road leading west from the village. The site's geographic coordinates were determined using the linear interpolation method described in the US Environmental Protection Agency (USEPA) publication, Guidance Document for Performing Preliminary Assessments Under CERCLA. For convenience, the northwest corner of the composite building (Bldg 413) was selected as the site reference point. The base map for the calculation was the USGS 1:25,000 Topographic Map of Bethel, Alaska. The coordinates were calculated to be:

LONGITUDE 161°52'45.8"

LATITUDE 60°40'16.1"

The site is located in Section 15, Township 8 North, Range 72 West, Seward Meridian, Alaska. The site is approximately 180 feet above mean sea level.

#### **3.2 Climate**

Bethel is characterized by a cold maritime climate. High humidity, considerable cloudiness, frequent fog, and multiple periods of light rain and snow showers are typical. The wettest season is generally middle and late summer. Summer temperature during June, July, and August average 52.8 degree F. Winter temperatures during December, January, and February average 6.6 degree F. The mean annual precipitation is 18.4 inches based on a 38 year average between 1931 and 1969.

#### **3.3 Hydrology**

Runoff originating from the BIA site is directed radially away from the site (Figure 4). The BIA site is not susceptible to flooding and is beyond the flood plain of the Kuskokwim River and its tributaries.

The dominate surface water feature in the Bethel area is the Kuskokwim River. The river flows in a broad meandering pattern that has created an intricate network of sloughs, cutoffs, and ponds. Surface water resources at the site include ponds, streams and bogs.

#### **3.4 Surface Geology**

The Bethel BIA site is underlain by Quaternary silt deposits of the Yukon-Kuskokwim delta, which consists chiefly of light to dark gray silt and sandy silt containing abundant permafrost, organic muck, which become sandier with depth and locally contain pebbles and wood fragments. Organic material, including wood chips and bark, suggest that these are freshwater estuarine deposits. These deposits apparently thicken westward and at Bethel have a minimum thickness of 450 feet. The silt deposits may also include eolian and marine members in some areas. Silt



underlies much of the Yukon-Kuskokwim delta, where it forms a wide plain at a general altitude of 10-150 feet above sea level.

### **3.5 Soil**

Soils at the site and vicinity are considered unsuitable for agricultural production because of poor soil structure, poor soil drainage, frozen or near frozen conditions, and a relatively short growing season. On site soils may be acidic and have naturally high organic content, as is typical of arctic tundra soils. The tundra is generally treeless and is covered with about one foot of matted vegetation. According to United States Department of Agriculture Soil Conservation Service, the site is underlain by the Kuskokwim-Kwethluk complex. The complex is intertwined such that mapping them separately is not feasible. Permeability of both the Kuskokwim and the Kwethluk soils is slow ( $4.24 \times 10^{-5}$  to  $1.41 \times 10^{-4}$  cm/sec) and the erosion hazard is none to slight. In the field, the two soils can be identified by their differences in slope, vegetation, drainage, and texture. The Kuskokwim soils have a thick surface mat and a large proportion of sedges and sphagnum moss; the water table is generally near the surface, and the texture is silty in the upper part. The Kwethluk soils have a thin mat with polytrichum moss and low growing shrubs; the water table is several feet deep by mid-summer; and the texture is sandy throughout.

### **3.6 Critical Habitats and Endangered Species**

The BIA site is located within an area which provides suitable habitat to a wide range of birds and small game. According to USFWS, Alaska Division, there are no endangered or threatened species, and federally or state designated critical habitats or wilderness areas within one-mile radius of the BIA site. The Bethel area has not been mapped by the National Wetland Inventory.

## **4. FIELD INVESTIGATION**

### **4.1 General Information**

Field activities relied on data acquired and interpretation performed for the Preliminary Assessment (PA) in 1991. The site designations are the same as those of the PA. Soils sampling protocol followed the guidelines established with the Sampling and Analysis Plan (SAP) submitted for Alaska Department of Environmental Conservation (ADEC) review.

For spatial reference, a rectangular field grid system was developed where the northwest corner of the Bldg 413 served as the reference point. Distances were measured as north, south, east and west in feet from this reference point. Survey stakes were placed at key locations, with denser coverage near contamination sites.

### **4.2 Soils Sampling Protocol**

#### **4.2.1 Field Screening**

Field screening refers to the use of portable devices capable of detecting petroleum contaminants on a real time basis or by rapid field analytical technique. Field screening, utilizing the devices listed in the following subsection, were used to help assess the locations where contamination was most likely to be present in:

- Areas of suspected or obvious contamination
- Areas adjacent to the obvious contamination
- Excavation sidewalls
- One representative sample for at least every 100 square feet of excavation bottom

When possible, field screening samples were collected directly from the excavation or from excavation equipment's bucket. When the field screening was conducted only on equipment's bucket, then a minimum of one field screening sample was collected from each 10 cubic yards of excavated soil. When instruments or other observations indicated contamination, soil was separated into stockpiles based on apparent degrees of contamination. At minimum, soil suspected of contamination was segregated from soil which observations indicated was free of contamination.

#### **4.2.2 Field Screening Devices**

Field screening instruments for this project included Photo Ionization Detectors (PID), and Hanby Field Test Kits (HANBY). Both PID and the HANBY were approved methods of contaminant detection as outlined in the project-specific Quality Assurance Project Plan (QAPP) on file with the ADEC. However, PID was the most commonly used instrument in the field. The accuracy of the field screening device was verified throughout the sampling process through use of appropriate standards to match the use intended for the data.

PIDs can measure groups of volatile organic vapors in soil, using a headspace technique or in air. Limitations of the PID was that it may not accurately detect the presence of diesel range organics (DRO) or weathered gasoline range organics (GRO) contamination. The rationale for selecting the PID for field confirmation of the presence/absence of petroleum contamination included ease of operation and portability of the instrument.

The HANBY is a procedure for analysis of petroleum aromatic hydrocarbons over a wide range of concentrations in water and soil. The Hanby procedure provides a colorimetric indication of the presence of aromatic compounds (benzene, toluene, ethylbenzene and xylene (BTEX), gasoline, diesel, etc.). The HANBY was used to overcome the limitations of PID with DRO and weathered GRO. The limitations of the HANBY observed during this field study were: (i) a mixture of different compounds resulted in a color somewhere between the colors shown on the charts, thereby resulting in error in identification; (ii) the Hanby procedure was considerably slower relative to PID.

No previous study was done at this site comparing results of laboratory sample analyses, PID and Hanby Procedure. Results from this field investigation indicated that both PID and Hanby Procedure underestimated the GRO and the DRO. Both of these techniques overestimated BTEX. There was no definite advantage in using HANBY over PID in the delineation of POL contaminated soils at the BIA site.

#### 4.2.3 PID: Headspace Analytical Screening Procedure

The headspace screening procedure discussed below was used to obtain and analyze field screening samples with a PID.

- A clean resealable plastic bag was partially filled (one-third to one-half) with the sample to be analyzed. Total capacity of the bag was not less than eight ounces (approx. 350 ml).
- The resealable plastic bag was quickly sealed shut.
- Headspace vapors were allowed to develop in the container for at least 10 minutes but no longer than 1 hour. Containers were shaken or agitated for 15 seconds at the beginning and end of headspace development period to assist volatilization. The temperature of headspace was brought to at least 60 degree F (approximately 20 degree C). At minimum, samples will be warmed to at least 40 degree F (approximately 5 degree C). For warming up purposes automobile defroster was used mostly. Alternatively, portable electric heaters were used inside the BIA building.
- Subsequent to headspace development, the instrument sampling probe was inserted to a point about one-half the headspace depth. The container opening was minimized and care was taken to avoid uptake of water droplets and soil particulates.
- Following probe insertion, the highest meter reading was taken and recorded, which normally occurred between two and five seconds after probe insertion.
- All field screening results were documented in the field record or log book.

#### 4.2.4 HANBY: Soil Extraction Method

The following procedure was followed to test soil samples with a HANBY. A small work area was set up to run the HANBY procedure inside the BIA building near a window.

- During the use of the HANBY gloves and safety glasses were worn, fumes were avoided. The work area was kept clean and well ventilated.
- A beaker was placed on balance and was tared.
- Five grams of soil sample was quickly added to beaker.
- The extraction reagent containing within 10 ml ampoules was poured into beaker.
- The sample was chopped with a clean spatula until the soil was very small.
- The soil was stirred in extraction reagent for three minutes.
- The solvent was poured from the beaker into one of the screw top test tubes up to the black line on the tube.
- One catalyst vial was added to the tube. The cap was firmly screwed on the test tube. The tube was shaken well for two minutes.
- The color of the catalyst at the bottom of the tube was compared to photographs of standard results. The concentration and the type of the contaminant were documented in the field record or logbook.

#### 4.2.5 Collecting Soil Samples

The following procedures were used to collect laboratory soil samples:

- All laboratory soil samples were grab samples and were not composited prior to analysis.
- Soil samples taken directly from the surface of excavations were obtained from freshly uncovered soil. A minimum of six inches of soil was removed immediately prior to collection, and then the sample was obtained from the newly uncovered soil. When the excavation had been open for longer than one hour, then a minimum of 18 inches of soil was removed immediately prior to collection.
- Soil samples collected from excavation equipment buckets were obtained from the center of the bucket and away from the bucket sides; a minimum of six inches of soil was removed immediately prior to collection. When heavily contaminated soil was encountered the backhoe bucket was cleaned prior to moving into soil that was less impacted.
- Soil samples collected from a soil boring were collected using a Bobcat auger. Using an auger, the drill hole was advanced to the desired depth. After the auger was retrieved back out of the boring, the desired sample section was immediately removed from the auger. The sample container was quickly capped, sealed, and labeled.
- All samples were collected with disposable or clean tools that have been properly decontaminated.

- Disposable gloves were worn and changed between sample collections.
- Sample containers were filled quickly.
- Soil samples will be placed in containers in the order of volatilization sensitivity; i.e. Volatile Organic Analysis (VOA) vials will be taken first, gasoline range petroleum organics next, heavier range petroleum organics next, and soil classification samples last.
- Containers were quickly and adequately sealed. Rims were cleaned prior to tightening lids.
- Sample containers were labeled as required.
- Containers were immediately preserved according to procedures in section 4.1.13 (sample containers). The samples were immediately cooled to 4 degree C and this temperature was maintained through delivery to laboratory and analysis.

When groundwater was encountered while soil sampling, the provisions of 18 AAC 78.090(d)(3) was followed concerning sampling.

#### 4.2.6 Decontamination of Field Equipment

Decontamination of personnel, sampling equipment, and containers prior to and after sampling was used to ensure collection of representative samples and to prevent the potential spread of contamination. Decontamination of personnel prevents ingestion and absorption of contaminants and was done with a soap and water wash and water rinse.

All previously used sampling equipment was previously decontaminated before sampling and between sampling locations to prevent introduction of contamination into uncontaminated samples and avoid cross contamination of samples.

Clean, solvent resistant, rubber gloves, and appropriate protective equipment were worn by individuals decontaminating tools and equipment.

#### 4.2.7 Decontamination of Soil Sampling Tools

At a minimum, soil sampling tools were cleaned and decontaminated by the following two-step procedure:

- Tool was scrubbed with a stiff brush in a solution of hot water and laboratory solution (such as Alconox or similar product).
- Tool was thoroughly rinsed with deionized water.

#### 4.2.8 Decontamination of Excavation Equipment

Excavation equipment was cleaned with a pressure washer before each site excavation began.

#### 4.2.9 Cleaning Sample Containers

Sample containers were cleaned and prepared by an analytical laboratory. The exterior of sample containers were wiped after the samples were collected and the container lids were tightly sealed. Solvents were not used for this procedure because of the potential to contaminate the sample.

#### 4.2.10 Disposal of Wash Water, Rinsate, Disposable Sample Tools

Wash water and rinsate solutions were collected in appropriate containers and were disposed of properly in accordance with federal, state, and local regulations. Disposable sampling tools were properly discarded after use.

#### 4.2.11 Sample Containers and Holding Conditions

Containers used to collect samples were chosen based on their suitability for the analyte of interest. Preservation methods and maximum conditions are based on U.S. Environmental Protection Agency (USEPA) and laboratory consensus.

#### 4.2.12 Sample Containers

The containers were amber glass jars with teflon lined lids. Sample jars were in accordance with the acceptable type of material, size, and type of lid are shown in Table 1. Use of sample containers conformed to these specifications. Also shown in this table are the preservation methods and maximum holding times for each analyte of interest.

All sample containers were inspected before transit to the site to ensure that they had undamaged lids and were tightly sealed. Jars were placed into containers that were secured to prevent damage or tampering in transit to the site. Containers and lids were re-inspected at the job site.

#### 4.2.13 Labeling Containers

Indelible/waterproof ink was used to write on sample labels which were securely fastened to the container. All information entered onto the label or container was also duplicated into the field record or log book and chain of custody form. Information on the containers or labels included:

- Unique identifying number assigned to the sample for laboratory analysis
- Date and time of collection
- Name of person collecting the sample
- The intended laboratory analysis(es) for the sample
- Project name and location of sample

#### 4.2.14 Holding Times

Sample handling, transport, and analysis was arranged so that the recommended maximum holding times established by USEPA and other laboratories, shown in Table 1, were not exceeded. Also, most volatile compounds were extracted and analyzed as quickly as practical after collection.

#### 4.2.15 Holding Conditions and Methods of Preservation

All samples were immediately cooled and maintained at 4 degree C through delivery to the laboratory and subsequent analysis to minimize biodegradation and volatilization.

#### 4.2.16 Chain of Custody

A Chain of custody consisting of a document that physically accompanied the sample jars, and which provided the name of each individual that had been assigned control of the sample and the period covered by the individual's assignment was used.

The Chain of custody for each final verification sample will be retained by the laboratory receiving the samples for a period of two years following the date of receipt in the laboratory.

The laboratory receiving samples will process the samples via control procedures documented in their QA/QC plans and standard operating procedures (SOP).

#### 4.2.17 Field Screening Procedures

Use of field screening analyses with PIDs and HANBY followed the relevant procedures outlined previously.

#### 4.2.18 Calibration and Maintenance of Field Instruments

To assure that field instruments were properly calibrated and remain operable in the field, the following procedures were used:

- PID instruments were calibrated before each testing session. For volatile and unknown potential contaminants, these instruments were calibrated to yield total organic vapors in parts per million (v/v) to a benzene equivalent. PIDs were operated with a 10.2 eV (+/-) lamp source. If the potential contaminant is known to be a diesel or heavier range petroleum hydrocarbon and the instrument's operation manual recommends different span settings, calibration gases, or lamp sources, then the recommended modifications were followed.
- Operation, maintenance, and calibration were performed in accordance with the instrument manufacturer's specifications.
- All standards used to calibrate field instruments met the requirements for source and purity recommended in the equipment's operation manual.
- Acceptance criteria for calibration was within the limits set in the operations manual.
- The dates, times and results of all calibrations and repairs to field instruments were recorded in the field record and in the instrument's log.
- In order to avoid and/or minimize breakdown of instruments in the field, the following procedures were followed:
  - All users of the instrument were trained in the proper calibration and operation of the instrument and were required to read the operation manual prior to initial use.
  - All users of the instrument were trained in routine maintenance, including battery and lamp replacement, lamp and sensor cleaning, and battery charging.
  - Each instrument's operation and maintenance manual was brought to the site.

- Field instruments were calibrated and inspected prior to departure for the site. Instrument battery charge was inspected far enough ahead of time to bring the instrument up to full charge prior to departure for the site.
- Extra batteries and lamps (if applicable) were readily available.

HANBY was a disposable unit and did not require any maintenance.



*Table 1 Sample Containers and Holding Conditions*

Parameter	Matrix (Soil or Liquid/water)	Method <sup>a</sup> (Extraction/ Analysis)	Volume of Container	Container Description	Preservation of sample Cool < 4°C	Maximum holding Time
Diesel Range Petroleum Hydrocarbons	Soil	3540/8100M <sup>b</sup> 3550/8100M <sup>b</sup>	50 g or 4-8 oz	Glass w/TLC		14 days to extract/ 40 days to analysis
	Liquid	3510/8100M <sup>b</sup> 3500/8100M <sup>b</sup>	1 liter	Glass w/TLC		14 days to extract/ 40 days to analysis
Gasoline Range Petroleum Hydrocarbons	Soil	5030/8015M <sup>c</sup>	50 g or 4 oz	Glass w/TLC		Extract ASAP/ 14 days to analysis
	Liquid	5030/8015M <sup>c</sup>	40 mL	Glass VOA vial with TLS	HCl to < 2 pH	Extract ASAP/ 14 days to analysis
Total Range Petroleum Hydrocarbons	Soil	3540/418.1 <sup>d</sup> 3550/418.1 <sup>d</sup>	50 g or 4-8 oz	Glass w/TLC		14 days to extract/ 40 days to analysis
	Liquid	/418.1	1 liter	Glass w/TLC	H <sub>2</sub> SO <sub>4</sub> to < 2 pH	14 days to extract/ 40 days to analysis
Total BTEX	Soil	5030/8020 5030/8240	10 g or 4 oz	Glass w/TLC		Extract ASAP/ 14 days to analysis
	Liquid	5030/602	40 mL	Glass VOA vial with TLS	HCl to < 2 pH	Extract ASAP/ 14 days to analysis
Volatile Chlorinated Solvents	Soil	5030/8010 8240	50 g or 4-8 oz	Glass jar w/TLC		14 days to extract/ 40 days to analysis
	Liquid	5030/601	40 mL	Glass VOA vial with TLS	H <sub>2</sub> SO <sub>4</sub> to < 2 pH	Extract ASAP/ 14 days to analysis
PCBs	Soil	3550/8080	50 g or 4-8 oz	Glass w/TLC		Extract ASAP/ 14 days to analysis
	Liquid	3550/8080	1 liter	Glass w/TLC		14 days to extract/ 40 days to analysis
<b>Leachable Metals</b>						
Arsenic	Soil	3050/7060	10g or 4-8 oz	Glass w/TLC		6 months
	Liquid	3020/7060	100 mL - 1 L	Glass, Plastic	HNO <sub>3</sub> to < 2 pH	6 months
Cadmium	Soil	3050/6010	10g or 4-8 oz	Glass w/TLC		6 months
	Liquid	3010/6010	100 mL - 1 L	Glass, Plastic	HNO <sub>3</sub> to < 2 pH	6 months
Chromium	Soil	3050/6010	10g or 4-8 oz	Glass w/TLC		6 months
	Liquid	3010/6010	100 mL - 1 L	Glass, Plastic	HNO <sub>3</sub> to < 2 pH	6 months
Lead	Soil	3050/7421	10g or 4-8 oz	Glass w/TLC		6 months
	Liquid	3020/7421	100 mL - 1 L	Glass, Plastic	HNO <sub>3</sub> < 2 pH	6 months

Legend: BTEX = Benzene, Toluene, Ethylbenzene, Xylene; PCBs = Polychlorinated Biphenyls  
TLC = Teflon coated lid; TLS = Teflon lined septum cap; ASAP = as soon as possible after collection to minimize volatilization; Maximum holding time is from date of sample collection; All glass containers are glass jars unless otherwise noted.

<sup>a</sup> Unless otherwise noted, all extraction and analytical methods refer to those contained in: US Environmental Protection Agency, Methods for Chemical Analysis for Water & Wastes, EPA 600/4-79-020, revised March, 1983, Environmental Monitoring and Support Laboratory, Cincinnati, OH 45268. The American Petroleum Institute/EPA 1992 consensus methods may also be used for diesel and gasoline range petroleum hydrocarbons; method available from ADEC Laboratory, 10107 Brentwood Place, Juneau, AK 99801, 907-790-2169.

<sup>b</sup> EPA Method 8100 modified. Modification of method measures diesel range organics in the C<sub>10</sub> - C<sub>28</sub> range using a solvent extraction (methylenechloride, Freon 113) with gas chromatography analysis with a flame ionization detector (FID) or FID with an in-line photo ionization detector (PID).

<sup>c</sup> EPA Method 8015 modified. Modification of method measures gasoline range organics in the C<sub>6</sub> - C<sub>10</sub> alkane range using a purge and trap gaschromatography procedure with a flame ionization detector (FID) or FID with photoionization detector in series.

<sup>d</sup> EPA Method 418.1, modified for soil samples where soil is analyzed (see EPA reference in footnote a).

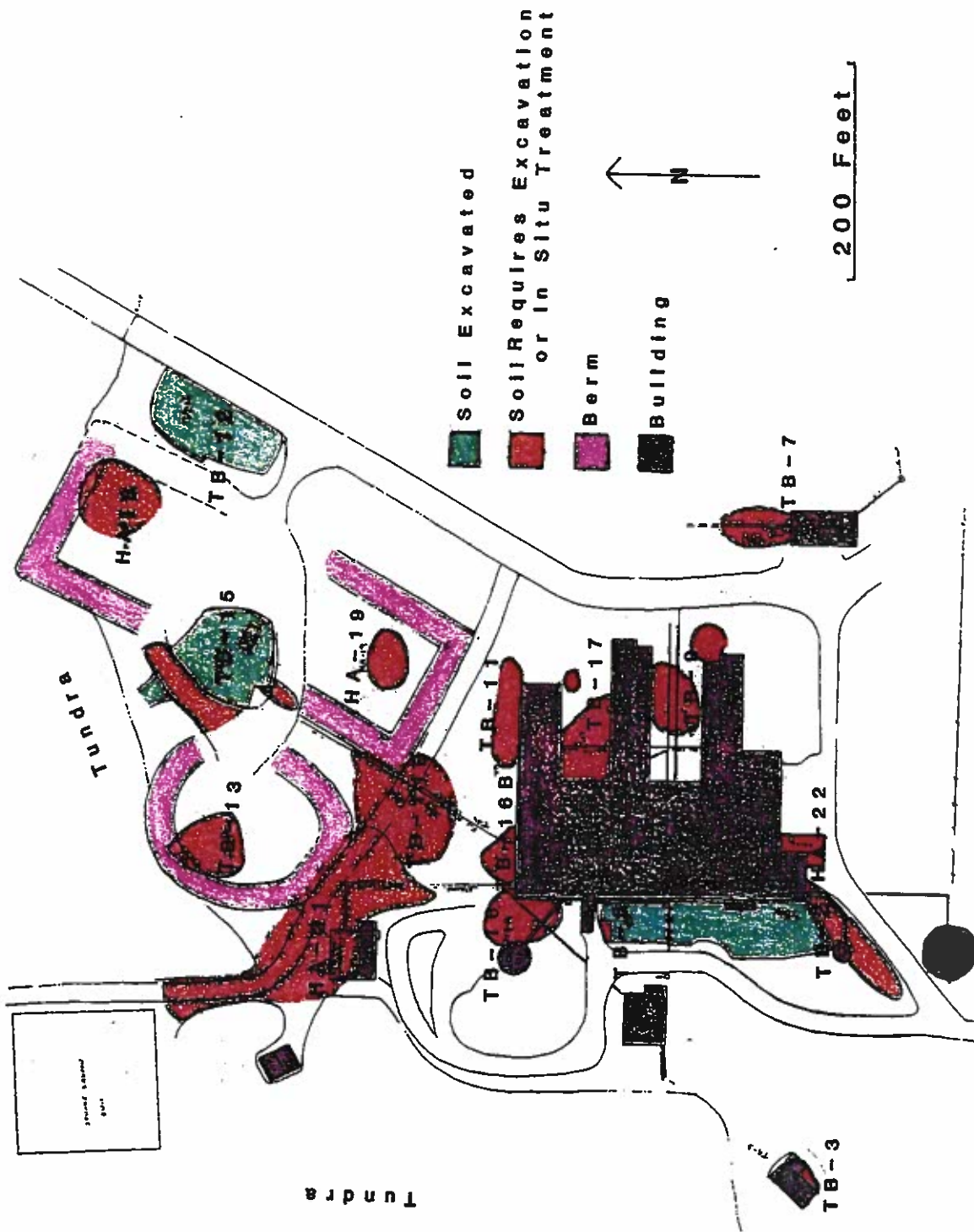


Figure 5 Contaminated soil outline at the BIA site, Bethel, Alaska (October, 1994). The outlines for the soil requires excavation were delineated with field screening data acquired at every 20 ft from 3 ft depth. PID data values are listed in Table 20, data locations are in Figure 18, and the contaminated soil volumes are illustrated in Table 19.

### 4.3 TB-12 Site

#### 4.3.1 Site Description

TB-12 site was located to the west of the BIA road near the site entrance gate (Figures 5 and 6). To the west there was a 400,000 gallon tank, and to the south there was an access road leading to the fuel pump house. To the north is rolling tundra that slopes to the north.

A 34,000 gallon aboveground gasoline tank was located at this site. This was the only gasoline tank in the site. Unlined earthen berms were found to the south, west, and north of the tank. Surface water runoff from this site flowed to the north.

#### 4.3.2 Previous Investigative Work

The 11th Civil Engineering Operations Squadron conducted a field investigation during August through December of 1991 to help in defining areas of hazardous contamination. Fuel stained soils and a strong odor were evident at this site. Test Boring 12 (TB-12) was drilled to a depth of 13 feet and three samples were collected. Ground water was reported at 11 feet and the permafrost was at 12 feet. Laboratory samples shallower than 10 feet showed contamination (Table 2).

*Table 2 Laboratory analyses results for the samples collected from TB-12 during PA.*

Sample Number	Depth FT	Field Screen	BTEX	Benzene	DRO	Comment
		PID PPM	PPM	PPM	PPM	
420099180022	2	482	1041.00	ND	ND	TCLP metals were within regulatory limit
420099180023	5	225	346.00	ND		
420099180024	10	42	0.74	ND		

BTEX = Benzene, Toluene, Ethylbenzene and Xylene

DRO = Diesel Range Organics

ND = None detected at or above the method reporting limit for the sample

PID = Photo Ionization Detector

PPM = Parts per million

#### 4.3.3 Soil Excavation and Removal

The scope of work originally planned for this site was based on data obtained during PA. Calculations from these data indicated excavation operations should involve approximately 131 cubic yards. This estimate was reasonably accurate since the PA did not include the lateral migration along the peat layer which was unknown at the time. Actual volume of soil removed from this site in 1994, was approximately 1,359 cubic yards.

Contaminated soil removal operations were generally performed in the following manner:

- a. Explored Perimeter:
  - To delineate the areal extent of surface contamination, test pits were excavated with a backhoe, organic vapor concentrations were screened with a PID
  - Based on PID readings a map of surface contamination was prepared
- b. Excavated Identified Contaminated Soil:
  - Soil identified by PID as contaminated, greater than 10 ppm, was excavated by backhoe
  - Soil was screened as dump truck was loaded, every 5-10 yards
- c. Sample and Field Assessment:
  - Contaminated soil was sampled (stockpile) for laboratory analyses every 50 cubic yards
  - When PID readings indicated a clean sidewall or bottom, a confirmation sample was taken, usually one in every 250 square feet, for laboratory analyses
- d. Contaminated soil was transported to containment cells.

Excavation began at the most contaminated surface location, at the center part of the tank site, and was extended outward until clean sidewalls were reached to the north, west and south. The highest PID readings and the strongest POL odor were found in the subsurface immediately beneath the tank location. As the excavation extended deeper, the contamination was found segregated into two zones: one to the northeast and the other to the southwest, separated by an impermeable barrier of shallow permafrost. The southwest zone was directly underneath the tank nozzle whereas the northeastern zone was along the downgrading migration pathway of POL. Away from the tank location the shallower 1-2 feet of soil was minimally contaminated while soils at deeper levels were more contaminated, indicating both vertical and lateral migration of the contaminants. The excavation extended down to a depth of 8 feet to the south and 7 feet to the north. Ground water was encountered at 6 feet to the south and 7 feet to the north. The permafrost was encountered approximately 1 foot below the groundwater table.

The vertical succession of soils was grouped into two units separated by a 12-18 inches thick peat layer. The near surface unit was gray to light brown colored, friable, porous, medium to fine grained sand. The soil beneath the peat layer was hard, compact, silt to silty clay. The peat layer was highly porous and permeable, recorded mostly high PID readings, and appeared to have played an important role in the lateral migration of POL. The peat layer had a gradient to the north and graded into the present-day vegetation of tundra. The peat layer represented the tundra vegetation before the site was developed in 1957. The tundra vegetation to the north was presumed not to be contaminated as the northern excavation sidewall was clean and the confirmation samples on that side were also clean. The soil overlying the peat layer was brought in from a nearby borrow pit to level off the ground surface. The soil underlying the peat layer was

*in situ*. This fine grained soil unit and the underlying permafrost acted as a vertical barrier to the POL migration.

The sidewall along the BIA road (east wall) remained contaminated. Laboratory samples from the other side of the BIA road (to the east) showed the presence of POL contamination. Excavation along the BIA road sidewall was stopped because any additional excavation would threaten the integrity the road prism (120 feet). Considering the BIA road as the property boundary it was beyond the scope of the work plan.

#### 4.3.4 Summary of TB-12 Site

Table 3 is a summary of the complete laboratory analyses for the TB-12 site. Figures 7 and 8 are two cross-sections across the site. No additional soil removal was necessary. The excavation pit was backfilled with clean soil.

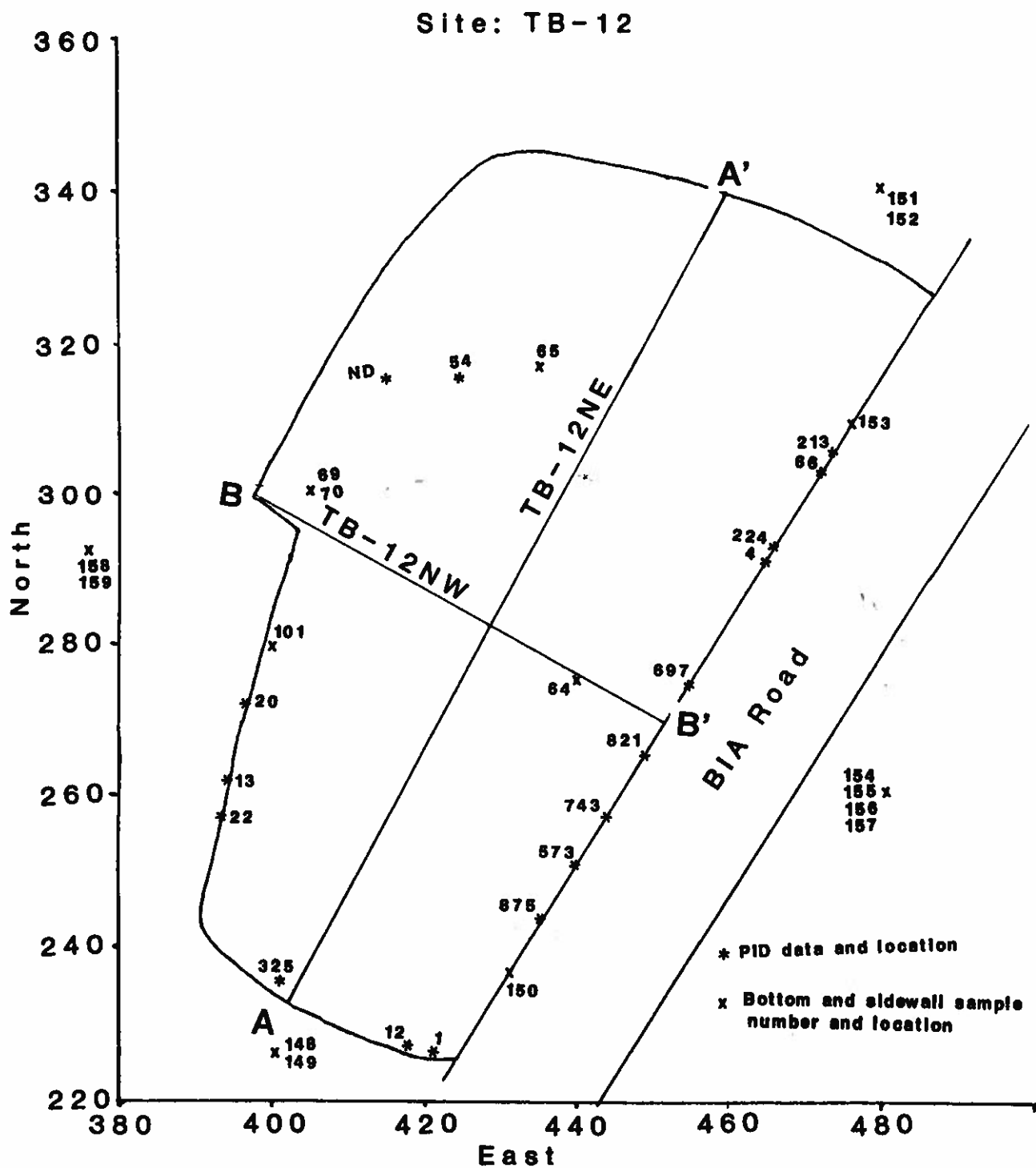


Figure 6 Location map for Site: TB-12. The map co-ordinates are in feet and are relative to the northwest corner of the Building 413. TB-12NW and TB-12NE are the two cross-section locations. A gasoline tank was located at the center of the site. The site area is 6400 sq ft; 1359 cubic yards of contaminated soil was removed in 1994. Field screening and laboratory sample analyses indicated that the soil underlying the BIA Road and the soil immediate southeast of the road were contaminated with POL. Bottom and sidewall sample and PID data location, and PID data values are also shown. Sample results are in Table 3.

SW

TB-12NE

NE

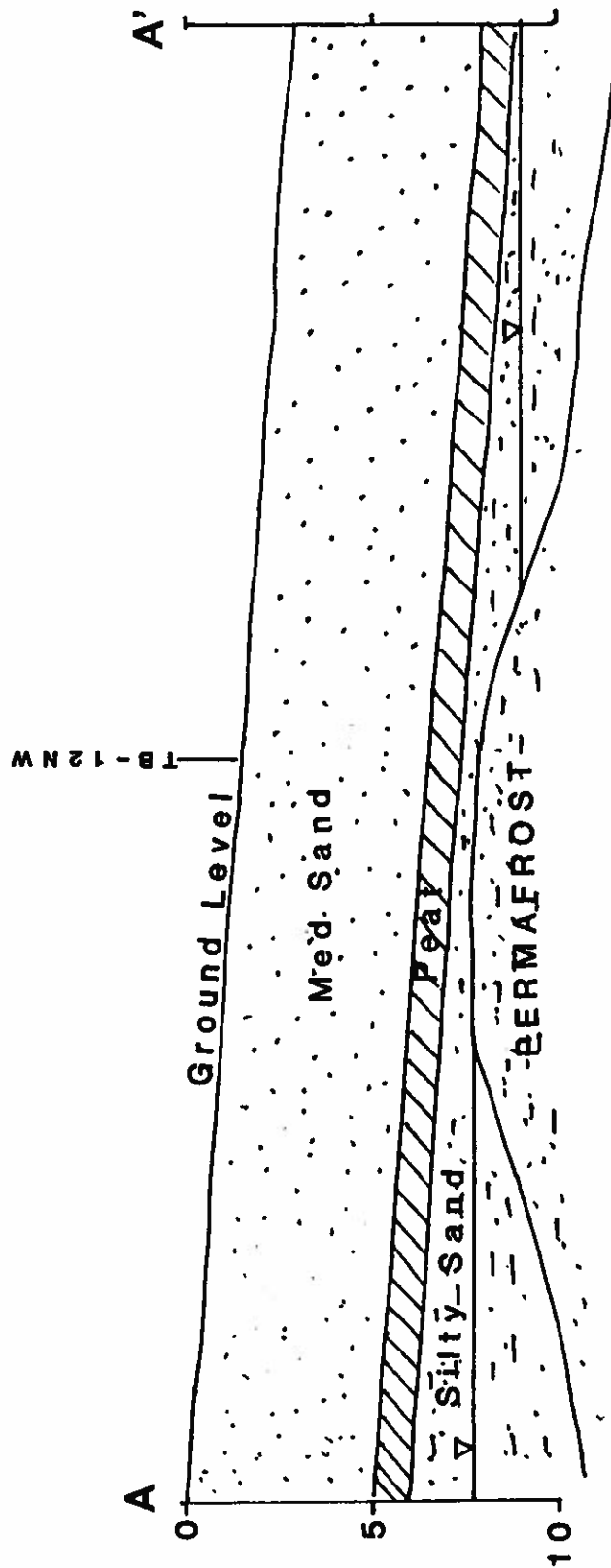


Figure 7 Northeast-Southwest cross-section across TB-12 contaminated site.  
The section location is shown in Figure 6.

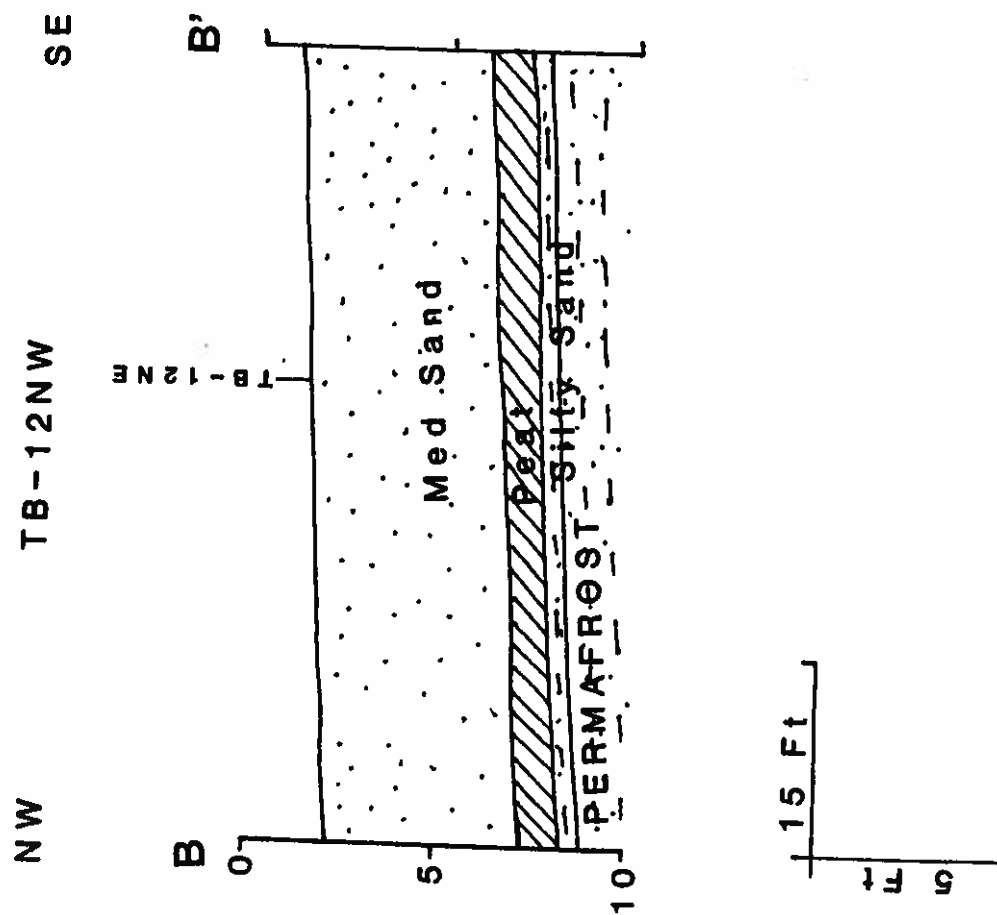


Figure 8 Northwest-Southeast cross-section across TB-12 contaminated site. The section location is shown in Figure 6.



Table 3 Laboratory analyses results of samples collected from TB-12 site during this field season, summer, 1994. Bottom and sidewall sample locations are shown in Figure 6.

Sample Number	Coordinates			Sample Location relative to the Excavation Pit				Field Screen		Solids %	GRO PPM	BTEX PPM	Benzene PPM	Lead PPM
	N-S		Depth FT	Stockpile		Bottom	Sidewall	PID PPM	Hanby PPM					
	FT	FT		FT	FT									
340009480048	315N	425E	3	X				670	500	86.6	2900	124.00	ND	10.8
340009480049	315N	435E	3	X				366		88.2	ND	ND	ND	9.1
340009480050	315N	445E	3	X				957	100	85.6	22	2.79	ND	5.7
340009480051	305N	425E	3	X				725		89.5	325	7.64	ND	8.2
340009480052	305N	435E	3	X				5028	200	87.8	610	15.03	ND	8.2
340009480053	305N	445E	3	X				1266		88.4	6800	1790.00	10	40.1
340009480054	295N	425E	3	X				593	1000	88.3	2200	387.00	ND	9.2
340009480055	295N	435E	3	X				831		88.2	2200	281.70	ND	11.2
340009480056	295N	445E	3	X				1021	1000	89.7	7500	797.00	ND	12.8
340009480057	285N	425E	3	X				529		87.1	540	15.12	ND	11.3
340009480058	285N	435E	3	X				477	120	88.8	1200	25.31	ND	5.8
340009480059	285N	445E	3	X				1208		89.8	2500	207.00	ND	14.5
340009480060	275N	425E	3	X				751	10	87.9	113	2.32	ND	6.2
340009480061	275N	425E	3	X				751	10	88.9	129	2.69	ND	10.4
340009480062	275N	435E	3	X				835		86.7	450	9.47	ND	18.8
340009480063										0.0	ND	ND	ND	
340009480064	275N	440E	7	X				127		85.8	ND	2.11	ND	4.5
340009480065	316N	435E	7	X				407		85.3	ND	0.43	ND	3.5
340009480066	240N	425E	4	X				101		84.9	ND	0.34	ND	2.9
340009480067	290N	420E	5	X				339		57.8	40	12.81	ND	1.5
340009480068	290N	392E	4	X				153		31.2	182	11.55	ND	2.7
340009480069	300N	405E	5	X				30		34.9	12	0.78	ND	1.8
340009480070	300N	405E	5	X				30		36.0	21	0.79	ND	ND
340009480101	280N	400E	8	X				13		86.1	ND	0.07	0.07	6.2
340009480148	226N	400E	4					29		85.0	ND	ND	ND	3
340009480149	226N	400E	5					67		19.0	19	6.56	ND	6
340009480150	236N	430E	2					11	ND	87.5	ND	ND	ND	5
340009480151	340N	480E	5					49		85.5	ND	ND	ND	4
340009480152	340N	480E	6					93	ND	30.4	48	14.64	5.83	2
340009480153	308N	476E	2					4	ND	89.1	ND	ND	ND	3
340009480154	26N	480E	3					401		27.0	1000	164.8	0.8	19

Table 3 (Continued)

Sample Number	Coordinates			Sample Location relative to the Excavation Pit			Field Screen		Solids	GRO	BTEX	Benzene	Lead	
	N-S	E-W					PID	Hanby						
		FT	FT	Depth	Stockpile	Bottom			Sidewall	PPM	PPM	%	PPM	PPM
	340009480155	26N	480E	4				X	21	10	83.8	ND	ND	ND
340009480156	26N	480E	4				X	13	ND	83.2	ND	ND	ND	3
340009480157	26N	480E	1				X	472	100	83.3	120	6.84	ND	3
340009480158	292N	376E	3				X	10	10	83.2	ND	ND	ND	3
340009480159	292N	376E	4				X	7		53.9	ND	ND	ND	3

BTEX = Benzene, Toluene, Ethylbenzene and Xylene

DRO = Diesel Range Organics

GRO = Gasoline Range Organics

ND = None detected at or above the method reporting limit for the sample

PID = Photo Ionization Detector

PPM = Parts per million

#### 4.4 TB-15 Site

##### 4.4.1 Site Description

TB-15 site was located at the fuel transfer station located near the center of the three large 400,000 gallon tanks (Figures 5 and 9). Northwest was the downgrading side which merged into the rolling tundra. There was an access road from the BIA road to the fuel transfer station.

Four 2-inch fuel transfer lines converged and entered the station to the west. Tanker trucks filled and transferred fuel to the east of the station. No spill containment structures were present.

##### 4.4.2 Previous Investigative Work

The 11th Civil Engineering Operations Squadron conducted a field investigation during August through December of 1991 to help in defining areas of hazardous contamination. The investigation reported POL staining and strong fuel odor on the west side of the station. Heavy fuel staining was reported also from the east side of the station.

TB-15 was drilled to a depth of 5 feet and 2 samples were collected (Table 4). No groundwater was encountered.

*Table 4 Laboratory analyses results for the samples collected from TB-15 during PA. Both the samples were contaminated at levels higher than the ADEC clean up level.*

Sample Number		Field Screen	BTEX	Benzene	DRO	Comment
	Depth FT	PID PPM	PPM	PPM	PPM	
420099180029	2	144	105.13	0.13	24000	
420099180030	5	197	38.90	ND		

BTEX = Benzene, Toluene, Ethylbenzene and Xylene

DRO = Diesel Range Organics

ND = None detected at or above the method reporting limit for the sample

PID = Photo Ionization Detector

PPM = Parts per million

##### 4.4.3 Soil Excavation and Removal

The scope of work originally planned for this site was based on data obtained during PA. Calculations from these data indicated excavation operations should involve approximately 220 cubic yards. This estimate was reasonably accurate since the PA did not include the lateral migration along the peat layer which was unknown at the time. Actual volume of soil removed from this site in 1994, was approximately 3,105 cubic yards. Contaminated soil removal operations followed the same manner previously described for the TB-12 site in 4.3.3.

Excavation began near the location of fuel transfer building and was extended outward until clean sidewalls were reached. As the excavation progressed it was evident that the most of the contaminated soils extended to the northwest. The contaminant plumes migrated vertically down to the peat layer and then downgradient. The highest PID readings and the strongest POL odor were found in the subsurface beneath the station. The ground water was encountered at 9 feet to the southeast and at 5 feet to the northwest. The permafrost usually occurred approximately 1 foot below the groundwater table. Excavation stopped at the water table. The excavation pit extended down to a depth of 10 feet to the southeast and 5 feet to the northwest.

As in the TB-12 site, the vertical succession of soils was grouped into two units separated by a 12-18 inches thick peat layer. The near surface unit was gray to light brown colored, friable, porous, medium to fine grained sand. The soil beneath the peat layer was hard, compact, silt to silty clay. The peat layer was highly porous and permeable, recorded mostly high PID readings, and appeared to have played an important role in the lateral migration of POL. The peat layer had a gradient to the northwest and graded into the present-day vegetation of tundra. The peat layer represented the tundra vegetation before the site was developed in 1957. The soil overlying the peat layer was brought in from a nearby borrow pit to level off the ground surface. The soil underlying the peat layer was *in situ*. This fine grained soil unit and the underlying permafrost acted as a vertical barrier to the POL migration.

Limitations of time and resources did not allow the complete removal all the contaminated soils from this site. The contaminated soils remained at the southwest corner and along a northeast-southwest extending swath to the northwest of the site. The excavation pit was backfilled with clean soil and the boundaries of contaminated and clean soil were marked with stakes for future investigations.

#### 4.4.4 Summary of TB-15 Site

Table 5 is a summary of the complete laboratory analyses for the TB-15 site. Figure 9 shows the location map for the TB-15 site while Figures 10 and 11 illustrate the shallow subsurface geology.

Table 5 Complete Laboratory analyses of samples for TB-15 site (the Fuel Pumphouse)

Sample Number	Coordinates			Sample Location relative to Excavation Pit			Field Screen		Solids	DRO
	N-S	E-W	Depth	Stockpile	Bottom	Sidewall	PID	Hanby	%	PPM
	FT	FT	FT				PPM	PPM		
340009480071	285N	225E	2	X			559		87.4	6230
340009480072	295N	230E	6	X			255		79.6	380
340009480073	302N	225E	3	X			337		86.2	100
340009480075	286N	185E	5	X					84.3	12000
340009480076	288N	205E	6	X			499		90.9	17000
340009480077	285N	217E	4	X			349		93.3	880
340009480078	285N	270E	3	X			293		89.6	5960
340009480079	300N	225E	3	X			63		91.1	93
340009480080	300N	225E	3	X			63		91.0	31
340009480081	316N	200E	5	X			407		84.7	13000
340009480082	300N	227E	7	X			446		84.6	2950
340009480083	315N	231E	5	X			145		81.7	256
340009480084	305N	248E	7	X			53		84.1	60
340009480085	325N	190E	5	X			403		92.9	29000
340009480086	326N	225E	3	X			283		92.5	90
340009480087	312N	235E	7	X			515		86.7	10000
340009480088	313N	175E	3	X			342		90.5	4280
340009480089	310N	170E	2	X			523		89.0	4460
340009480090	316N	178E	2	X			681		87.8	4880
340009480091	324N	198E	2	X			568		80.8	4390
340009480092	332N	223E	2	X			12		92.3	82
340009480093	264N	220E	3	X			6		90.7	36
340009480094	264N	220E	3	X			6		92.7	33
340009480095	260N	246E	3	X			428		90.3	13000
340009480096	254N	248E	3	X			681		84.5	5570
340009480097	240N	244E	6	X			358		56.8	3230
340009480098	238N	246E	4	X			315		87.9	62
340009480099	235N	250E	5	X			5		85.6	26
340009480100	233N	256E	5	X			4		89.5	21
340009480103	266N	258E	5	X			43		85.4	47
340009480104	280N	264E	5	X			2		88.9	75
340009480105	230N	222E	4	X			756		88.0	39
340009480106	230N	220E	5	X			530		85.4	9000
340009480107	231N	219E	6	X			427		85.1	330
340009480108	230N	229E	6	X			3		82.9	41
340009480109	304N	242E	6	X			1		89.1	102
340009480110	308N	242E	6	X	X		9		84.4	52
340009480111	256N	208E	4	X			2		91.1	36
340009480112	256N	208E	4	X			2		90.1	74
340009480113	250N	206E	4	X			4		84.8	54
340009480114	235N	208E	5	X			566		86.8	15000
340009480115	236N	212E	6	X			582		89.2	5930
340009480116	238N	192E	8	X			57	1	81.2	12
340009480117	242N	190E	6	X			560		86.5	84
340009480118	258N	192E	4	X			23		87.5	66
340009480119	252N	188E	4	X			4		86.4	36

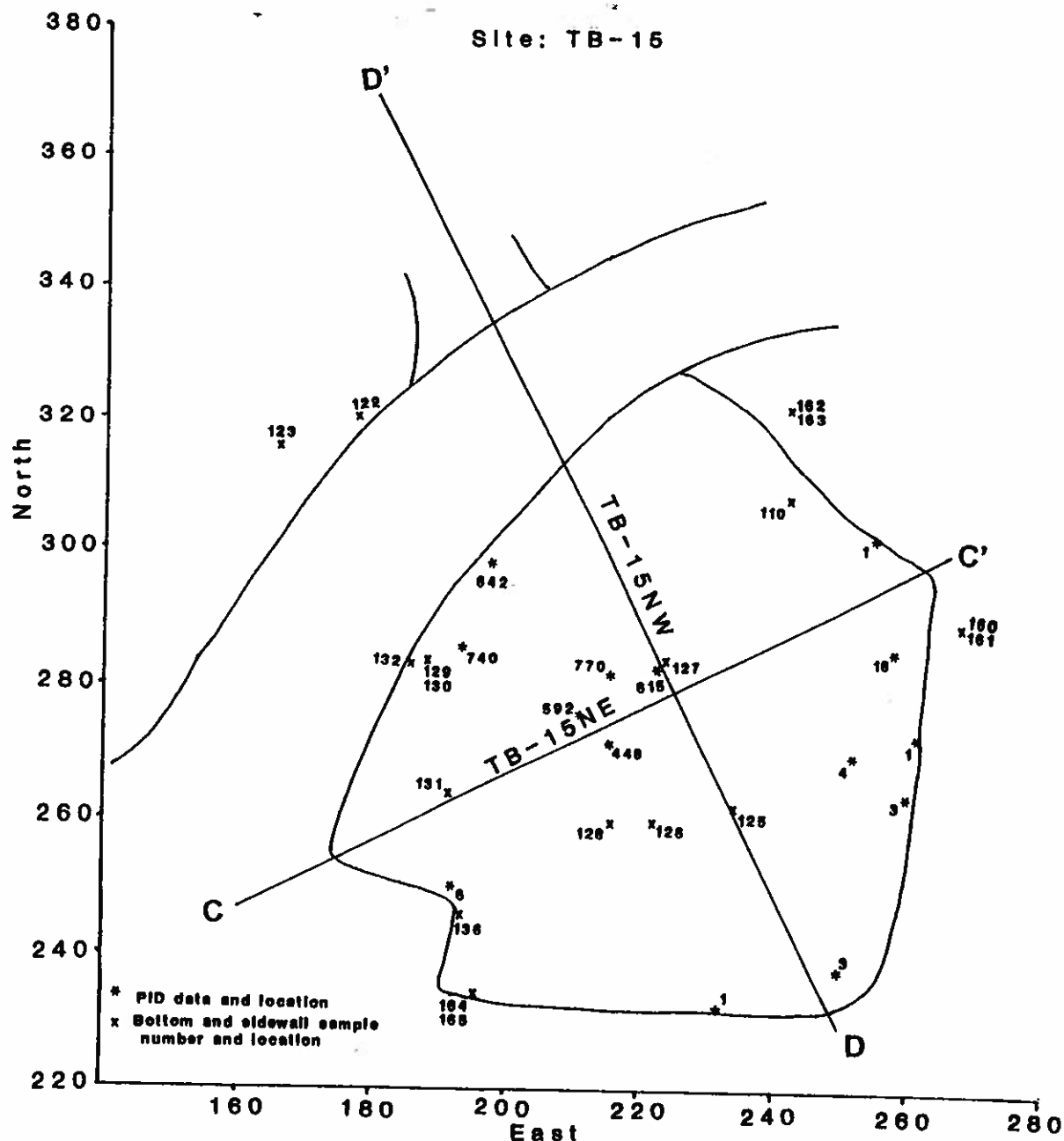


Figure 9 Location map for Site: TB-15. The map co-ordinates are in feet and are relative to the northwest corner of the Bldg 413. TB-15NW and TB-15NE are the two cross-section locations. The fuel pump house for the three large tanks (HA-18, HA-19 and TB-13) was located at the southeast corner of the site. Most of the fuel migrated to the northwest from the pump house. The site area is 10,400 sq ft; 3,105 cubic yards of contaminated soil was removed in 1994, while another 500 cubic yards of soil remain in place. Bottom and sidewall sample and PID data locations, and PID data values are also shown. Sample results are in Table 5.

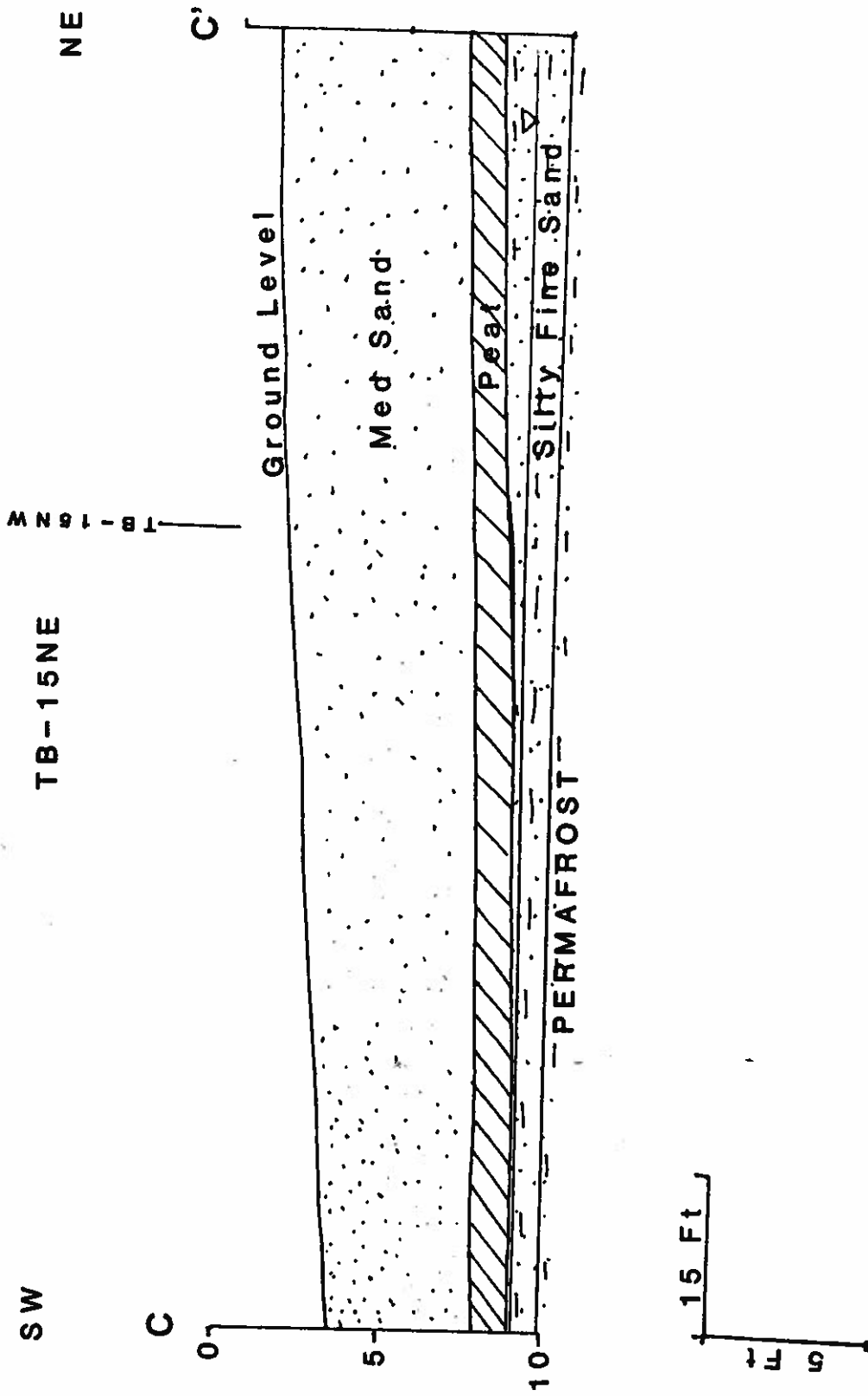


Figure 10 Northwest-Southeast cross-section across TB-15 contaminated site. The location of the section is shown in Figure 9.

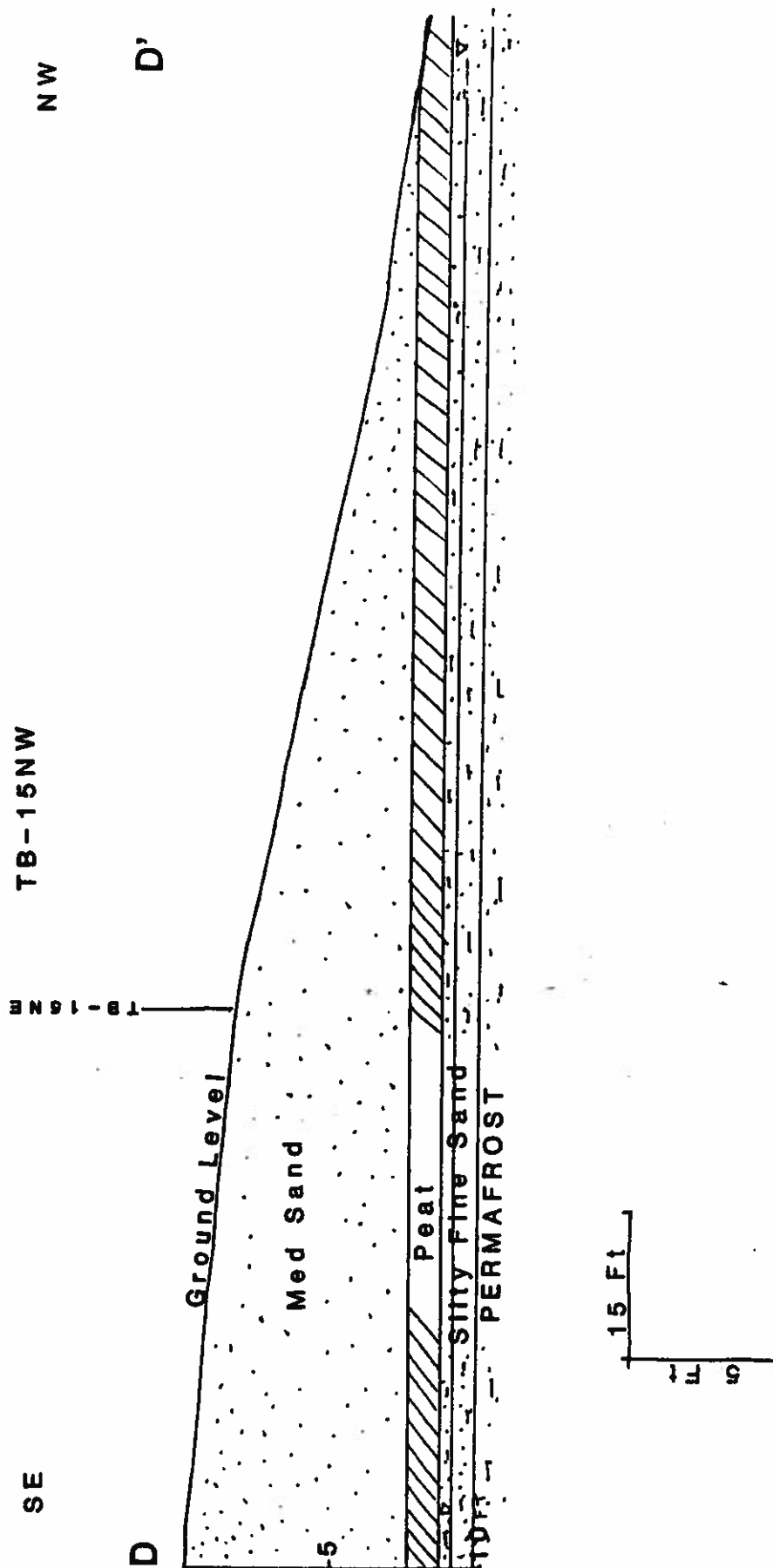


Figure 11 Northeast-Southwest cross-section across TB-15 contaminated site. The location of the section is shown in Figure 9.



## 4.5 TB-2 Site

### 4.5.1 Site Description

TB-2 site was located adjacent to the BIA building at the south-west corner (Figures 5 and 12). This site includes both TB-2 and TB-4 sites of the PA study. There were access roads both to the west and to the south of the site.

The site was the location of a fuel pumphouse, 1-10,000 gallon, and 3-300 gallon day tanks. Fuel pipe lines extended along the west face of the building. No containment structures were found for these tanks. Surface water run-off from this site flowed to the north.

### 4.5.2 Previous Investigative Work

The 11th Civil Engineering Operations Squadron conducted a field investigation during August through December of 1991 at this site. TB-2 and TB-4 were drilled at this site. TB-2 was drilled to 5.0 feet, 2 samples were collected, and no groundwater was encountered. TB-4 was drilled to 16.5 feet, 4 samples were collected, ground water was encountered at 11 feet and permafrost was at 14.0 feet depth.

*Table 6 Laboratory analyses results for the samples collected from TBs 2 and 4 drilled in 1991.*

Test Boring	Sample Number	Depth	Field Screen	BTEX	Benzene	DRO	TPH
		FT	PID PPM	PPM	PPM	PPM	PPM
TB-2	420099180002	2	9	0.15	ND		
TB-2	420099180003	5	13				140
TB-4	420099180006	2	480	6.59	ND	4300	
TB-4	420099180007	5	177	ND	ND		
TB-4	420099180008	10	35				97
TB-4	420099180009	15	0				ND

BTEX = Benzene, Toluene, Ethylbenzene and Xylene

DRO = Diesel Range Organics

ND = None detected at or above the method reporting limit for the sample

PID = Photo Ionization Detector

PPM = Parts per million

TPH = Total Recoverable Petroleum Hydrocarbons

### 4.5.3 Soil Excavation and Removal

The scope of work originally planned for this site was based on the data obtained during the PA. Calculations from these data indicated excavation operations should involve approximately 54 cubic yards. This estimate was reasonably accurate since the PA did not include the lateral migration along the peat layer which was unknown at the time. Actual volume of soil removed from this site in 1994, was approximately 1,881 cubic yards. Contaminated soil removal operations followed the same manner as previously described for the TB-12 site in section 4.3.3.

Excavation began at the most contaminated surface location, next to the building and was extended outward until clean sidewalls were reached. As the excavation progressed it was evident that the most of the contaminated soils extended to the north. The excavation pit at this site finally joined to the pit drilled at the TB-6 site to the north. The contaminant plumes migrated downgradient to the north along the peat layer. This shallow subsurface northward migration essentially mirrored the surface run-off. The highest PID readings and the strongest POL odor were found next to the building. Soil excavation was done carefully near the building to protect its structural integrity. The groundwater was encountered at 8.5 feet to the south and at 7.5 feet to the north. Excavation stopped at the water table. The excavation pit extended down to a depth of 10 feet to the south and 9 feet to the north. The permafrost was not reached.

The vertical succession of soils was grouped into two units separated by a 12-18 inches thick peat layer. The near surface unit was gray to light brown, friable, porous, medium to fine grained sand. The soil beneath the peat layer was hard, compact, medium to fine grained sand. The peat layer was highly porous and permeable, recorded mostly high PID readings, and appeared to have played an important role in the lateral migration of POL. The peat layer represented the tundra vegetation before the site was developed in 1957. The soil overlying the peat layer was brought in from a nearby borrow pit to level off the ground surface. The soil underlying the peat layer was *in situ*. The finer grained soil unit underlying the peat acted as a vertical barrier to the POL migration.

A second, relatively thin (approximately 6 inches thick) peat layer occurred above the main peat layer at this site. This second peat layer was limited in extent and occurred only beneath the topographic mound outside the entrance to the BIA building. This upper peat layer graded into the presentday vegetation away from the mound. Evidently the ground level was filled in at least two stages. The upper peat layer represented the vegetation developed at the interval of the two filling events.

Limitations of time and resources did not allow the complete removal all the contaminated soils from this site. The contaminated soils remained at the southwest corner of the pit. The excavation pit was backfilled with clean soil and the boundaries of contaminated and clean soil were marked with metal stakes for future reference.

#### 4.5.4 Summary of TB-2 Site.

Table 7 illustrates the complete laboratory analyses of laboratory samples. Figure 12 shows the location map for the TB-2 site while Figures 13 and 14 illustrate the shallow subsurface geology. Contaminated soil removed was more than what previous estimate suggested. Contaminated soil remained in place to the southwest.

Table 7 Complete Laboratory analyses of samples for TB-2 site (1994 summer). The locations of bottom and sidewall samples are shown in Figure 12.

Sample Number	Coordinates			Sample Location relative to Excavation Pit			Field Screen		Solids	DRO
	N-S	E-W	Depth	Stockpile	Bottom	Sidewall	PID	Hanby	%	PPM
	FT	FT	FT				PPM	PPM		
340009480139	265S	7W	2	X			701		88.9	4220
340009480140	240S	20W	2	X			491		90.2	3640
340009480141	240S	20W	2	X			491		89.4	3770
340009480142	265S	15W	2	X			385		93.4	2580
340009480144	250S	25W	2	X			611		90.0	4050
340009480145	245S	38W	2	X			273		93.1	2680
340009480146	260S	8W	5	X			215		88.6	3580
340009480147	248S	30W	5	X			352		88.4	2560
340009480166	245S	20W	8	X	X		25		84.3	5040
340009480167	245S	20W	8	X	X		25		82.9	5080
340009480168	266S	10W	8	X	X				84.0	5340
340009480169	250S	10W	8	X	X				83.0	4930
340009480170	262S	28W	8	X	X		69		87.8	28
340009480171	269S	25W	8	X	X		199		88.5	681
340009480172	275S	30W	6	X			3		37.8	4230
340009480173	275S	35W	11	X	X		30		85.6	81
340009480174	276S	48W	2			X	ND	ND	90.5	36
340009480175	276S	48W	4			X	6	50	38.2	4170
340009480176	276S	48W	6			X	ND	ND	84.1	ND
340009480177	228S	4W	5	X		X	431		88.1	5920
340009480178	226S	22W	8	X	X		196		83.0	434
340009480179	225S	25W	7	X			532		48.9	17000
340009480180	225S	25W	7	X			532		46.0	9090
340009480181	227S	32W	8	X	X		67		83.6	ND
340009480182	250S	48W	8	X	X		8		82.5	ND
340009480183	226S	35W	7	X			438		86.6	7900
340009480184	250S	50W	4	X			10		87.1	ND
340009480185	251S	52W	6	X			15		87.4	20
340009480186	227S	55W	7	X		X	2		84.2	42
340009480187	219S	16W	2	X			488		87.8	8500
340009480188	214S	17W	6	X			239		84.0	4400
340009480189	208S	20W	8	X			480		83.6	17000
340009480190	208S	20W	8	X			480		82.0	16000
340009480191	200S	16W	10	X	X	X	274		84.3	3640
340009480193	222S	30W	9	X			538		90.9	20
340009480194	200S	35W	6	X		X	52		87.9	15
340009480195	218S	48W	4	X			4		87.6	15
340009480196	207S	54W	6	X	X	X	2	ND	86.0	16
340009480197	194S	14W	2	X		X	250	50	86.6	2880
340009480198	182S	10W	11	X	X		543		82.4	8000
340009480199	188S	34W	6	X		X	4		47.7	1500
340009480200	188S	34W	6	X		X	4		74.9	1380
340009480201	175S	8W	6	X		X	73		65.8	952
340009480202	166S	10W	4	X	X		598		83.0	7030
340009480203	174S	28W	5	X	X	X	2		61.0	3320
340009480204	164S	26W	4	X		X	4		80.5	367

Table 7 (Continued).

Sample Number	Coordinates			Sample Location relative to Excavation Pit			Field Screen		Solids	DRO
	N-S	E-W	Depth	Stockpile	Bottom	Sidewall	PID	Hanby	%	PPM
	FT	FT	FT				PPM	PPM		
340009480205	152S	8W	5	X	X		10		84.2	155
340009480206	142S	4W	5	X		X	548		85.2	14000
340009480207	142S	34W	4	X		X	2		67.3	1180

DRO = Diesel Range Organics

ND = None detected at or above the method reporting limit for the sample

PID = Photo Ionization Detector

PPM = Parts per million

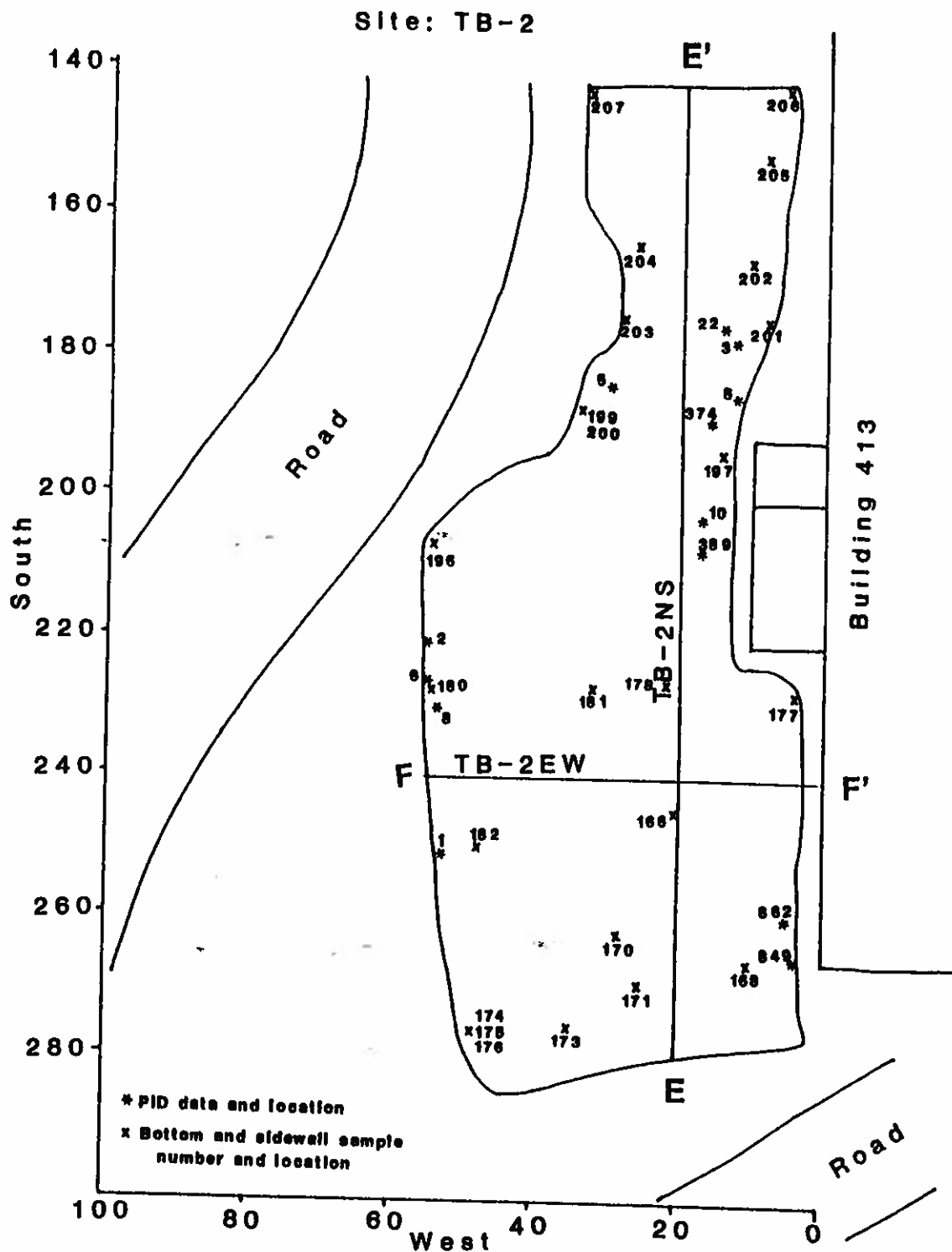


Figure 12 Location map for Site: TB-2. The map co-ordinates are in feet and are relative to the northwest corner of the Bldg 413. TB-2NS and TB-2EW are the two cross-section locations. Several fuel tanks were located at this site. The site area is 8,400 sq ft; 1,881 cubic yards of contaminated soil was removed in 1994. Field screening with a PID indicated that another 600 cubic yards of contaminated soil remain to the southwest of the 1994 excavation. Bottom and sidewall sample and PID data locations, and PID data values are also shown. Sample results are in Table 7.

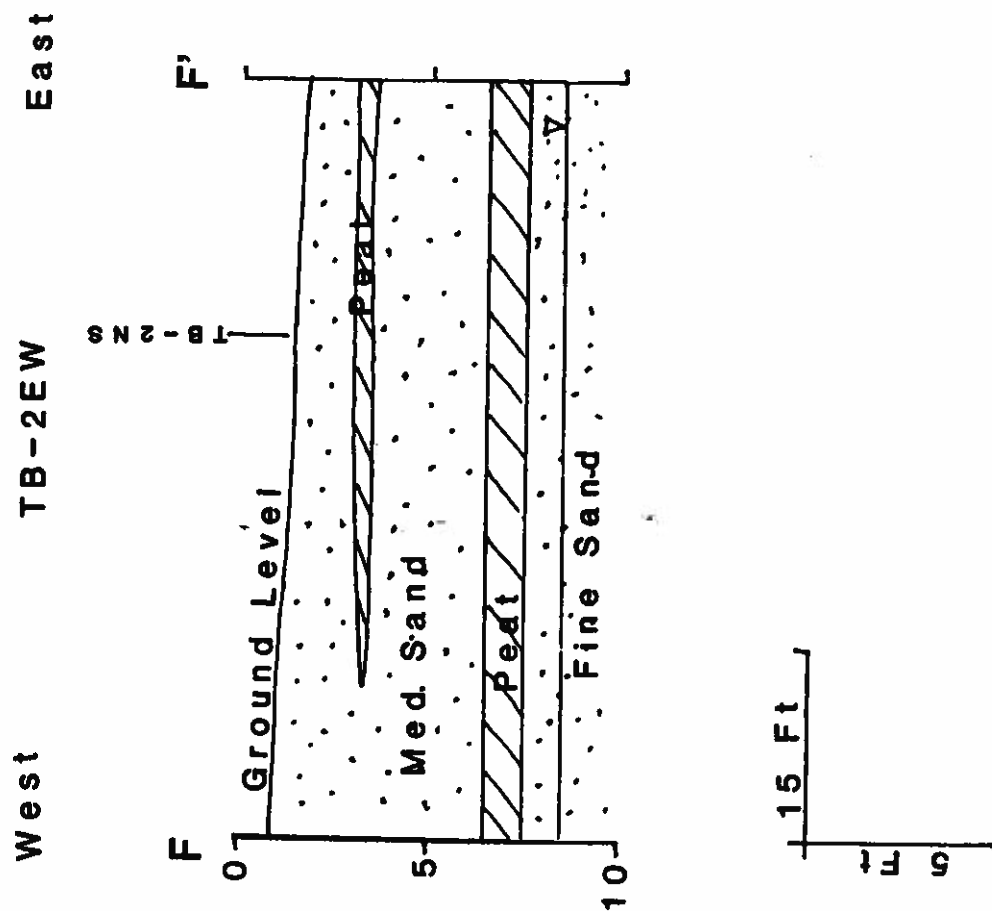


Figure 13 East-West cross-section across TB-2 contaminated site. The location of the section is shown in Figure 12.

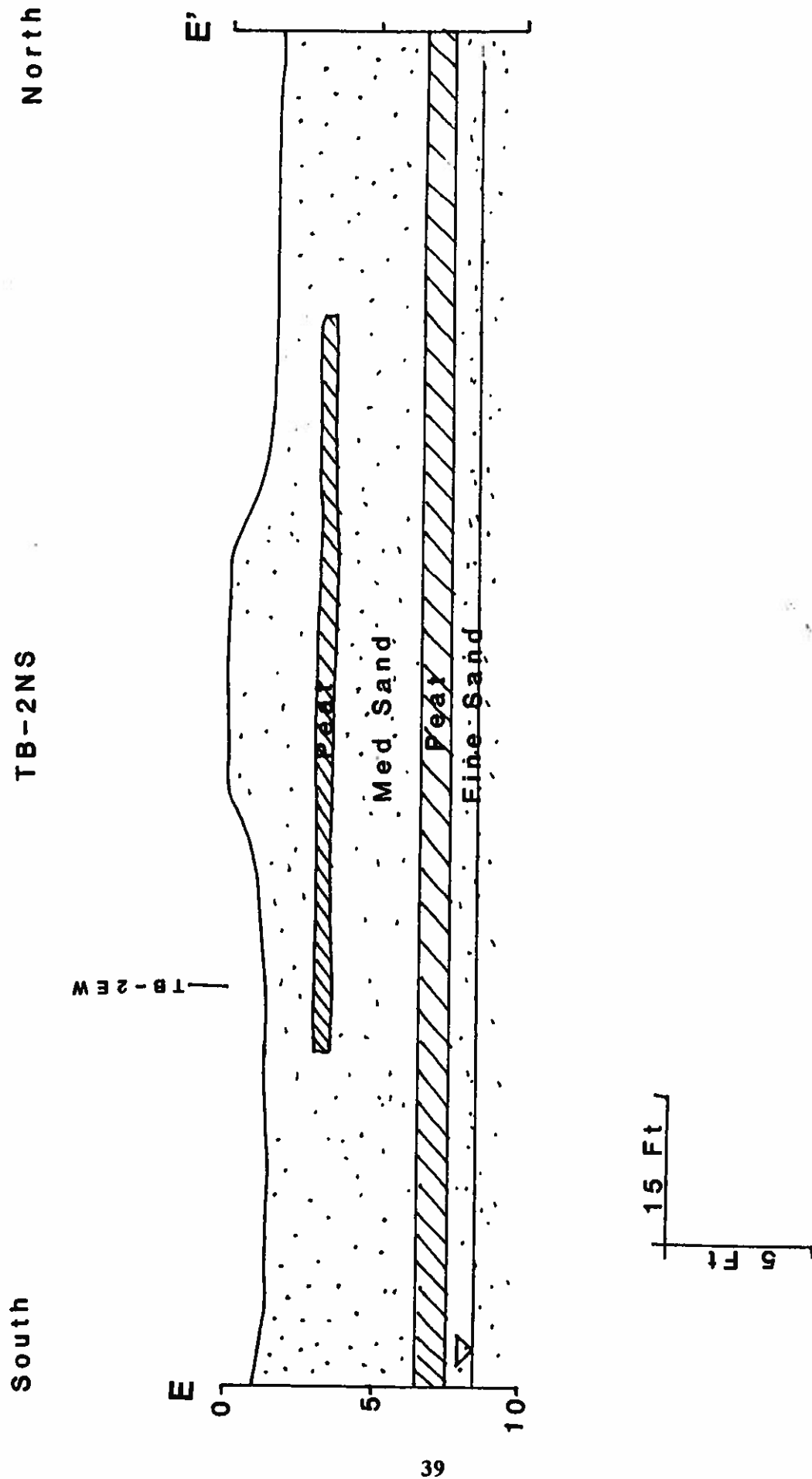


Figure 14 North-South cross-section across TB-2 contaminated site. The location of the section is shown in Figure 12.

## 4.6 TB-6 Site

### 4.6.1 Site Description

TB-6 site was adjacent to the BIA building at the center of the west side (Figures 5 and 15). There was an extension of the BIA building to the north of the site. Access road ran along the western edge of the site.

The site was the location of 3-300 gallon day tanks. Fuel pipe lines extended along the west face of the BIA building and connected this site with the TB-2 site. No containment structures were found for these tanks. Surface water run-off from this site flowed to the north.

### 4.6.2 Previous Investigative Work

The 11th Civil Engineering Operations Squadron conducted a field investigation during August through December of 1991 at this site. TB-6 was drilled at this site. TB-6 was drilled to 5.0 feet, 1 sample was collected; neither groundwater nor the permafrost was encountered.

*Table 8 Laboratory analyses results for the samples collected from TB-6 drilled in 1991.*

Sample Number	Depth	Field Screen	BTEX	Benzene	DRO
	FT	PID PPM	PPM	PPM	PPM
420099180012	2	97			
	5	163	11.19	0.3	6800

BTEX = Benzene, Toluene, Ethylbenzene and Xylene

DRO = Diesel Range Organics

PID = Photo Ionization Detector

PPM = Parts per million

### 4.6.3 Soil Excavation and Removal

The scope of work originally planned for this site was based on the data obtained during the PA. Calculations from these data indicated excavation operations should involve approximately 30 cubic yards. This estimate was reasonably accurate since the PA did not include the lateral migration along the peat layer which was unknown at the time. Actual volume of soil removed from this site in 1994, was approximately 531 cubic yards. Contaminated soil removal operations followed the same manner as previously described for the TB-12 site in section 4.3.3.

Excavation began at the most contaminated surface location, next to the building and was extended outward until clean sidewalls were reached. The highest PID readings and the strongest POL odor were found in the shallow subsurface immediately beneath the day tank locations. Soil excavation was done carefully near the building to protect its structural integrity. The ground water was encountered at 7 feet. Excavation stopped at the water table. The excavation pit extended down to a depth of 8 feet. The permafrost was not reached.

As in TB-2 site, the vertical succession of soils was grouped into two units separated by a 12-18 inches thick peat layer. The near surface unit was gray to light brown, friable, porous,



medium to fine grained sand. The soil beneath the peat layer was hard, compact, medium to fine grained sand. The peat layer was highly porous and permeable, recorded mostly high PID readings, and appeared to have played an important role in the lateral migration of POL. The peat layer represented the tundra vegetation before the site was developed in 1957. The soil overlying the peat layer was brought in from a nearby borrow pit to level off the ground surface. The soil underlying the peat layer was *in situ*. The finer grained soil unit underlying the peat acted as a vertical barrier to the POL migration.

#### 4.6.4 Summary of TB-6 Site

Figure 15 shows the location map for the TB-6 site while Figures 16 and 17 illustrate the shallow subsurface geology. Table 9 lists the complete laboratory analyses of laboratory samples. Contaminated soil removed this summer was more than what previous estimate suggested.

*Table 9 Complete Laboratory analyses of samples for TB-6 site (1994 summer). Bottom and sidewall sample locations are shown in Figure 15.*

Sample Number	Coordinates			Sample Location relative to Excavation Pit			Field Screen		Solids	DRO
	N-S	E-W	Depth	Stockpile	Bottom	Sidewall	PID	Hanby	%	PPM
	FT	FT	FT				PPM	PPM		
340009480208	145S	10W	4	X		X	331		66.9	1190
340009480209	145S	24W	4	X	X		20		85.4	205
340009480210	146S	37W	4	X			88		48.6	1060
340009480211	146S	42W	5	X	X		17		76.2	414
340009480212	115S	42W	4	X			237		86.8	64
340009480213	117S	42W	8	X	X		16		82.5	88
340009480214	106S	22W	10	X	X		77		84.0	30
340009480215	101S	40W	10	X	X		8		83.3	ND
340009480216	101S	40W	10	X	X		8		83.3	ND
340009480217	88S	12W	8	X		X	742		83.6	1570
340009480218	79S	12W	10	X		X	656		81.9	15000

DRO = Diesel Range Organics

ND = None detected at or above the method reporting limit for the sample

PID = Photo Ionization Detector

PPM = Parts per million

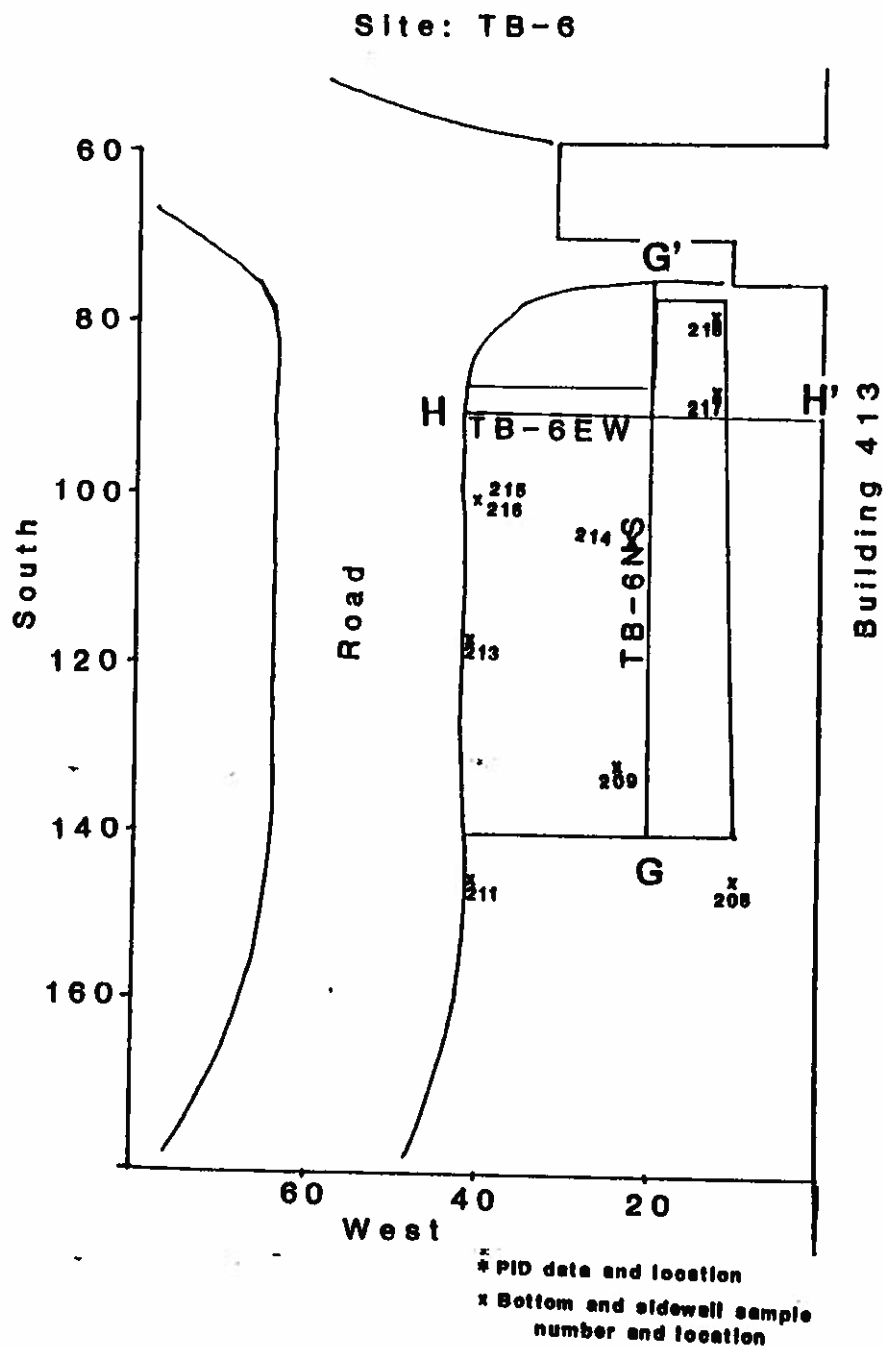


Figure 15 Location map for Site: TB-6. The map co-ordinates are in feet and are relative to the northwest corner of the Bldg 413. TB-6NS and TB-6EW are the two cross-section locations. Fuel tanks were located at the center of this site. The site area is 3,200 sq ft; 531 cubic yards of contaminated soil was removed in 1994. Field screening with a PID indicated that another 72 cubic yards of contaminated soil remain to the north of the 1994 excavation. Bottom and sidewall sample locations, and PID data values are also shown. Sample results are in Table 7.

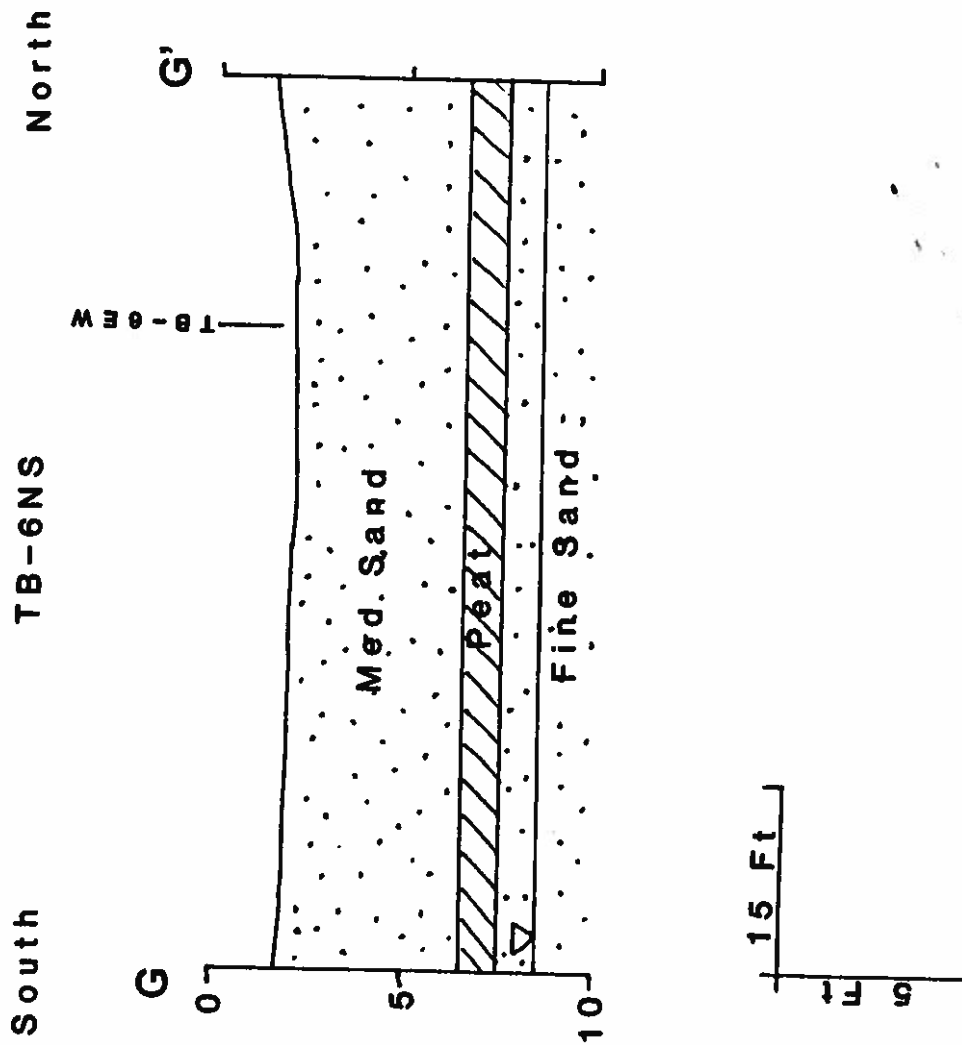


Figure 16 North-South cross-section across TB-6 contaminated site. The section location is shown in Figure 15.

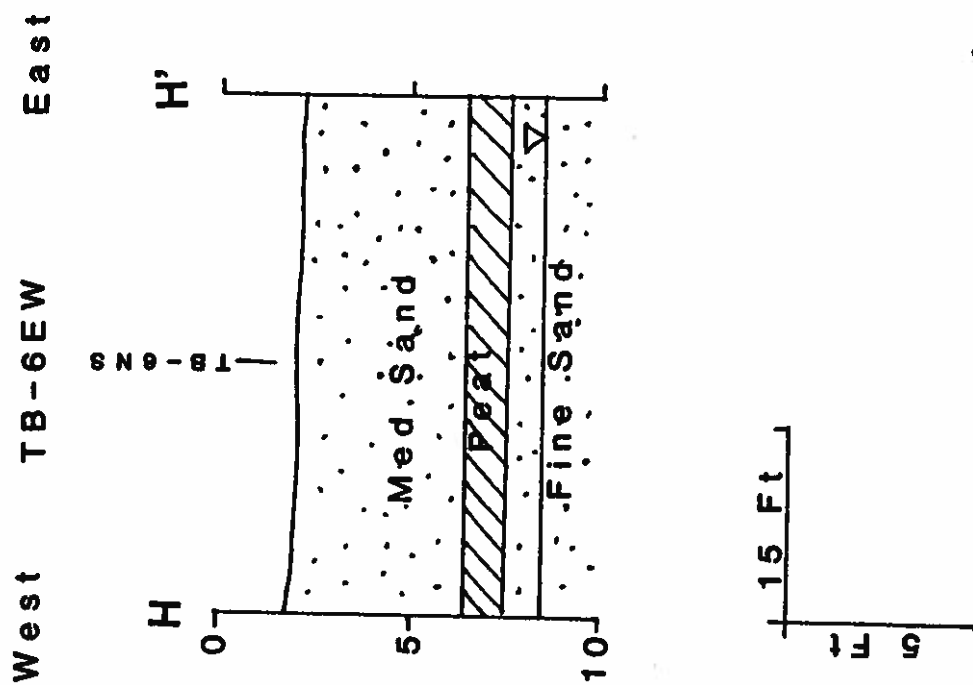


Figure 17 East-West cross-section across TB-6 contaminated site. The section location is shown in Figure 15.

#### ***4.7 Reanalysis of samples***

Initial analysis of samples 340009480146, 340009480147, and 340009480160-340009480191 showed method blanks were contaminated. Several samples contained DRO greater than ten times the method blank concentration. Samples below 10 times the method blank concentration were re-analyzed. Re-extraction of the 13 samples for re-analysis was 33 days beyond the 14 day holding time. Table 10 lists the affected samples. Data indicated that the re-analysis always produced lower contaminant concentrations.

*Table 10 Laboratory samples analyzed with contaminated method blanks. Samples below ten times the method blank concentration were re-analyzed 33 days beyond the 14-day holding time. Data presented in this Table indicated that the re-analysis always produced lower contaminant concentrations as the relatively volatile components of diesel were lost.*

Sample #	DRO Analysis of 9/20/94		DRO Analysis of 10/20/94		(New data/ Old data)%
	PPM	Method Blank PPM	PPM	Method Blank PPM	
340009480146	3580	24			
340009480147	2560	24			
340009480160	185	24	143	ND	77%
340009480161	55	24	52	ND	95%
340009480162	3950	24			
340009480163	83	24	21	ND	25%
340009480164	4370	24			
340009480165	191	24	152	ND	80%
340009480166	5040	24			
340009480167	5080	24			
340009480168	5340	24			
340009480169	4930	24			
340009480170	73	24	28	ND	38%
340009480171	681	24			
340009480172	4230	24			
340009480173	81	24	10	ND	12%
340009480174	71	24	36	ND	51%
340009480175	4170	24			
340009480176	117	24	10	ND	9%
340009480177	5920	24			
340009480178	431	27			
340009480179	17000	24			
340009480180	9090	27			
340009480181	48	27	10	ND	21%
340009480182	23	27	10	ND	43%
340009480183	7900	24			
340009480184	87	27	10	ND	11%
340009480185	87	27	10	ND	11%
340009480186	49	27	10	ND	20%
340009480187	8500	24			
340009480188	4400	27			
340009480189	17000	24			
340009480190	16000	24			
340009480191	3640	27			
Average					38%

DRO = Diesel Range Organics

ND = Not detected at or above the method reporting limit for the sample

PPM = Parts per million in concentration.

## **5. QUALITY CONTROL SUMMARY**

This appraisal (Table 11) provides data validation in support of the project specific QAPP, which was submitted to the ADEC before the soil excavation began at the BIA site. This appraisal examines the quality of the field procedure and of the analytical data for the samples collected from the site during August through September of 1994. All samples were collected by 611 CES/CEOR geologists. The samples were extracted and analyzed by a contractor laboratory, Columbia Analytical Services. Data validation was performed following the directions of the QAPP.

Table 11 Quality Control Summary

INDICATOR		OBJECTIVE	RESULT	ACCEPT
Chain of Custody		100%	100%	Yes
Labeling		100%	100%	Yes
Holding Time BTEX	Extract	ASAP	11 days <sup>a</sup>	Yes
	Analysis	14 days	12 days <sup>a</sup>	Yes
Holding Time GRO	Extract	ASAP	11 days <sup>a</sup>	Yes
	Analysis	14 days	12 days <sup>a</sup>	Yes
Holding Time DRO	Extract	14 days	10 days <sup>a</sup>	Yes
	Analysis	40 days	22 days <sup>a</sup>	Yes
Holding Time Lead	Extract	6 months	20 days <sup>a</sup>	Yes
	Analysis	6 months	20 days <sup>a</sup>	Yes
Holding Time Pesticide and PCBs	Extract	ASAP	8 days <sup>a</sup>	Yes
	Analysis	14 days	19 days <sup>a</sup>	Marginally Acceptable
Holding Time Volatile Organic Comp	Extract	ASAP	Not Available	Yes
	Analysis	14 days	12 days <sup>a</sup>	Yes
Holding Time TCLP Metals	Extract	6 months	Not Available	Yes
	Analysis	6 months	20 days <sup>a</sup>	Yes
Completeness		> 85%	100%	Yes
Comparability		Yes	Yes	Yes
Representativeness		Yes	Yes	Yes
Precision	Gasoline Range Organics	50%	34% <sup>a</sup>	Yes
	BTEX	40%	8% <sup>a</sup>	Yes
	Lead	40%	25% <sup>a</sup>	Yes
	Diesel Range Organics	50%	27% <sup>a</sup>	Yes
Sample Preservation Temperature		4 ± 2°C	3.7°C <sup>a</sup>	Yes
Trip Blanks		ND	ND	Yes
Accuracy	Gasoline Range Organics	50-140%	77% <sup>a</sup>	Yes
	BTEX	60-130%	80% <sup>a</sup>	Yes
	Diesel Range Organics	50-140%	93% <sup>a</sup>	Yes
	Pesticide and PCBs	50-150%	89% <sup>a</sup>	Yes
	Volatile Organic Compounds	81-117%	98% <sup>a</sup>	Yes

<sup>a</sup>Average of all the samples

ASAP = As soon as possible

BTEX = Benzene, Toluene, Ethylbenzene and Xylene

DRO = Diesel Range Organics

ND = None detected at or above the method reporting limit for the sample

### 5.1 Field Quality Control

The USEPA Level 3 of data validation was applied to the field sampling. Instruments used in the field were calibrated daily according to QAPP.



### 5.1.1 Sample Labeling

Waterproof ink was used on labels to write unique sample number, date and time of collection, field sampler's name, and the laboratory analyses to be performed. The waterproof labels were securely fastened to the sample containers. No incorrect sample label information nor any missing information was reported for a total of 198 samples in 7 sample cooler shipments.

### 5.1.2 Chain-of-Custody Records

A transfer log or Chain-of-Custody records were prepared for and accompanied each batch of samples. In addition to the spaces for control individuals the document contained sampling date and time, the laboratory analyses needed to perform. No error was reported, no sample was missing and no inconsistency was recorded for a total of 198 samples and 7 sample cooler shipments. All the custody seals on sample jars and on the sample coolers were untampered.

### 5.1.3 Sample Preservation Temperature

Samples were refrigerated soon after collection. Ice packs were placed inside the cooler to maintain the required temperature. A temperature bottle was included with each sample cooler. Upon arrival of the sample cooler at the laboratory the bottle temperature was recorded. This temperature was actually the highest the samples were exposed for the shipment. Table 12 shows the sample temperatures upon arrival at the laboratory. Note that all the samples were within the acceptable temperature range.

*Table 12 Sample temperature when the sample shipment arrived at the laboratory.*

Sample Shipment	Sample Temperature upon arrival at the laboratory in degree C	Acceptable Temperature in degree C
1	6.7 <sup>a,c</sup>	4 ± 2
2	2.9 <sup>b</sup>	4 ± 2
3	4.5 <sup>b</sup>	4 ± 2
4	3.4 <sup>b</sup>	4 ± 2
5	3.9 <sup>b</sup>	4 ± 2
6	3.1 <sup>b</sup> /4.0 <sup>c</sup>	4 ± 2
7	1.3 <sup>b</sup> /2.8 <sup>c</sup>	4 ± 2
Average	3.7	4 ± 2

<sup>a</sup> No temperature bottle was available to include with this sample shipment.

<sup>b</sup> Temperature of water in "temperature bottle"

<sup>c</sup> The reported temperature was that of the vermiculite used as insulator. Previously refrigerated sample jars are colder than the insulating material. Also, the friction of the thermometer with the vermiculite while inserting records at a higher temperature.

### 5.1.4 Trip Blanks

A trip blank is a sample of analyte-free media taken from the laboratory to the sampling site along with each batch of samples and returned to the laboratory unopened. A trip blank will be used to document contamination attributable to shipping and field handling procedures. This type of

blank will be especially useful in documenting when trace volatile organic compounds are being investigated.

Seven trip blanks, one with each batch of samples, were packaged, assigned independent laboratory numbers, and handled as samples. Five of these trip blanks were analyzed. The analytical results reported all parameters were below method reporting limit. The contracting laboratory did not analyze the remaining two trip blanks because those were shipped along diesel contaminated soil samples where contamination from volatile organic compounds were not important.

#### 5.1.5 Background Samples

A background sample is collected in an area judged to be free of a site contaminant. The background sample is taken to document and assess analyte baseline or historical information.

Two background samples were collected in an area judged to be free of a site contaminant. The background samples were taken to document and assess analyte baseline or historical information, specifically to document the occurrence of naturally occurring organics. Both the background samples were collected from east of the radio tower, approximately 30 feet west of the access road halfway between the radar site and the BIA site. Permafrost was encountered immediately beneath the tundra vegetation.

*Table 13 Laboratory Analyses results for the background samples. Concentrations are in PPM (parts per million).*

	Sample # 340009480236 (884S, 242W, 1.5 ft)	Sample #340009480237 (884S, 242W, 2.0 ft)
Field Screening (PID)	4	4
Diesel Range Organics (DRO)	17 <sup>a</sup>	416 <sup>a</sup>
Gasoline Range Organics (GRO)	ND	ND
Benzene	ND	ND
BTEX	ND	ND
PCB	ND	ND
DDT	ND	ND
Total Metals	ND	ND

<sup>a</sup> Quantified as diesel. The sample contained biogenic components that eluted in the C<sub>10</sub>-C<sub>28</sub> range.

ND = None detected at or above the method reporting limit for the sample

BTEX = Benzene, Toluene, Ethylbenzene and Xylene

PCB = Polychlorinated biphenyls

DDT = Dichloro diphenyl trichloroethane

## 5.2 Laboratory Quality Control

The contracting laboratory, Columbia Analytical Services, has in place a Quality Assurance/Quality Control (QA/QC) document together with SOPs that address instrument

calibration, sample preparation and analysis, method blanks, method spikes, method spike duplicates, and verification (QC) samples. All reported instrument detection limits were equal to or below 20 percent of the contract-required detection limits.

### ***5.3 Data Quality Indicators***

#### **5.3.1 Holding Time**

Samples were handled and transported expeditiously to analyze within the maximum holding times. Tables 14 and 15 shows the holding times for the samples collected for this project.

Table 14 Holding times for the laboratory samples analyzed for GRO, BTEX, lead and DRO

Sample Number	Collect Date	GRO+BTEX				Lead			DRO			
		Extract Date	Analysis Date	Holding(days)		Extract Date	Analysis Date	Holding Days	Extract Date	Analysis Date	Holding(Days)	
				Extract	Analysis						Extract	Analysis
340009480048	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480049	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480050	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480051	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480052	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480053	8/3/94	8/12/94	8/24/94	9	21		8/15/94	12				
340009480054	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480055	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480056	8/3/94	8/12/94	8/24/94	9	21		8/15/94	12				
340009480057	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480058	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480059	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480060	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480061	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480062	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				
340009480063	8/3/94	8/12/94	8/12/94	9	9		8/15/94	12				Trip Blank
340009480064	8/6/94	8/19/94	8/19/94	13	13		8/17/94	11				
340009480065	8/6/94	8/19/94	8/19/94	13	13		8/17/94	11				
340009480066	8/8/94	8/19/94	8/20/94	11	12		8/17/94	9				
340009480067	8/8/94	8/19/94	8/20/94	11	12		8/17/94	9				
340009480068	8/9/94	8/19/94	8/20/94	10	11		8/17/94	8				
340009480069	8/9/94	8/19/94	8/20/94	10	11		8/17/94	8				
340009480070	8/9/94	8/19/94	8/20/94	10	11		8/17/94	8				
340009480071	8/10/94						8/18/94	8/26/94	8	16		
340009480072	8/10/94						8/18/94	8/26/94	8	16		
340009480073	8/10/94						8/18/94	8/26/94	8	16		
340009480074	8/10/94	8/19/94	8/19/94	9	9							Trip Blank
340009480075	8/11/94											
340009480076	8/11/94						8/25/94	9/3/94	14	23		

Table 14 (Continued)

Sample Number	Collect Date	GRO+BTEX				Lead			DRO				Comment
		Extract Date	Analysis Date	Holding(days)		Extract Date	Analysis Date	Holding Days	Extract Date	Analysis Date	Holding(Days)		
				Extract	Analysis						Extract	Analysis	
340009480077	8/11/94								8/25/94	8/30/94	14	19	
340009480078	8/11/94								8/25/94	8/30/94	14	19	
340009480079	8/11/94								8/25/94	8/30/94	14	19	
340009480080	8/11/94								8/25/94	8/30/94	14	19	
340009480081	8/12/94								8/25/94	9/1/94	13	20	
340009480082	8/12/94								8/25/94	8/30/94	13	18	
340009480083	8/12/94								8/25/94	8/30/94	13	18	
340009480084	8/12/94								8/25/94	9/10/94	13	29	
340009480085	8/12/94								8/25/94	9/3/94	13	22	
340009480086	8/12/94								8/25/94	9/3/94	13	22	
340009480087	8/12/94								8/25/94	9/3/94	12	21	
340009480088	8/13/94								8/25/94	9/3/94	12	21	
340009480089	8/13/94								8/25/94	9/3/94	12	21	
340009480090	8/13/94								8/25/94	9/3/94	12	21	
340009480091	8/13/94								8/25/94	9/3/94	12	21	
340009480092	8/13/94								8/25/94	9/3/94	12	21	
340009480093	8/13/94								8/25/94	9/3/94	12	21	
340009480094	8/13/94								8/25/94	9/3/94	12	21	
340009480095	8/15/94								8/27/94	9/11/94	12	27	
340009480096	8/15/94								8/27/94	9/10/94	12	26	
340009480097	8/15/94								8/27/94	9/10/94	12	26	
340009480098	8/15/94								8/27/94	9/10/94	12	26	
340009480099	8/15/94								8/27/94	9/10/94	12	26	
340009480100	8/15/94								8/27/94	9/10/94	12	26	
340009480101	8/10/94	8/25/94	8/26/94	15	16								
340009480102		8/25/94	8/26/94								0	0	Trip Blank
340009480103	8/20/94								8/31/94	9/12/94	11	23	
340009480104	8/20/94								8/31/94	9/12/94	11	23	
340009480105	8/20/94								8/31/94	9/12/94	11	23	

Table 14 (Continued)

Sample Number	Collect Date	GRO+BTEX				Lead			DRO				Comment
		Extract Date	Analysis Date	Extract Date	Holding(days)	Extract Date	Analysis Date	Holding Days	Extract Date	Analysis Date	Extract Date	Holding(Days)	
340009480106	8/20/94								8/31/94	9/13/94	11	24	
340009480107	8/20/94								8/31/94	9/12/94	11	23	
340009480108	8/20/94								8/31/94	9/12/94	11	23	
340009480109	8/20/94								8/31/94	9/12/94	11	23	
340009480110	8/20/94								8/31/94	9/12/94	11	23	
340009480111	8/20/94								8/31/94	9/12/94	11	23	
340009480112	8/20/94								8/31/94	9/12/94	11	23	
340009480113	8/20/94								8/31/94	9/12/94	11	23	
340009480114	8/20/94								8/31/94	9/13/94	11	24	
340009480115	8/22/94								8/31/94	9/12/94	9	21	
340009480116	8/22/94								8/31/94	9/12/94	9	21	
340009480117	8/22/94								8/31/94	9/12/94	9	21	
340009480118	8/22/94								8/31/94	9/12/94	9	21	
340009480119	8/22/94								8/31/94	9/12/94	9	21	
340009480120	8/22/94								8/31/94	9/12/94	9	21	
340009480121	8/22/94								8/31/94	9/12/94	9	21	
340009480122	8/22/94								8/31/94	9/12/94	9	21	
340009480123	8/22/94								8/31/94	9/12/94	9	21	
340009480124	8/23/94								8/31/94	9/12/94	8	20	
340009480125	8/23/94								8/31/94	9/13/94	8	21	
340009480126	8/23/94								8/31/94	9/12/94	8	20	
340009480127	8/23/94								8/31/94	9/12/94	8	20	
340009480128	8/23/94								8/31/94	9/16/94	8	24	
340009480129	8/23/94								8/31/94	9/13/94	8	21	
340009480130	8/23/94								8/31/94	9/12/94	8	20	
340009480131	8/23/94								8/31/94	9/12/94	8	20	
340009480132	8/23/94								8/31/94	9/13/94	8	21	
340009480133	8/23/94								8/31/94	9/12/94	8	20	
340009480134	8/24/94								8/31/94	9/12/94	7	19	

Table 14 (Continued)

Sample Number	Collect Date	GRO+BTEX				Lead			DRO				Comment
		Extract Date	Analysis Date	Extract Date	Holding(days)	Extract Date	Analysis Date	Holding Days	Extract Date	Analysis Date	Extract Date	Holding(Days)	
340009480135	8/24/94								8/31/94	9/12/94	7	19	
340009480136	8/24/94								8/31/94	9/12/94	7	19	
340009480137	8/24/94								8/31/94	9/12/94	7	19	
340009480138	8/24/94								8/31/94	9/12/94	7	19	
340009480139	8/24/94								8/31/94	9/12/94	7	19	
340009480140	8/24/94								8/31/94	9/12/94	7	19	
340009480141	8/24/94								8/31/94	9/12/94	7	19	
340009480142	8/24/94								8/31/94	9/12/94	7	19	
340009480143									8/31/94	9/12/94	7	19	
340009480144	8/24/94								8/31/94	9/12/94	7	19	
340009480145	8/24/94								8/31/94	9/12/94	7	19	
340009480146	8/25/94								9/4/94	9/20/94	10	26	
340009480147	8/25/94								9/4/94	9/20/94	10	26	
340009480148	8/25/94	9/8/94	9/8/94	14	14		9/29/94	35					
340009480149	8/25/94	9/8/94	9/8/94	14	14		9/29/94	35					
340009480150	8/25/94	9/8/94	9/8/94	14	14		9/29/94	35					
340009480151	8/25/94	9/8/94	9/8/94	14	14		9/29/94	35					
340009480152	8/25/94	9/8/94	9/8/94	14	14		9/29/94	35					
340009480153	8/25/94	9/8/94	9/8/94	14	14		9/29/94	35					
340009480154	8/25/94	9/8/94	9/8/94	14	14		9/29/94	35					
340009480155	8/25/94	9/8/94	9/8/94	14	14		9/29/94	35					
340009480156	8/25/94	9/8/94	9/9/94	14	15		9/29/94	35					
340009480157	8/25/94	9/8/94	9/9/94	14	15		9/29/94	35					
340009480158	8/25/94	9/8/94	9/9/94	14	15		9/29/94	35					
340009480159	8/25/94	9/8/94	9/9/94	14	15		9/29/94	35					
340009480160	8/25/94								9/4/94	9/20/94	10	26	Sample reanalyzed.
340009480161	8/25/94								9/4/94	9/20/94	10	26	Sample reanalyzed.
340009480162	8/25/94								9/4/94	9/20/94	10	26	
340009480163	8/25/94								9/4/94	9/20/94	10	26	Sample reanalyzed.

Table 14 (Continued)

Sample Number	Collect Date	GRO+BTEX				Lead			DRO				Comment
		Extract Date	Analysis Date	Holding(days)	Extract Date	Analysis Date	Holding Days	Extract Date	Analysis Date	Holding(Days)			
340009480164	8/25/94							9/4/94	9/20/94	10	26		
340009480165	8/25/94							9/4/94	9/20/94	10	26		Sample reanalyzed.
340009480166	8/25/94							9/4/94	9/20/94	10	26		
340009480167	8/25/94							9/4/94	9/20/94	10	26		
340009480168	8/25/94							9/4/94	9/20/94	10	26		
340009480169	8/25/94							9/4/94	9/20/94	10	26		
340009480170	8/26/94							9/4/94	9/20/94	9	25		Sample reanalyzed.
340009480171	8/26/94							9/4/94	9/20/94	9	25		
340009480172	8/26/94							9/4/94	9/20/94	9	25		
340009480173	8/26/94							9/4/94	9/20/94	9	25		Sample reanalyzed.
340009480174	8/26/94							9/4/94	9/20/94	9	25		Sample reanalyzed.
340009480175	8/26/94							9/4/94	9/20/94	9	25		
340009480176	8/26/94							9/4/94	9/20/94	9	25		Sample reanalyzed.
340009480177	8/26/94							9/4/94	9/20/94	9	25		
340009480178	8/26/94							9/4/94	9/20/94	9	25		
340009480179	8/27/94							9/4/94	9/20/94	8	24		
340009480180	8/27/94							9/4/94	9/20/94	8	24		
340009480181	8/27/94							9/4/94	9/19/94	8	23		Sample reanalyzed.
340009480182	8/27/94							9/4/94	9/19/94	8	23		Sample reanalyzed.
340009480183	8/27/94							9/4/94	9/20/94	8	24		
340009480184	8/27/94							9/4/94	9/19/94	8	23		Sample reanalyzed.
340009480185	8/27/94							9/4/94	9/19/94	8	23		Sample reanalyzed.
340009480186	8/27/94							9/4/94	9/19/94	8	23		Sample reanalyzed.
340009480187	8/29/94							9/4/94	9/20/94	6	22		
340009480188	8/29/94							9/4/94	9/20/94	6	22		
340009480189	8/29/94							9/4/94	9/20/94	6	22		
340009480190	8/29/94							9/4/94	9/20/94	6	22		
340009480191	8/29/94							9/4/94	9/20/94	6	22		
340009480192	8/29/94	9/8/94		10				9/4/94	9/20/94	6	22		Trip Blank



Table 14 (Continued)

Sample Number	Collect Date	GRO-BTEX				Lead			DRO			
		Extract Date	Analysis Date	Holding(days)	Extract Date	Analysis Date	Holding Days	Extract Date	Analysis Date	Extract Date	Analysis Date	Comment
340009480193	8/29/94							9/12/94	9/16/94	14	18	
340009480194	8/29/94							9/12/94	9/16/94	14	18	
340009480195	9/1/94							9/15/94	9/22/94	14	21	
340009480196	9/1/94							9/15/94	9/22/94	14	21	
340009480197	9/1/94							9/15/94	9/22/94	14	21	
340009480198	9/1/94							9/15/94	9/22/94	14	21	
340009480199	9/1/94							9/15/94	9/22/94	14	21	
340009480200	9/1/94							9/15/94	9/22/94	14	21	
340009480201	9/1/94							9/15/94	9/22/94	14	21	
340009480202	9/2/94							9/15/94	9/22/94	13	20	
340009480203	9/2/94							9/15/94	9/22/94	13	20	
340009480204	9/2/94							9/15/94	9/22/94	13	20	
340009480205	9/2/94							9/15/94	9/22/94	13	20	
340009480206	9/2/94							9/15/94	9/22/94	13	20	
340009480207	9/2/94							9/15/94	9/22/94	13	20	
340009480208	9/2/94							9/15/94	9/22/94	13	20	
340009480209	9/3/94							9/15/94	9/22/94	12	19	
340009480210	9/3/94							9/15/94	9/22/94	12	19	
340009480211	9/3/94							9/15/94	9/22/94	12	19	
340009480212	9/3/94							9/15/94	9/22/94	12	19	
340009480213	9/3/94							9/15/94	9/22/94	12	19	
340009480214	9/3/94							9/15/94	9/22/94	12	19	
340009480215	9/3/94							9/15/94	9/26/94	12	23	
340009480216	9/3/94							9/15/94	9/26/94	12	23	
340009480217	9/5/94							9/15/94	9/26/94	10	21	
340009480218	9/5/94							9/15/94	9/26/94	10	21	
340009480233	9/5/94											Trip Blank
340009480234	9/13/94							9/21/94	10/5/94	8	22	
340009480235	9/13/94							9/21/94	10/5/94	8	22	

Table 14 (Continued)

Sample Number	Collect Date	GRO+BTEX				Lead			DRO				Comment
		Extract Date	Analysis Date	Extract Date	Holding(days) Analysis	Extract Date	Analysis Date	Holding Days	Extract Date	Analysis Date	Extract	Holding(Days) Analysis	
340009480236	9/13/94	9/27/94	9/27/94		14	14			9/21/94	10/5/94	8	22	
340009480237	9/13/94	9/27/94	9/27/94		14	14			9/21/94	10/5/94	8	22	
340009480238	9/13/94	9/27/94	9/27/94		14	14			9/21/94	10/5/94	8	22	
340009480239	9/13/94								9/21/94	10/5/94	8	22	
340009480240	9/13/94								9/21/94	10/5/94	8	22	
340009480241	9/13/94								9/21/94	10/5/94	8	22	
340009480242	9/13/94								9/21/94	10/5/94	8	22	
340009480243	9/13/94								9/21/94	10/5/94	8	22	
340009480244	9/13/94								9/21/94	10/5/94	8	22	
340009480245	9/14/94	9/27/94	9/27/94		13	13							Trip Blank
Average					11	12		20			10	22	

Shaded values exceed the holding period

Table 15 Holding times for the laboratory samples analyzed for Pesticides and PCBs, Volatile Organic Compounds, and TCLP Metals.

Sample Number	Pesticides and PCBs				Volatile Organic Compounds 8240			TCLP Metals (EPA 1311)		
	Collect Date	Extract Date	Analysis Date	Holding(days) Extract Analysis	Extract Date	Analysis Date	Holding Days	Extract Date	Analysis Date	Holding(Days) Extract Analysis
340009480219	9/5/94	9/13/94	9/24/94	8	19	9/16/94	11	9/25/94	20	
340009480220	9/5/94	9/13/94	9/24/94	8	19	9/20/94	15*	9/25/94	20	
340009480221	9/5/94	9/13/94	9/24/94	8	19	9/15/94	10	9/25/94	20	
340009480222	9/5/94	9/13/94	9/24/94	8	19	9/15/94	10	9/25/94	20	
340009480223	9/5/94	9/13/94	9/24/94	8	19	9/15/94	10	9/25/94	20	
340009480224	9/5/94	9/13/94	9/24/94	8	19	9/15/94	10	9/25/94	20	
340009480225	9/5/94	9/13/94	9/24/94	8	19	9/15/94	10	9/25/94	20	
340009480226	9/5/94	9/13/94	9/24/94	8	19	9/16/94	11	9/25/94	20	
340009480227	9/5/94	9/13/94	9/24/94	8	19	9/16/94	11	9/25/94	20	
340009480228	9/5/94	9/13/94	9/24/94	8	19	9/17/94	12	9/25/94	20	
340009480229	9/5/94	9/13/94	9/25/94	8	20	9/17/94	12	9/25/94	20	
340009480230	9/5/94	9/13/94	9/25/94	8	20	9/16/94	11	9/25/94	20	
340009480231	9/5/94	9/13/94	9/25/94	8	20	9/17/94	12	9/25/94	20	
340009480232	9/5/94	9/13/94	9/25/94	8	20	9/21/94	16*	9/25/94	20	
Average				8	19		12		20	

Shaded values exceed the holding period

\* Sample was analyzed past the end of the recommended maximum holding time. Initial analysis, performed *within* the recommended maximum holding time, failed the laboratory QC criteria. The reanalysis met the criteria. It is the opinion of the laboratory that the quality of the sample data has not been significantly affected.

### 5.3.2 Precision

Relative percent difference (RPD) in the concentrations between the two samples of field duplicates was determined by the formula:

$$\text{RPD} = [(D1-D2)/(\text{average of } D1 \text{ \& } D2)] \times 100$$

Where: RPD = Relative percent difference

D1 = First duplicate value

D2 = Second duplicate value

The RPD for the duplicate samples collected for this field investigation are listed in Table 16.

Table 16 Relative percent difference (RPD) in the concentrations of the field duplicate samples.

Duplicate Set	GRO	BTEX	Lead	DRO
340009480060	113	2.32	6.2	
340009480061	129	2.69	10.4	
RPD	-13.22	-14.77	-50.60	
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480069	12	0.78	1.8	
340009480070	21	0.79	ND	
RPD	-54.55	-1.27	*	
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480079				93
340009480080				31
RPD				100.00
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480093				36
340009480094				33
RPD				8.70
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480111				36
340009480112				74
RPD				-69.09
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480119				36
340009480120				32
RPD				11.76
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480129				8300
340009480130				7030
RPD				16.57
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480140				3640
340009480141				3770
RPD				-3.51
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480156	ND	ND	3	
340009480157	120	6.84	3	
RPD	*	*	0.00	
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480166				5040
340009480167				5080
RPD				-0.79
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480179				17000
340009480180				9090
RPD				60.64
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480189				17000
340009480190				16000
RPD				6.06
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480199				1500
340009480200				1380
RPD				8.33
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480215				ND
340009480216				ND
RPD				*
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480234				32
340009480235				29
RPD				9.84
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

340009480240				ND
340009480241				206
RPD				*
Allowable RPD	+/-50%	+/-40%	+/-40%	+/-50%

\* Analysis results were less than method reporting limit (MRL) so RPD could not be calculated.

### 5.3.3 Accuracy

A measure of the closeness of an individual measurement or an average of a number of measurements to the true value. This measure is based on surrogate and/or spike recovery and evaluates the impact of matrix interferences. Accuracy is calculated using the formula:

$$R = [(SSR - SR) / SA] \times 100$$

Where, R = Percent Recovery

SSR = Analyte spiked sample result

SR = Sample result

SA = Amount of spike added

The acceptance criteria for the surrogate recovery are dependent on both the measured parameter and on the sample matrix.

QA/QC results from the laboratory were incomplete. The data are presented as received from the laboratory. Tables 14 and 15 summarize the surrogate recovery for all the samples of this project. All the reported recovery values are within the acceptance criteria.

*Table 17 Surrogate recovery summary for all the samples except samples 340009480219 through 340009480232. The values are in percent. Note that all the reported surrogate recovery values are within the acceptance criteria.*

Sample Number	BTEX (EPA 8020)		GRO (EPA 8015M)		DRO (EPA 8100M)	
	Recovery	Acceptance	Recovery	Acceptance	Recovery	Acceptance
340009480048	120	60-130	102	50-140		
340009480049	80	60-130	75	50-140		
340009480050	78	60-130	73	50-140		
340009480051	77	60-130	71	50-140		
340009480052	73	60-130	86	50-140		
340009480053	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480054	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480055	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480056	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480057	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480058	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480059	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480060	76	60-130	73	50-140		
340009480061	80	60-130	77	50-140		
340009480062	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480063	90	60-130	87	60-130		
340009480064	79	60-130	75	50-140		

Table 17 (Continued).

Sample Number	BTEX (EPA 8020)		GRO (EPA 8015M)		DRO (EPA 8100M)	
	Recovery	Acceptance	Recovery	Acceptance	Recovery	Acceptance
340009480065	78	60-130	74	50-140		
340009480066	82	60-130	78	50-140		
340009480067	73	60-130	67	50-140		
340009480068	80	60-130	77	50-140		
340009480069	76	60-130	72	50-140		
340009480070	76	60-130	71	50-140		
340009480071					86	50-140
340009480072					62	50-140
340009480073					74	50-140
340009480074	96	60-130	88	60-130		
340009480075					98	50-140
340009480076					100	50-140
340009480077					95	50-140
340009480078					105	50-140
340009480079					100	50-140
340009480080					101	50-140
340009480081					102	50-140
340009480082					101	50-140
340009480083					101	50-140
340009480084					94	50-140
340009480085					109	50-140
340009480086					95	50-140
340009480087					103	50-140
340009480088					103	50-140
340009480089					115	50-140
340009480090					104	50-140
340009480091					92	50-140
340009480092					85	50-140
340009480093					96	50-140
340009480094					100	50-140
340009480095					69	50-140
340009480096					69	50-140
340009480097					75	50-140
340009480098					70	50-140
340009480099					73	50-140
340009480100					73	50-140
340009480101	###	60-130	###	50-140		
340009480102	96	60-130	90	60-130		
340009480103					94	50-140
340009480104					65	50-140
340009480105					74	50-140
340009480106					83	50-140
340009480107					61	50-140
340009480108					95	50-140

Table 17 (Continued).

Sample Number	BTEX (EPA 8020)		GRO (EPA 8015M)		DRO (EPA 8100M)	
	Recovery	Acceptance	Recovery	Acceptance	Recovery	Acceptance
340009480109					66	50-140
340009480110					85	50-140
340009480111					92	50-140
340009480112					79	50-140
340009480113					64	50-140
340009480114					89	50-140
340009480115					87	50-140
340009480116					104	50-140
340009480117					84	50-140
340009480118					57	50-140
340009480119					113	50-140
340009480120					113	50-140
340009480121					107	50-140
340009480122					110	50-140
340009480123					109	50-140
340009480124					117	50-140
340009480125					109	50-140
340009480126					119	50-140
340009480127					119	50-140
340009480128					###	50-140
340009480129					103	50-140
340009480130					94	50-140
340009480131					117	50-140
340009480132					109	50-140
340009480133					106	50-140
340009480134					112	50-140
340009480135					119	50-140
340009480136					107	50-140
340009480137					71	50-140
340009480138					92	50-140
340009480139					85	50-140
340009480140					84	50-140
340009480141					83	50-140
340009480142					87	50-140
340009480143					###	60-130
340009480144					76	50-140
340009480145					84	50-140
340009480146					97	50-140
340009480147					92	50-140
340009480148	83	60-130	84	50-140		
340009480149	69	60-130	69	50-140		
340009480150	80	60-130	80	50-140		
340009480151	69	60-130	70	50-140		
340009480152	69	60-130	68	50-140		



Table 17 (Continued).

Sample Number	BTEX (EPA 8020)		GRO (EPA 8015M)		DRO (EPA 8100M)	
	Recovery	Acceptance	Recovery	Acceptance	Recovery	Acceptance
340009480153	76	60-130	77	50-140		
340009480154	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140		
340009480155	71	60-130	71	50-140		
340009480156	73	60-130	74	50-140		
340009480157	76	60-130	80	50-140		
340009480158	76	60-130	77	50-140		
340009480159	70	60-130	71	50-140		
340009480160					97	50-140
340009480161					95	50-140
340009480162					63	50-140
340009480163					93	50-140
340009480164					68	50-140
340009480165					98	50-140
340009480166					104	50-140
340009480167					104	50-140
340009480168					103	50-140
340009480169					104	50-140
340009480170					94	50-140
340009480171					68	50-140
340009480172					65	50-140
340009480173					90	50-140
340009480174					92	50-140
340009480175					64	50-140
340009480176					90	50-140
340009480177					97	50-140
340009480178					93	50-140
340009480179					84	50-140
340009480180					85	50-140
340009480181					89	50-140
340009480182					83	50-140
340009480183					93	50-140
340009480184					85	50-140
340009480185					86	50-140
340009480186					89	50-140
340009480187					86	50-140
340009480188					88	50-140
340009480189					89	50-140
340009480190					91	50-140
340009480191					90	50-140
340009480192	89	60-130	89	60-130		
340009480193					###	50-140
340009480194					###	50-140
340009480195					70	50-140
340009480196					73	50-140

Table 17 (Continued).

Sample Number	BTEX (EPA 8020)		GRO (EPA 8015M)		DRO (EPA 8100M)	
	Recovery	Acceptance	Recovery	Acceptance	Recovery	Acceptance
340009480197					94	50-140
340009480198					111	50-140
340009480199					91	50-140
340009480200					112	50-140
340009480201					114	50-140
340009480202					112	50-140
340009480203					120	50-140
340009480204					105	50-140
340009480205					109	50-140
340009480206					109	50-140
340009480207					110	50-140
340009480208					116	50-140
340009480209					107	50-140
340009480210					119	50-140
340009480211					114	50-140
340009480212					101	50-140
340009480213					99	50-140
340009480214					106	50-140
340009480215					78	50-140
340009480216					77	50-140
340009480217					123	50-140
340009480218					5 <sup>a</sup>	50-140
340009480233					###	60-130
340009480234					98	50-140
340009480235					106	50-140
340009480236	69	60-130	68	50-140	108	50-140
340009480237	75	60-130	73	50-140	82	50-140
340009480238	NA <sup>a</sup>	60-130	NA <sup>a</sup>	50-140	84	50-140
340009480239					84	50-140
340009480240					79	50-140
340009480241					80	50-140
340009480242					85	50-140
340009480243					73	50-140
340009480244					79	50-140
340009480245	93	60-130	92	60-130		
Average	80		77		93	

<sup>a</sup> Not Applicable because of the sample matrix. Analysis of this sample required a dilution such that the surrogate concentration was diluted below the method reporting limit.

### designates missing data

Table 18 Surrogate recovery summary for the samples 340009480219 through 340009480232. The values are in percent.

Sample Number	Pesticide and PCBs (EPA 8080)		Volatile Organic Compounds (EPA 8240)		
	Tetrachloro- <i>m</i> -xylene	Decachlorobiphenyl	1,2-Dichloroethane - D4	Toluene - D8	4-Bromofluorobenzene
340009480219	86	100	109	85	91
340009480220	89	98	103	101	100
340009480221	89	97	91	79 <sup>a</sup>	86
340009480222	96	95	87	78 <sup>a</sup>	84
340009480223	85	95	89	78 <sup>a</sup>	87
340009480224	91	102	106	85	95
340009480225	95	103	92	77 <sup>a</sup>	85
340009480226	91	103	111	87	93
340009480227	90	104	108	88	101
340009480228	66	104	119	107	103
340009480229	59	87	114	109	106
340009480230	67	91	113	90	104
340009480231	79	93	113	93	115
340009480232	57	91	97	72 <sup>b</sup>	128 <sup>b</sup>
Average	81	97	104	92	98
Acceptance Criteria	50-150	50-150	70-121 <sup>c</sup>	81-117 <sup>c</sup>	74-121 <sup>c</sup>

<sup>a</sup> Outside of acceptance limits because of matrix effects. This sample was analyzed a second time, and again produced unacceptable recovery values. The results from the initial analysis are reported.

<sup>b</sup> Outside of acceptance limits because of matrix interferences. The chromatogram showed nontarget compounds that interfered with the analysis.

<sup>c</sup> USEPA Acceptance Criteria.

#### 5.3.4 Completeness

Completeness is a measure of the amount of valid data obtained compared to the amount expected. For this project, the required level of completeness is 85 percent. All the laboratory samples collected for this project are determined to be valid; completeness is reported as 100 percent.

### 5.4 Qualitative Quality Assurance Indicators

#### 5.4.1 Representativeness

Representativeness describes the degree to which data characterizes the actual conditions at a site. To assure that measurements were as representative as possible, the sampling procedures described in Section 4 of QAPP (Sampling Procedures) were used. Samples were collected to reflect the site's characteristics, and the sample analyses that were performed were appropriate for the samples collected. Sampling locations were properly selected, potential contaminated areas were addressed, and a sufficient number of samples were collected for a specified volume of contaminated soils to ensure data representativeness.

#### 5.4.2 Comparability

Comparability expresses the confidence with which one data set can be compared with another. To assure comparability, standard operating procedures were used for the collection, and analysis of samples. Data are reported in the same units of quantitation and in accordance with ADEC reporting requirements.

## **6. SITE ASSESSMENTS**

### **6.1 Introduction**

All the tank locations excavated in 1994 had more contaminated soils than the estimates based on the PA of 1991. The scope of work originally planned for the whole site was based on the data obtained during PA. Calculations from this data indicated excavation operations should involve approximately 2,710 cubic yards. This estimate was reasonably accurate since the PA did not include the lateral migration along the peat layer which was unknown at the time. Actual volume of soil removed in 1994 from four tank locations was approximately 6,876 cubic yards.

The data gathered at the four tank locations during excavation and soil removal in 1994, along with the data gathered at the time of the PA in 1991, provided an improved understanding of the shallow subsurface geology and the hydrogeology. To improve the estimate of the remaining work, site investigations were performed to delineate the extent and the volume of the contaminated soils. Following the procedure illustrated in the succeeding section the remaining contaminated soil in place was approximately 12,542 cubic yards (Table 19).

### **6.2 Procedure**

Samples were collected with a Bobcat auger from three-foot depth at the nodal points of a mostly 20-foot square grid laid out on entire site. Fuel pipe joints and tank locations were preferentially selected. For each sample, concentrations of organic vapor were measured with a PID. Contaminated soils outline are shown in Figure 5, PID data values are listed in Table 20, and PID data locations are shown in Figure 18. Laboratory samples were collected from the garage floor, storage sheds, sewage lagoon and the berms surrounding the tanks.

*Table 19 Contaminated Soil Estimate based on the site assessments performed in summer, 1994. With 700 cubic yards of contaminated soil for each of the major tank locations (HA-18, HA-19, and TB-13) contaminated soil estimates before the excavation began in 1994 was 2,710 cubic yards.*

Site	Area Sq FT	Depth FT	Phase I: 1994		Phase II: 1995		Total: Phases I+II	
			Cubic Yards	Cubic Feet	Cubic Yards	Cubic Feet	1994 Cubic Yards	1991 Cubic Yards
TB-12	6400	8	1359	36693			1359	131
TB-15	10400	9	3105	83835	500	13500	3605	220
TB-2	8400	8	1881	50787	600	16200	2481	54
TB-6	3200	8	531	14337			531	30
HA-18	5200	8			1600	43200	1600	
HA-19	2400	8			750	20250	750	
TB-13	3200	10			1200	32400	1200	
TB-16	1600	8			500	13500	500	25
TB-16B	800	8			250	6750	250	
TB-11	2400	8			750	20250	750	27
TB-11B	8400	8			2500	67500	2500	
HA-21	12000	4			1800	48600	1800	
TB-17	2400	8			750	20250	750	27
TB-9	2000	8			600	16200	600	27
TB-7	1600	8			500	13500	500	27
TB-3	400	8			150	4050	150	
HA-22	360	3			42	1134	42	42
HA-22B	144	8			50	1350	50	
<b>Total</b>	<b>71304</b>		<b>6876</b>	<b>185652</b>	<b>12542</b>	<b>338634</b>	<b>19418</b>	<b>610</b>

Table 20 PID readings collected for site assessment. Samples with readings 10 and above were considered contaminated and were used to delineate the contaminated soil outline in Figure 5. The data locations are shown in Figure 18.

Date	Site	Sample Coordinates			PID	Peat	Comments
		N-S	E-W	Depth	PPM	Depth	
7-Sep-94	TB-16	38S	2W	1.5	16		
7-Sep-94	TB-16	2N	2W	1.5	224		
7-Sep-94	TB-16	2N	4E	1.5	523		
7-Sep-94	TB-16	2N	46E	1.5	42		
7-Sep-94	TB-16	2N	139E	1.5	13		
7-Sep-94	TB-16	2N	15E	1.5	279		
7-Sep-94	TB-16	75N	115E	1.5	556		
7-Sep-94	TB-16	65N	110E	1.5	5		
7-Sep-94	TB-16	68S	140E	1.5	16		
7-Sep-94	TB-16	163S	145E	1.5	19		
7-Sep-94	TB-16	141S	145E	1.5	8		
7-Sep-94	TB-16	41S	140E	1.5	3		
7-Sep-94	TB-16	166N	220E	1.5	725		
7-Sep-94	TB-16	165S	140E	1.5	6		
8-Sep-94	TB-16&11	12N	40E	3.0	515		
8-Sep-94	TB-16&11	12N	50E	3.0	550	2.5	POL smell
8-Sep-94	TB-16&11	12N	70E	3.0	2		
8-Sep-94	TB-16&11	12N	86E	3.0	41		
8-Sep-94	TB-16&11	12N	110E	2.0	1	1.5	
8-Sep-94	TB-16&11	12N	110E	3.0	1	1.5	Soil 1 ft below peat
8-Sep-94	TB-16&11	12N	110E	1.5	4	1.5	Peat sample
8-Sep-94	TB-16&11	12N	130E	3.0	1	1.5	
8-Sep-94	TB-16&11	12N	130E	2.0	4	1.5	
8-Sep-94	TB-16&11	12N	150E	3.0	406	2.5	
8-Sep-94	TB-16&11	12N	170E	3.0	65	2.5	
8-Sep-94	TB-16&11	12N	190E	3.0	10	2.0	
8-Sep-94	TB-16&11	22N	50E	3.0	3	2.0	
8-Sep-94	TB-16&11	22N	38E	3.0	68	2.5	POL smell
8-Sep-94	TB-16&11	27N	60E	3.0	8	3.0	
8-Sep-94	TB-16&11	45N	70E	3.0	3	3.0	
8-Sep-94	TB-16&11	64N	78E	3.0	5		
8-Sep-94	TB-16&11	83N	86E	3.0	6		
8-Sep-94	TB-16&11	102N	89E	3.0	690		Strong POL odor, pipe joint
8-Sep-94	TB-16&11	121N	90E	3.0	695		Strong POL odor, pipe joint
8-Sep-94	TB-16&11	140N	93E	3.0	725		Strong POL odor, pipe joint
8-Sep-94	TB-16&11	159N	96E	3.0	98		
8-Sep-94	TB-16&11	179N	99E	3.0	20	2.5	Peat sample
8-Sep-94	TB-16&11	121N	100E	3.0	740		Strong POL odor, pipe joint
8-Sep-94	TB-16&11	140N	103E	3.0	712		
8-Sep-94	TB-16&11	140N	83E	3.0	740		
8-Sep-94	TB-16&11	121N	80E	3.0	633		
8-Sep-94	TB-16&11	102N	99E	3.0	696		
8-Sep-94	TB-16&11	102N	79E	3.0	687		
8-Sep-94	TB-16&11	121N	110E	3.0	24		
8-Sep-94	TB-16&11	121N	70E	3.0	693		

Table 20 (Continued)

Date	Site	Sample Coordinates			PID	Peat	Comments
		N-S	E-W	Depth	PPM	Depth	
8-Sep-94	TB-16&11	140N	63E	3.0	549		
8-Sep-94	TB-16&11	140N	73E	3.0	605		
8-Sep-94	TB-16&11	102N	110E	3.0	13		
8-Sep-94	TB-16&11	102N	69E	3.0	703		
8-Sep-94	TB-16&11	140N	113E	3.0	574		
8-Sep-94	TB-16&11	140N	53E	3.0	634		
8-Sep-94	TB-16&11	119N	53E	3.0	256		
8-Sep-94	TB-16&11	102N	53E	3.0	578		
8-Sep-94	TB-16&11	140N	33E	3.0	7		
8-Sep-94	TB-16&11	160N	23E	3.0	10		
8-Sep-94	TB-16&11	120N	23E	3.0	7		
8-Sep-94	TB-16&11	140N	43E	3.0	47		
8-Sep-94	TB-16&11	160N	13E	3.0	63		
8-Sep-94	TB-16&11	170N	7W	3.0	231		
8-Sep-94	TB-16&11	160N	3E	3.0	9		
8-Sep-94	TB-16&11	170N	3E	3.0	27		
8-Sep-94	TB-16&11	159N	86E	3.0	11		
8-Sep-94	TB-16&11	159N	113E	3.0	ND		
8-Sep-94	TB-16&11	83N	110E	3.0	2		
8-Sep-94	TB-16&11	92N	89E	3.0	552		
9-Sep-94	HA-19	100N	210E	3.0	1		
9-Sep-94	HA-19	80N	230E	3.0	2		Peat Sample
9-Sep-94	HA-19	100N	190E	3.0	1		Peat Sample
9-Sep-94	HA-19	100N	230E	3.0	1		
9-Sep-94	HA-19	100N	250E	3.0	2		Peat Sample
9-Sep-94	HA-19	120N	250E	3.0	12	1.5	Peat Sample
9-Sep-94	HA-19	120N	230E	3.0	104		
9-Sep-94	HA-19	120N	210E	3.0	16	1.5	
9-Sep-94	HA-19	120N	190E	3.0	4		
9-Sep-94	HA-19	120N	170E	3.0	1		
9-Sep-94	HA-19	140N	170E	3.0	1	2.5	Peat Sample
9-Sep-94	HA-19	140N	190E	3.0	ND		
9-Sep-94	HA-19	140N	210E	3.0	1		
9-Sep-94	HA-19	140N	230E	3.0	ND		
9-Sep-94	HA-19	140N	250E	3.0	ND		
9-Sep-94	HA-19	140N	270E	3.0	1		
9-Sep-94	HA-19	160N	250E	3.0	ND		Berm soil
9-Sep-94	HA-19	160N	230E	3.0	ND		Berm soil
9-Sep-94	HA-19	160N	210E	3.0	1		Berm soil
9-Sep-94	HA-19	160N	190E	3.0	1		
9-Sep-94	HA-19	180N	210E	3.0	ND		
9-Sep-94	TB-13	255N	110E	3.0	21		
9-Sep-94	TB-13	255N	90E	3.0	1		
9-Sep-94	TB-13	255N	70E	3.0	ND		
9-Sep-94	TB-13	255N	50E	3.0	ND		
9-Sep-94	TB-13	275N	50E	3.0	399		
9-Sep-94	TB-13	275N	70E	3.0	2		
9-Sep-94	TB-13	275N	90E	3.0	ND		
9-Sep-94	TB-13	235N	90E	3.0	ND		



Table 20 (Continued)

Date	Site	Sample Coordinates			PID	Peat	Comments
		N-S	E-W	Depth	PPM	Depth	
9-Sep-94	TB-13	235N	70E	3.0	ND		
9-Sep-94	TB-13	235N	50E	3.0	ND		
9-Sep-94	TB-13	235N	30E	3.0	4		
9-Sep-94	TB-13	255N	30E	3.0	1		
9-Sep-94	TB-13	215N	50E	3.0	3		Peat Sample
9-Sep-94	TB-13	215N	90E	3.0	1		Peat Sample
9-Sep-94	TB-13	195N	50E	3.0	1		
9-Sep-94	TB-13	215N	30E	3.0	ND		Peat Sample
9-Sep-94	TB-13	235N	10E	3.0	1		
9-Sep-94	TB-13	255N	10E	3.0	1		
9-Sep-94	TB-13	275N	10E	3.0	10		
9-Sep-94	TB-13	275N	30E	3.0	206		
9-Sep-94	TB-13	198N	162E	3.0	1		Pipe joint
9-Sep-94	TB-13	179N	159E	3.0	384		Pipe joint
9-Sep-94	TB-13	295N	30E	3.0	457		
9-Sep-94	TB-13	295N	50E	3.0	7		
9-Sep-94	TB-13	295N	70E	3.0	1		
9-Sep-94	TB-13	295N	90E	3.0	1		
9-Sep-94	TB-13	295N	110E	3.0	1		
9-Sep-94	TB-13	295N	130E	3.0	1		
9-Sep-94	TB-13	275N	110E	3.0	ND		
9-Sep-94	TB-13	315N	90E	3.0	1		
9-Sep-94	HA-18	340N	275E	3.0	7		
9-Sep-94	HA-18	360N	275E	3.0	2		
9-Sep-94	HA-18	380N	275E	3.0	11		
9-Sep-94	HA-18	400N	275E	3.0	ND		BIA spill site
9-Sep-94	HA-18	420N	295E	3.0	ND		
9-Sep-94	HA-18	400N	295E	3.0	3		
9-Sep-94	HA-18	380N	295E	3.0	1		Peat sample
9-Sep-94	HA-18	360N	295E	3.0	3		
9-Sep-94	HA-18	340N	295E	3.0	2		
9-Sep-94	HA-18	440N	315E	3.0	ND		
9-Sep-94	HA-18	420N	315E	3.0	3		
9-Sep-94	HA-18	420N	335E	3.0	1		
9-Sep-94	HA-18	400N	355E	3.0	32		
9-Sep-94	HA-18	400N	335E	3.0	43		Peat sample
9-Sep-94	HA-18	400N	315E	3.0	5	2.5	
9-Sep-94	HA-18	380N	315E	3.0	21	2.5	
9-Sep-94	HA-18	320N	315E	3.0	1		
9-Sep-94	HA-18	340N	315E	3.0	1		
9-Sep-94	HA-18	360N	315E	3.0	457		Strong POL odor
9-Sep-94	HA-18	360N	335E	3.0	3		
9-Sep-94	HA-18	340N	335E	3.0	ND		
9-Sep-94	HA-18	320N	355E	3.0	2		
9-Sep-94	HA-18	320N	335E	3.0	ND		
9-Sep-94	HA-18	340N	355E	3.0	37		
9-Sep-94	HA-18	360N	355E	3.0	60		Strong POL odor
9-Sep-94	HA-18	360N	375E	3.0	33		Strong POL odor
9-Sep-94	HA-18	380N	375E	3.0	13		

Table 20 (Continued)

Date	Site	Sample Coordinates			PID	Peat	Comments
		N-S	E-W	Depth	PPM	Depth	
9-Sep-94	HA-18	320N	375E	3.0	1		
9-Sep-94	HA-18	405N	375E	3.0	4		
9-Sep-94	HA-18	380N	355E	3.0	6		
9-Sep-94	HA-21B	175N	50E	3.0	5		
9-Sep-94	HA-21B	175N	30E	3.0	3		Berm sand
9-Sep-94	HA-21B	175N	10E	3.0	123		
9-Sep-94	HA-21B	190N	10W	3.0	179		
9-Sep-94	HA-21B	195N	10W	3.0	47		
9-Sep-94	HA-21B	195N	30W	3.0	6		
9-Sep-94	HA-21B	215N	50W	3.0	23		
9-Sep-94	HA-21B	195N	50W	3.0	39		
9-Sep-94	HA-21B	195N	70W	3.0	224		
9-Sep-94	HA-21B	195N	90W	3.0	79		
9-Sep-94	HA-21B	215N	90W	3.0	127		
9-Sep-94	HA-21B	215N	70W	3.0	30		
9-Sep-94	HA-21B	235N	70W	3.0	51		
9-Sep-94	HA-21B	235N	90W	3.0	20		
9-Sep-94	HA-21B	175N	50W	3.0	161		
9-Sep-94	HA-21B	175N	30W	3.0	65		
9-Sep-94	HA-21B	115N	10W	3.0	48		
9-Sep-94	HA-21B	135N	10W	3.0	16		
9-Sep-94	HA-21B	155N	10W	3.0	25		
9-Sep-94	HA-21B	135N	10W	3.0	15		
9-Sep-94	HA-21B	135N	30W	3.0	4		
9-Sep-94	HA-21B	12N	210E	3.0	12		
9-Sep-94	HA-21B	12N	230E	3.0	2		
9-Sep-94	HA-21B	12N	250E	3.0	4		
9-Sep-94	HA-21B	70S	243E	3.0	1		
9-Sep-94	HA-21B	70S	223E	3.0	ND		
9-Sep-94	HA-21B	70S	203E	3.0	ND		
9-Sep-94	HA-21B	70S	183E	3.0	1		
9-Sep-94	HA-21B	70S	163E	3.0	118		
9-Sep-94	HA-21B	70S	143E	3.0	206		
9-Sep-94	HA-21B	70S	123E	3.0	55		
9-Sep-94	HA-21B	50S	123E	3.0	364		
9-Sep-94	HA-21B	50S	143E	3.0	12		
9-Sep-94	HA-21B	50S	163E	3.0	3		
9-Sep-94	HA-21B	50S	183E	3.0	1		
9-Sep-94	HA-21B	50S	203E	3.0	18		
9-Sep-94	HA-21B	50S	223E	3.0	3		
9-Sep-94	HA-21B	50S	243E	3.0	6		
13-Sep-94	HA-18	320N	375E	3.0	1		
13-Sep-94	HA-18	320N	395E	3.0	6		
13-Sep-94	HA-18	320N	415E	3.0	15		
13-Sep-94	HA-18	340N	415E	3.0	ND		
13-Sep-94	HA-18	340N	395E	3.0	ND	2.5	
13-Sep-94	HA-18	360N	395E	3.0	6		
13-Sep-94	HA-18	360N	415E	3.0	ND		
13-Sep-94	HA-18	380N	415E	3.0	ND		

Table 20 (Continued)

Date	Site	Sample Coordinates			PID	Peat	Comments
		N-S	E-W	Depth	PPM	Depth	
13-Sep-94	HA-18	400N	415E	3.0	ND		Berm sample
13-Sep-94	HA-18	400N	435E	3.0	1		Berm sample
13-Sep-94	HA-18	419N	415E	3.0	ND		Berm sample
13-Sep-94	HA-18	420N	395E	3.0	2		
13-Sep-94	HA-18	400N	395E	3.0	40		
13-Sep-94	HA-18	380N	395E	3.0	25		
13-Sep-94		95N	10W	3.0	11		
13-Sep-94		92N	50W	3.0	42		
13-Sep-94		77N	329E	3.0	ND		
13-Sep-94		95N	70W	3.0	ND		
13-Sep-94		135N	90W	3.0	ND		
13-Sep-94		155N	10W	3.0	58		
13-Sep-94		195N	110W	3.0	44		
13-Sep-94		95N	90W	3.0	1		
13-Sep-94		150N	329E	3.0	ND		
13-Sep-94		95N	110W	3.0	41		
13-Sep-94		95N	130W	3.0	8		
13-Sep-94		215N	110W	3.0	80		
13-Sep-94		115N	90W	3.0	8		
13-Sep-94		196N	329E	3.0	4		
13-Sep-94		310N	40E	3.0	80		
13-Sep-94		25N	0	3.0	ND		
13-Sep-94		97S	77W	3.0	ND		
13-Sep-94		74S	31W	3.0	ND		
13-Sep-94	TB-3	268S	250W	3.0	194		
13-Sep-94	TB-3	276S	258W	3.0	4		
13-Sep-94		211S	348W	3.0	ND		
13-Sep-94		211S	388W	3.0	ND	3.0	
13-Sep-94		271S	388W	3.0	ND		
13-Sep-94		271S	348W	3.0	ND		
13-Sep-94		331S	348W	3.0	ND		
13-Sep-94		391S	388W	3.0	ND		Peat Sample
13-Sep-94		331S	388W	3.0	ND		
13-Sep-94		451S	388W	3.0	ND		
13-Sep-94		391S	348W	3.0	ND		
13-Sep-94		451S	348W	3.0	ND		
13-Sep-94		511S	348W	3.0	ND		
13-Sep-94	TB-2	310S	70W	3.0	14		Peat sample
13-Sep-94	TB-2	310S	60W	3.0	37		
13-Sep-94	TB-2	320S	70W	3.0	3		
13-Sep-94	TB-2	320S	80W	3.0	26		
13-Sep-94	TB-2	310S	80W	3.0	3		
13-Sep-94	TB-2	320S	90W	3.0	14		
13-Sep-94		260S	200E	3.0	ND		
13-Sep-94		220S	160E	3.0	ND	3.0	Peat sample
13-Sep-94		220S	180E	3.0	ND		Peat sample
13-Sep-94		220S	220E	3.0	ND		
13-Sep-94		220S	200E	3.0	ND	3.0	Peat sample
13-Sep-94		220S	260E	3.0	ND	2.0	

Table 20 (Continued)

Date	Site	Sample Coordinates			PID PPM	Peat Depth	Comments
		N-S	E-W	Depth			
13-Sep-94		200S	260E	3.0	ND		
13-Sep-94		137S	235E	3.0	ND		Peat sample
13-Sep-94		137S	225E	3.0	ND	2.5	
13-Sep-94		137S	215E	3.0	ND		
13-Sep-94		137S	195E	3.0	ND		
13-Sep-94		137S	175E	3.0	44		POL smell
13-Sep-94		137S	155E	3.0	ND		
13-Sep-94		137S	135E	3.0	1		
13-Sep-94		137S	125E	3.0	ND		
13-Sep-94		157S	235E	3.0	ND		
13-Sep-94		147S	225E	3.0	4		
13-Sep-94		137S	225E	3.0	46		POL smell
13-Sep-94		157S	215E	3.0	3		
13-Sep-94		157S	195E	3.0	ND		
13-Sep-94		157S	175E	3.0	11		
13-Sep-94		157S	155E	3.0	2		
13-Sep-94		157S	135E	3.0	ND		
13-Sep-94		157S	125E	3.0	ND		
13-Sep-94		177S	235E	3.0	725		POL smell
13-Sep-94		177S	245E	3.0	12		
13-Sep-94		157S	245E	3.0	ND		
13-Sep-94		30S	243E	3.0	ND		
13-Sep-94		30S	223E	3.0	ND		
13-Sep-94		8S	230E	3.0	ND		
13-Sep-94		8S	210E	3.0	ND		
13-Sep-94		32N	230E	3.0	4		
13-Sep-94		32N	210E	3.0	ND		
13-Sep-94		32N	190E	3.0	5		
13-Sep-94		32N	170E	3.0	4		
13-Sep-94		32N	150E	3.0	ND		
13-Sep-94		32N	130E	3.0	ND		
13-Sep-94		32N	11E	3.0	ND		
13-Sep-94		177S	255E	3.0	ND		

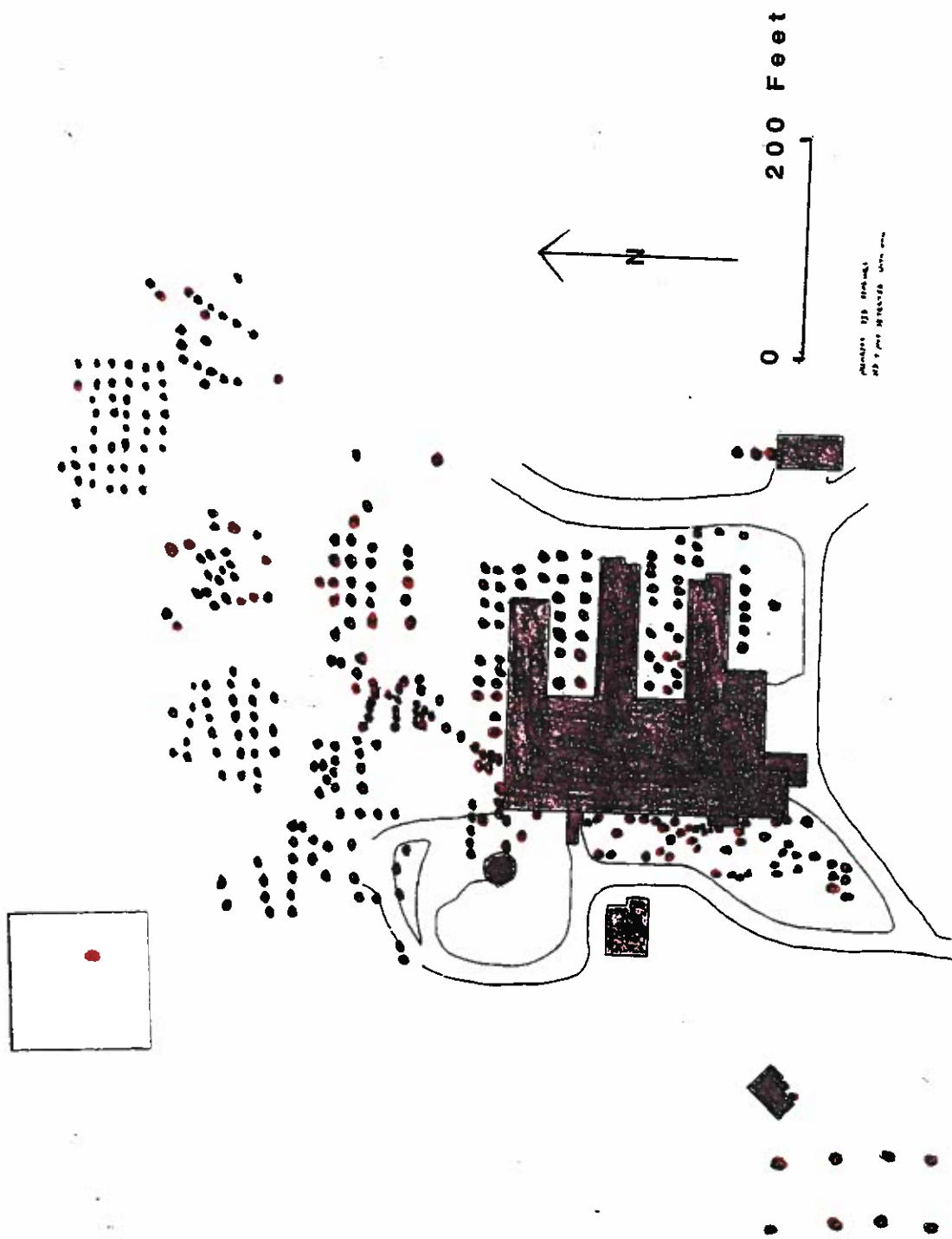


Figure 18 Locations of data utilized to delineate contaminated soils at the BIA site, Bethel, Alaska. Fuel pipe joints and tank locations were preferentially selected. Additionally, samples were collected with a Bobcat auger from three-foot depth at the nodal points of a mostly 20-foot square grid. For each sample, concentrations of organic vapor were measured with a PID. Laboratory samples were collected from the garage floor, storage sheds, sewage lagoon and the berms surrounding the tanks. These samples were analyzed for Organochlorine Pesticides, PCBs (EPA 8080), Volatile Organics (EPA 8240), TCLP Metals (EPA 1311), and DRO (EPA 8100M). Table 20 list the PID data values, Figure 5 delineates the extent, while Table 19 lists the volumes of contaminated soils.

### 6.3 Dirt Floors

#### 6.3.1 Previous Investigative Work

A sample, 420099180040, collected at the time of PA from the sand-floored portion of the garage in Bldg 413 (HA-22) showed DDT contamination of 730 PPB. The area of suspected contamination was 16 feet by 22 feet. The present work plan suggested containerization of the DDT contaminated soil and bringing to Elmendorf AFB for disposal.

#### 6.3.2 Delineation of DDT Contaminated Soils

To delineate the extent of DDT contaminated soils samples were collected from corner and center locations of garage and dirt floors at sites HA-21 & HA-22 (Table 21). The analyses indicated that DDT contamination was limited to the near surface soils and was non-detect at 3 feet depth (Sample 340009480238).

*Table 21 Laboratory analyses results for the samples analyzed for DDT and PCB*

Sample Number	Site	Coordinates			DDT PPM	PCB PPM
		N-S FT	E-W FT	Depth FT		
340009480219	Sewage Lagoon				0.75	11.50 ←
340009480220	HA-21	141N	69W	1.5	1.15	ND
340009480221	HA-21	162N	69W	1.5	0.06	ND
340009480222	HA-21	162N	45W	1.5	0.35	ND
340009480223	HA-22	141N	45W	1.5	0.30	ND
340009480224	HA-22	270S	35E	1.5	4.20	ND
340009480225	HA-22	270S	41E	1.5	0.12	0.30
340009480226	HA-22	278S	35E	1.5	0.23	ND
340009480227	HA-22	278S	41E	1.5	0.56	0.40
340009480228	HA-22	247S	50E	1.5	0.29	0.40
340009480229	HA-22	247S	56E	1.5	1.30	2.00 ←
340009480230	HA-22	262S	53E	1.5	0.06	ND
340009480231	HA-22	276S	56E	1.5	0.35	0.50
340009480232	HA-22	276S	50E	1.5	1.03	0.30
340009480236	Background	884S	242W	1.5	ND	ND
340009480237	Background	884S	242W	2.0	ND	ND
340009480238	HA-22	262S	53E	3.0	ND	ND

### 6.4 Sewage Lagoon

#### 6.4.1 Previous Investigative Work

A 130-foot by 130-foot sewage lagoon was located about 375 feet north of Bldg 413. During the PA in 1991 the integrity of the lagoon was intact and showed no evidence of imminent failure. At the time of the PA one water sample was collected from the sewage lagoon and analyzed for total coliform bacteria. Total coliform bacteria and fecal coliform bacteria results were negative.

#### **6.4.2 Chemical Analyses of Sludge**

A bottom mud (sludge) sample was collected during the present field investigation and was subjected to the following analyses: EPA 8240, EPA 8080 and EPA 7000. Analyses results with EPA Method 8080 showed presence of DDT (0.75 PPM) and PCB (11.50 PPM). Analyses results show none detected at or above the method reporting limits for EPA Methods 8240 and 7000.

#### **6.5 Water Well**

There was a water well located to the southeast of Bldg 413 across the BIA road. During this (1994) field investigation the water well was open only to 169 feet depth. The water within the well did not rise back to the initial level when water was withdrawn. There, probably was no hydraulic connection between the surface and the subsurface deeper than 169 feet.



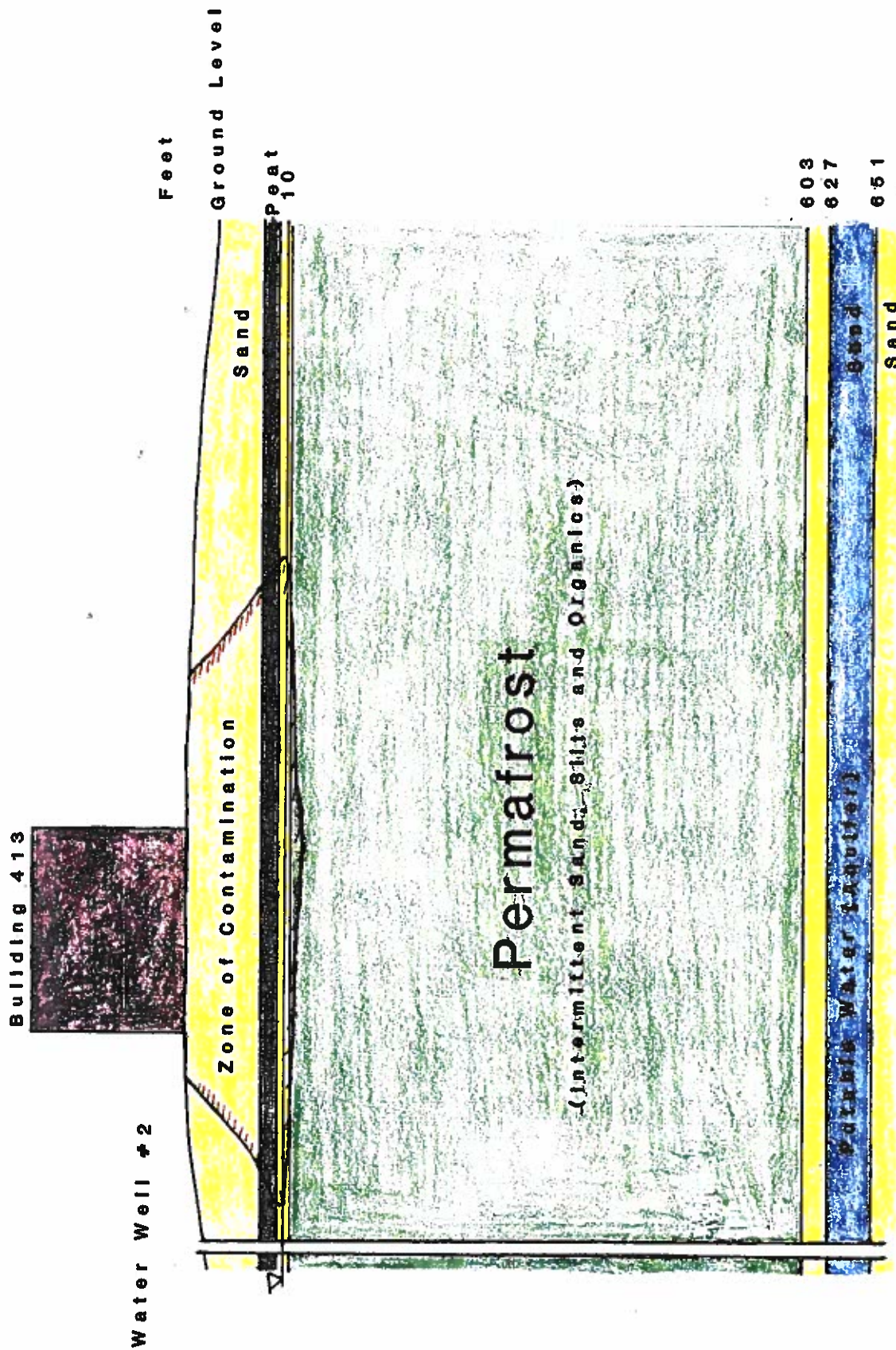


Figure 19 Schematic cross-section of the BIA site, Bethel, Alaska. POL related contaminations are limited to the shallow subsurface; a 600 ft thick continuous layer of permafrost vertically separates the contaminates from the aquifer which supplied the drinking water for the BIA facility. Field investigations (1994) indicated that the permafrost acts as a barrier to the downward migration of POL. Water Well 2 was open only to 169 ft depth. The water within the well did not rise back to the initial level when water was withdrawn. There, probably, is no hydraulic connection between the surface and the subsurface deeper than 169 ft.



## 6.6 Berm soils and backfill material

The large tanks located on the northern part of the site were surrounded by earthen, unlined berms to contain the spilled fuel. The excavation at the gasoline tank site near the BIA access gate (TB-12) demonstrated the ineffectiveness of these berms as barrier to the spilled fuel migration. At the TB-12 site the spilled fuel migrated past the berms along the underlying porous soil.

The tanks were removed, while the berms were left in place. Since spilled fuel migrated under the berms, the soil containing the berm may not be contaminated. If laboratory analysis of soil samples collected from the berms indicate no contamination than the soil can be used to backfill the excavations. Eight soil samples were collected for laboratory analysis. Two of these were duplicate samples. Samples were collected from the top of the berm by digging 18 inches deep holes with a clean shovel. Figure 20 illustrates the location of the samples while Table 22 reports the laboratory analysis results. Sample 340009480241 showed the DRO concentration of 206 PPM while the duplicate sample 340009480240 did not detect any concentration above the method reporting limit (10 PPM). However, the consulting laboratory reported that the concentration reported for the sample 340009480241 was biogenic in origin not from the diesel range organics. Based on this study, at least the upper part of the berms can be used as backfill soil for the future excavations.

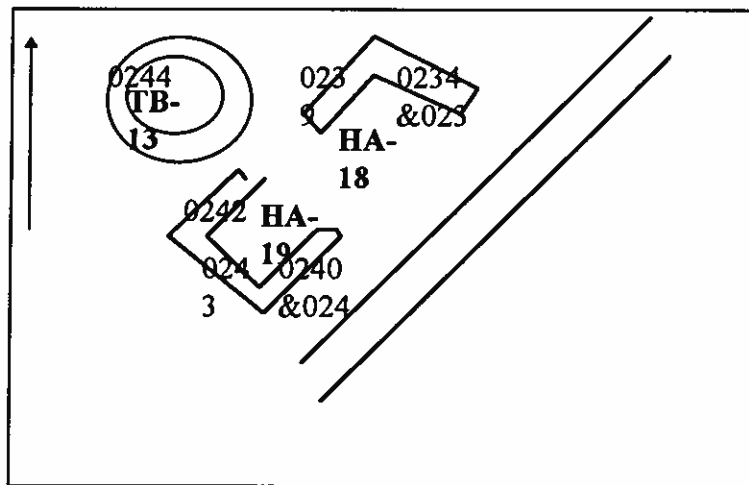


Figure 20 Schematic diagram of the berms at the northern part of the BIA site. Numbers are the last four digits of the sample numbers collected from that location. Samples were collected to determine the contamination level of the berms. See text for further information. Results of the analysis are in Table 22.

*Table 22 Laboratory analyses of the berm samples. The samples were collected to test the usability of the berm-soil as the backfill. Sample locations are shown in Figure 20.*

Sample Number	Tank	DRO PPM	Comments
340009480234	HA-18	32	North Berm. Duplicate of 340009480235
340009480235	HA-18	29	North Berm. Duplicate of 340009480234
340009480239	HA-18	ND	West Berm
340009480240	HA-19	ND	East Berm. Duplicate of 340009480241
340009480241	HA-19	206	East Berm. Duplicate of 340009480240
340009480242	HA-19	17	West Berm
340009480243	HA-19	ND	South Berm
340009480244	TB-13	ND	Circular Berm

DRO = Diesel Range Organics

ND = Not detected at or above the method reporting limit for the sample

PPM = Parts per million in concentration.



**FIELD AND ANALYTICAL REPORT**

**FOR**

**THE INTERIM REMOVAL OF CONTAMINATED SOIL AT THE  
BUREAU OF INDIAN AFFAIRS (BIA) SITE, BETHEL, ALASKA**

*AUGUST TO SEPTEMBER 1994*

**VOLUME II - DATA**

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611 CES/CEOR  
21885 2ND ST  
ELMENDORF AFB, AK 99506-4420

**APPENDIX A**  
**ANALYTICAL DATA**

**BETHEL BIA SITE  
SAMPLE IDENTIFICATION CROSS-REFERENCE**

Sample Number	Location	Page (s)
340009480048	TB-12	A-6; A-7; A-8
340009480049	TB-12	A-6; A-7; A-8
340009480050	TB-12	A-6; A-7; A-9
340009480051	TB-12	A-6; A-7; A-9
340009480052	TB-12	A-6; A-7; A-9
340009480053	TB-12	A-6; A-7; A-10
340009480054	TB-12	A-6; A-7; A-10
340009480055	TB-12	A-6; A-7; A-10
340009480056	TB-12	A-6; A-7; A-11
340009480057	TB-12	A-6; A-7; A-11
340009480058	TB-12	A-6; A-7; A-11
340009480059	TB-12	A-6; A-7; A-12
340009480060	TB-12	A-6; A-7; A-12
340009480061	TB-12	A-6; A-7; A-12
340009480062	TB-12	A-6; A-7; A-13
340009480063	Trip Blank	A-13
340009480064	TB-12	A-14; A-15; A-16
340009480065	TB-12	A-14; A-15; A-16
340009480066	TB-12	A-14; A-15; A-17
340009480067	TB-12	A-14; A-15; A-17
340009480068	TB-12	A-14; A-15; A-17
340009480069	TB-12	A-14; A-15; A-18
340009480070	TB-12	A-14; A-15; A-18
340009480071	TB-15	A-14; A-20
340009480072	TB-15	A-14; A-20
340009480073	TB-15	A-14; A-20
340009480074	Trip Blank	A-19
340009480075	TB-15	A-21; A-25
340009480076	TB-15	A-21; A-25
340009480077	TB-15	A-21; A-25
340009480078	TB-15	A-21; A-25
340009480079	TB-15	A-21; A-25
340009480080	TB-15	A-21; A-25
340009480081	TB-15	A-21; A-25
340009480082	TB-15	A-21; A-25
340009480083	TB-15	A-21; A-25
340009480084	TB-15	A-21; A-25
340009480085	TB-15	A-21; A-27
340009480086	TB-15	A-21; A-26
340009480087	TB-15	A-21; A-27

Sample Number	Location	Page (s)
340009480088	TB-15	A-21; A-26
340009480089	TB-15	A-21; A-26
340009480090	TB-15	A-21; A-26
340009480091	TB-15	A-21; A-26
340009480092	TB-15	A-21; A-26
340009480093	TB-15	A-21; A-26
340009480094	TB-15	A-21; A-26
340009480095	TB-15	A-21; A-28
340009480096	TB-15	A-21; A-28
340009480097	TB-15	A-21; A-28
340009480098	TB-15	A-21; A-28
340009480099	TB-15	A-21; A-28
340009480100	TB-15	A-21; A-28
340009480101	TB-12	A-21; A-22; A-23
340009480102	Trip Blank	A-24
340009480103	TB-15	A-29; A-31; A-33
340009480104	TB-15	A-29; A-31; A-33
340009480105	TB-15	A-29; A-31; A-33
340009480106	TB-15	A-29; A-33; A-33
340009480107	TB-15	A-29; A-31; A-33
340009480108	TB-15	A-29; A-31; A-33
340009480109	TB-15	A-29; A-31; A-33
340009480110	TB-15	A-29; A-31; A-33
340009480111	TB-15	A-29; A-31; A-33
340009480112	TB-15	A-29; A-31; A-33
340009480113	TB-15	A-29; A-31; A-33
340009480114	TB-15	A-29; A-33; A-33
340009480115	TB-15	A-29; A-31; A-33
340009480116	TB-15	A-29; A-31; A-33
340009480117	TB-15	A-29; A-31; A-33
340009480118	TB-15	A-29; A-31; A-33
340009480119	TB-15	A-29; A-31; A-33
340009480120	TB-15	A-29; A-31; A-33
340009480121	TB-15	A-29; A-31; A-33
340009480122	TB-15	A-29; A-31; A-33
340009480123	TB-15	A-29; A-31; A-33
340009480124	TB-15	A-29; A-31; A-33
340009480125	TB-15	A-29; A-33; A-33
340009480126	TB-15	A-29; A-31; A-33
340009480127	TB-15	A-29; A-31; A-33
340009480128	TB-15	A-30; A-33
340009480129	TB-15	A-30; A-33

Sample Number	Location	Page (s)
340009480130	TB-15	A-30; A-31; A-33
340009480131	TB-15	A-30; A-31; A-33
340009480132	TB-15	A-30; A-33
340009480133	TB-15	A-30; A-31; A-33
340009480134	TB-15	A-30; A-31; A-33
340009480135	TB-15	A-30; A-31; A-33
340009480136	TB-15	A-30; A-31; A-33
340009480137	TB-15	A-30; A-32; A-34
340009480138	TB-15	A-30; A-32; A-34
340009480139	TB-2	A-30; A-32; A-34
340009480140	TB-2	A-30; A-32; A-34
340009480141	TB-2	A-30; A-32; A-34
340009480142	TB-2	A-30; A-32; A-34
340009480143	Trip Blank	Not analyzed
340009480144	TB-2	A-30; A-32; A-34
340009480145	TB-2	A-30; A-32; A-34
340009480146	TB-2	A-35; A-43
340009480147	TB-2	A-35; A-43
340009480148	TB-12	A-35; A-36; A-38
340009480149	TB-12	A-35; A-36; A-38
340009480150	TB-12	A-35; A-36; A-39
340009480151	TB-12	A-35; A-36; A-39
340009480152	TB-12	A-35; A-36; A-39
340009480153	TB-12	A-35; A-36; A-40
340009480154	TB-12	A-35; A-36; A-40
340009480155	TB-12	A-35; A-36; A-40
340009480156	TB-12	A-35; A-36; A-41
340009480157	TB-12	A-35; A-36; A-41
340009480158	TB-12	A-35; A-36; A-41
340009480159	TB-12	A-35; A-36; A-42
340009480160	TB-15	A-35; A-43; A-46
340009480161	TB-15	A-35; A-43; A-46
340009480162	TB-15	A-35; A-43
340009480163	TB-15	A-35; A-43; A-46
340009480164	TB-15	A-35; A-43
340009480165	TB-15	A-35; A-43; A-46
340009480166	TB-2	A-35; A-43
340009480167	TB-2	A-35; A-43
340009480168	TB-2	A-35; A-43
340009480169	TB-2	A-35; A-43
340009480170	TB-2	A-35; A-43; A-46
340009480171	TB-2	A-35; A-43



Sample Number	Location	Page (s)
340009480172	TB-2	A-35; A-43
340009480173	TB-2	A-35; A-43; A-46
340009480174	TB-2	A-35; A-43; A-46
340009480175	TB-2	A-35; A-44
340009480176	TB-2	A-35; A-44; A-46
340009480177	TB-2	A-35; A-44
340009480178	TB-2	A-35; A-45
340009480179	TB-2	A-35; A-44
340009480180	TB-2	A-35; A-45
340009480181	TB-2	A-35; A-45; A-46
340009480182	TB-2	A-35; A-45; A-46
340009480183	TB-2	A-35; A-44
340009480184	TB-2	A-35; A-45; A-46
340009480185	TB-2	A-35; A-45; A-46
340009480186	TB-2	A-35; A-45; A-46
340009480187	TB-2	A-35; A-44
340009480188	TB-2	A-35; A-45
340009480189	TB-2	A-35; A-44
340009480190	TB-2	A-35; A-44
340009480191	TB-2	A-35; A-45
340009480192	Trip blank	A-37
340009480193	TB-2	A-47; A-48
340009480194	TB-2	A-47; A-48
340009480195	TB-2	A-47; A-49
340009480196	TB-2	A-47; A-49
340009480197	TB-2	A-47; A-49
340009480198	TB-2	A-47; A-49
340009480199	TB-2	A-47; A-49
340009480200	TB-2	A-47; A-49
340009480201	TB-2	A-47; A-49
340009480202	TB-2	A-47; A-49
340009480203	TB-2	A-47; A-49
340009480204	TB-2	A-47; A-49
340009480205	TB-2	A-47; A-49
340009480206	TB-2	A-47; A-49
340009480207	TB-2	A-47; A-49
340009480208	TB-6	A-47; A-49
340009480209	TB-6	A-47; A-49
340009480210	TB-6	A-47; A-49
340009480211	TB-6	A-47; A-49
340009480212	TB-6	A-47; A-49
340009480213	TB-6	A-47; A-49

Sample Number	Location	Page (s)
340009480214	TB-6	A-47; A-49
340009480215	TB-6	A-47; A-50
340009480216	TB-6	A-47; A-50
340009480217	TB-6	A-47; A-50
340009480218	TB-6	A-47; A-50
340009480219	Sewage Lagoon	A-51; A-59; A-61; A-66
340009480220	HA-21	A-52; A-59; A-61; A-67
340009480221	HA-21	A-52; A-59; A-61; A-67
340009480222	HA-21	A-53; A-59; A-61; A-67
340009480223	HA-21	A-53; A-59; A-61; A-68
340009480224	HA-22	A-54; A-59; A-61; A-68
340009480225	HA-22	A-54; A-59; A-63; A-68
340009480226	HA-22	A-55; A-59; A-63; A-69
340009480227	HA-22	A-55; A-59; A-63; A-71
340009480228	HA-22	A-56; A-59; A-64; A-70
340009480229	HA-22	A-56; A-60; A-64; A-70
340009480230	HA-22	A-57; A-60; A-64; A-71
340009480231	HA-22	A-57; A-60; A-65; A-71
340009480232	HA-22	A-58; A-60; A-65; A-72
340009480233	Trip blank	Not analyzed
340009480234	HA-18	A-75; A-80
340009480235	HA-18	A-75; A-80
340009480236	Background	A-75; A-76; A-78; A-80; A-81; A-82
340009480237	Background	A-75; A-76; A-78; A-80; A-81; A-82
340009480238	HA-22	A-75; A-76; A-79; A-80; A-81; A-82
340009480239	HA-18	A-75; A-80
340009480240	HA-19	A-75; A-80
340009480241	HA-19	A-75; A-80
340009480242	HA-19	A-75; A-80
340009480243	HA-19	A-75; A-80
340009480244	TB-13	A-75; A-80
340009480245	Trip blank	Not analyzed

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA, Bethel/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/5/94  
**Date Analyzed:** 8/12/94  
**Work Order #:** A940324

Solids, Total  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
340009480048	A940324-1	86.6
340009480049	A940324-2	88.2
340009480050	A940324-3	85.6
340009480051	A940324-4	89.5
340009480052	A940324-5	87.8
340009480053	A940324-6	88.4
340009480054	A940324-7	88.3
340009480055	A940324-8	88.2
340009480056	A940324-9	89.7
340009480057	A940324-10	87.1
340009480058	A940324-11	88.8
340009480059	A940324-12	89.8
340009480060	A940324-13	87.9
340009480061	A940324-14	88.9
340009480062	A940324-15	86.7

Approved by JFW September 1, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA, Bethel/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/5/94  
**Work Order #:** A940324

**Inorganic Parameters  
mg/Kg (ppm)  
Dry Weight Basis**

<b>Analyte:</b>	<b>Lead</b>
<b>Method:</b>	7421
<b>Method Reporting Limit:</b>	1.0
<b>Date Analyzed:</b>	8/15/94

<b>Sample Name</b>	<b>Lab Code</b>	
Method Blank	A940813-SB1	ND
340009480048	A940324-1	10.8
340009480049	A940324-2	9.1
340009480050	A940324-3	5.7
340009480051	A940324-4	8.2
340009480052	A940324-5	8.2
340009480053	A940324-6	40.1
340009480054	A940324-7	9.2
340009480055	A940324-8	11.2
340009480056	A940324-9	12.8
340009480057	A940324-10	11.3
340009480058	A940324-11	5.8
340009480059	A940324-12	14.5
340009480060	A940324-13	6.2
340009480061	A940324-14	10.4
340009480062	A940324-15	18.8

**ND** None Detected at or above the method reporting limit

Approved by JFW September 1, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA, Bethel/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/5/94  
**Date Extracted:** 8/12/94  
**Work Order #:** A940324

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	Method Blank	340009480048	340009480049
Lab Code:	A940812-SB1	A940324-1	A940324-2
Date Analyzed:	8/12/94	8/13/94	8/12/94

Analyte	MRL			
Benzene	0.05	ND	ND	ND
Toluene	0.05	ND	5 <sup>ab</sup>	ND
Ethylbenzene	0.05	ND	19 <sup>ab</sup>	ND
Total Xylenes	0.05	ND	100 <sup>ab</sup>	ND
GRO as Gasoline	5	ND	2900 <sup>abc</sup>	ND

- a MRL is elevated 10 times because the sample required diluting.  
b Result is from the analysis of a diluted sample, performed on August 17, 1994.  
c Quantified as gasoline. The sample contained components that eluted in the C<sub>6</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.

Approved by JFW September 1, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA, Bethel/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/5/94  
**Date Extracted:** 8/12/94  
**Work Order #:** A940324

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	340009480050	340009480051	340009480052
Lab Code:	A940324-3	A940324-4	A940324-5
Date Analyzed:	8/12/94	8/12/94	8/12/94

Analyte	MRL			
Benzene	0.05	ND	ND	ND
Toluene	0.05	0.07	ND	ND
Ethylbenzene	0.05	ND	3.10	6.44
Total Xylenes	0.05	2.72	4.54	8.59
GRO as Gasoline	5	22°	325°	610 <sup>abc</sup>

- a** MRL is elevated 10 times because the sample required diluting.  
**b** Result is from the analysis of a diluted sample, performed on August 17, 1994.  
**c** Quantified as gasoline. The sample contained components that eluted in the C<sub>8</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.

Approved by TFW September 1, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA, Bethel/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/5/94  
**Date Extracted:** 8/12/94  
**Work Order #:** A940324

BTEX and GRO as Gasoline  
 EPA Methods 5030/8020/Modified 8015  
 mg/Kg (ppm)  
 Dry Weight Basis

Sample Name:	340009480053	340009480054	340009480055
Lab Code:	A940324-6	A940324-7	A940324-8
Date Analyzed:	8/24/94	8/12/94	8/12/94

Analyte	MRL			
Benzene	0.05	10 <sup>da</sup>	ND	ND
Toluene	0.05	340 <sup>da</sup>	54 <sup>ab</sup>	2.2 <sup>ab</sup>
Ethylbenzene	0.05	140 <sup>da</sup>	43 <sup>ab</sup>	9.5 <sup>ab</sup>
Total Xylenes	0.05	1300 <sup>da</sup>	290 <sup>ab</sup>	270 <sup>ab</sup>
GRO as Gasoline	5	6800 <sup>da</sup>	2200 <sup>abc</sup>	2200 <sup>abc</sup>

- a MRL is elevated 10 times because the sample required diluting.
- b Result is from the analysis of a diluted sample, performed on August 17, 1994.
- c Quantified as gasoline. The sample contained components that eluted in the C<sub>6</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.
- d Result is from the analysis of a diluted sample, performed on August 24, 1994.
- e MRL is elevated 100 times because the sample required diluting.
- \* Sample was analyzed 7 days past the end of the recommended maximum holding time. Initial analysis, performed *within* the recommended maximum holding time, failed CAS QC criteria. The reanalysis met our QC criteria. It is the opinion of CAS that the quality of the sample data has not been significantly affected.

Approved by JEW September 1, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

Analytical Report

**Client:** Dept. of the Air Force  
**Project:** BIA, Bethel/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/5/94  
**Date Extracted:** 8/12/94  
**Work Order #:** A940324

BTEX and GRO as Gasoline  
 EPA Methods 5030/8020/Modified 8015  
 mg/Kg (ppm)  
 - Dry Weight Basis

Sample Name:	340009480056	340009480057	340009480058
Lab Code:	A940324-9	A940324-10	A940324-11
Date Analyzed:	8/24/94	8/12/94	8/12/94

Analyte	MRL			
Benzene	0.05	ND <sup>da</sup>	ND	ND
Toluene	0.05	7 <sup>da</sup>	ND	ND
Ethylbenzene	0.05	50 <sup>da</sup>	4.52	5.40
Total Xylenes	0.05	740 <sup>da</sup>	10.6	19.91
GRO as Gasoline	5	7500 <sup>da</sup>	540 <sup>abc</sup>	1200 <sup>abc</sup>

- a MRL is elevated 10 times because the sample required diluting.
- b Result is from the analysis of a diluted sample, performed on August 17, 1994.
- c Quantified as gasoline. The sample contained components that eluted in the C<sub>8</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.
- d Result is from the analysis of a diluted sample, performed on August 24, 1994.
- e MRL is elevated 100 times because the sample required diluting.
- \* Sample was analyzed 7 days past the end of the recommended maximum holding time. Initial analysis, performed *within* the recommended maximum holding time, failed CAS QC criteria. The reanalysis met our QC criteria. It is the opinion of CAS that the quality of the sample data has not been significantly affected.

Approved by JPW September 1, 1994



**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA, Bethel/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/5/94  
**Date Extracted:** 8/12/94  
**Work Order #:** A940324

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	340009480059	340009480060	340009480061
Lab Code:	A940324-12	A940324-13	A940324-14
Date Analyzed:	8/12/94	8/12/94	8/12/94

Analyte	MRL			
Benzene	0.05	ND	ND	ND
Toluene	0.05	ND <sup>ab</sup>	ND	ND
Ethylbenzene	0.05	17 <sup>ab</sup>	1.20	1.43
Total Xylenes	0.05	190 <sup>ab</sup>	1.12	1.26
GRO as Gasoline	5	2500 <sup>abc</sup>	113 <sup>c</sup>	129 <sup>c</sup>

- a** MRL is elevated 10 times because the sample required diluting.  
**b** Result is from the analysis of a diluted sample, performed on August 17, 1994.  
**c** Quantified as gasoline. The sample contained components that eluted in the C<sub>8</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.

Approved by IFW September 1, 1994

# COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Dept. of the Air Force  
Project: BIA, Bethel/Project No. 34000  
Sample Matrix: Soil

Date Received: 8/5/94  
Date Extracted: 8/12/94  
Work Order #: A940324

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	340009480062	340009480063
Lab Code:	A940324-15	A940324-16
Date Analyzed:	8/12/94	8/12/94
		(Water Matrix)

Analyte	MRL		
Benzene	0.05	ND	ND <sup>d</sup>
Toluene	0.05	ND	ND <sup>d</sup>
Ethylbenzene	0.05	2.64	ND <sup>d</sup>
Total Xylenes	0.05	6.83	ND <sup>d</sup>
GRO as Gasoline	5	450 <sup>a,b,c</sup>	ND <sup>e</sup>

- a MRL is elevated 10 times because the sample required diluting.
- b Result is from the analysis of a diluted sample, performed on August 17, 1994.
- c Quantified as gasoline. The sample contained components that eluted in the C<sub>8</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.
- d MRL = 1.0 µg/L
- e MRL = 50 µg/L

Approved by IFW September 1, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. B-003  
**Sample Matrix:** Soil

**Date Received:** 8/12/94  
**Date Analyzed:** 8/18/94  
**Work Order #:** A940357

Solids, Total  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
340009480064	A940357-1	85.8
340009480065	A940357-2	85.3
340009480066	A940357-3	84.9
340009480067	A940357-4	57.8
340009480068	A940357-5	31.2
340009480069	A940357-6	34.9
340009480070	A940357-7	36.0
340009480071	A940357-8	87.4
340009480072	A940357-9	79.6
340009480073	A940357-10	86.2

Approved by JEW September 12, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. B-003  
**Sample Matrix:** Soil

**Date Received:** 8/12/94  
**Work Order #:** A940357

**Inorganic Parameters  
mg/Kg (ppm)**

**Analyte:** **Lead**  
**Method:** 7421  
**Method Reporting Limit:** 1  
**Date Analyzed:** 8/17/94

<b>Sample Name</b>	<b>Lab Code</b>	
Method Blank	A940816-SB1	ND
340009480064	A940357-1	4.5
340009480065	A940357-2	3.5
340009480066	A940357-3	2.9
340009480067	A940357-4	1.5
340009480068	A940357-5	2.7
340009480069	A940357-6	1.8
340009480070	A940357-7	ND

ND None Detected at or above the method reporting limit

Approved by JEW September 12, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. B-003  
**Sample Matrix:** Soil

**Date Received:** 8/12/94  
**Date Extracted:** 8/19/94  
**Work Order #:** A940357

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	Method Blank	340009480064	340009480065
Lab Code:	A940819-SB1	A940357-1	A940357-2
Date Analyzed:	8/19/94	8/19/94	8/19/94

Analyte	MRL			
Benzene	0.05	ND	0.11	ND
Toluene	0.05	ND	ND	ND
Ethylbenzene	0.05	ND	0.40	0.08
Total Xylenes	0.05	ND	1.60	0.35
GRO as Gasoline	5	ND	ND	ND

Approved by JFW September 12, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Dept. of the Air Force  
Project: Bethel BIA/Project No. B-003  
Sample Matrix: Soil

Date Received: 8/12/94  
Date Extracted: 8/19/94  
Work Order #: A940357

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	340009480066	340009480067	340009480068
Lab Code:	A940357-3	A940357-4	A940357-5
Date Analyzed:	8/20/94	8/20/94	8/20/94

Analyte	MRL			
Benzene	0.05	ND	ND <sup>a</sup>	ND <sup>a</sup>
Toluene	0.05	ND	4.46 <sup>a</sup>	0.43 <sup>a</sup>
Ethylbenzene	0.05	0.06	2.85 <sup>a</sup>	0.32 <sup>a</sup>
Total Xylenes	0.05	0.28	5.50 <sup>a</sup>	10.8 <sup>a</sup>
GRO as Gasoline	5	ND	40 <sup>a</sup>	182 <sup>ab</sup>

- a MRL is elevated because of the low percent solids in the sample as received.  
b Quantified as gasoline. The sample contained components that eluted in the C<sub>8</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.

Approved by IFW September 12, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. B-003  
**Sample Matrix:** Soil

**Date Received:** 8/12/94  
**Date Extracted:** 8/19/94  
**Work Order #:** A940357

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	340009480069	340009480070
Lab Code:	A940357-6	A940357-7
Date Analyzed:	8/20/94	8/20/94

Analyte	MRL		
Benzene	0.05	ND <sup>a</sup>	ND <sup>a</sup>
Toluene	0.05	ND <sup>a</sup>	ND <sup>a</sup>
Ethylbenzene	0.05	0.14 <sup>a</sup>	0.15 <sup>a</sup>
Total Xylenes	0.05	0.64 <sup>a</sup>	0.64 <sup>a</sup>
GRO as Gasoline	5	12 <sup>ab</sup>	21 <sup>ab</sup>

- a** MRL is elevated because of the low percent solids in the sample as received.  
**b** Quantified as gasoline. The sample contained components that eluted in the C<sub>6</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.

Approved by JEW September 12, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. B-003  
**Sample Matrix:** Water

**Date Received:** 8/12/94  
**Date Extracted:** 8/19/94  
**Work Order #:** A940357

**BTEX and GRO as Gasoline**  
**EPA Methods 5030/8020/Modified 8015**  
**µg/L (ppb)**

**Sample Name:**  
**Lab Code:**  
**Date Analyzed:**

**Method Blank**  
**A940819-WB1**  
**8/19/94**

**340009480074**  
**A940357-11**  
**8/19/94**

<b>Analyte</b>	<b>MRL</b>		
Benzene	0.5	ND	ND
Toluene	1	ND	ND
Ethylbenzene	1	ND	ND
Total Xylenes	1	ND	ND
GRO as Gasoline	50	ND	ND

Approved by ITW September 12, 1994



**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. B-003  
**Sample Matrix:** Soil

**Date Received:** 8/12/94  
**Date Extracted:** 8/18/94  
**Date Analyzed:** 8/26/94  
**Work Order #:** A940357

**Diesel Range Organics**  
**EPA Methods 3540/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
Method Blank	A940818-SB1	10	ND <sup>a</sup>
340009480071	A940357-8	10	6230
340009480072	A940357-9	10	380 <sup>b</sup>
340009480073	A940357-10	10	100 <sup>b</sup>

**a** Result is from an analysis performed on August 24, 1994.

**b** Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

Approved by JEW September 12, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/19/94  
**Date Analyzed:** 8/25/94  
**Work Order #:** A940387

Solids, Total  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
340009480075	A940387-1	84.3
340009480076	A940387-2	90.9
340009480077	A940387-3	93.3
340009480078	A940387-4	89.6
340009480079	A940387-5	91.1
340009480080	A940387-6	91.0
340009480081	A940387-7	84.7
340009480082	A940387-8	84.6
340009480083	A940387-9	81.7
340009480084	A940387-10	84.1
340009480085	A940387-11	92.9
340009480086	A940387-12	92.5
340009480087	A940387-13	86.7
340009480088	A940387-14	90.5
340009480089	A940387-15	89.0
340009480090	A940387-16	87.8
340009480091	A940387-17	80.8
340009480092	A940387-18	92.3
340009480093	A940387-19	90.7
340009480094	A940387-20	92.7
340009480095	A940387-21	90.3
340009480096	A940387-22	84.5
340009480097	A940387-23	56.8
340009480098	A940387-24	87.9
340009480099	A940387-25	85.6
340009480100	A940387-26	89.5
340009480101	A940387-27	86.1

Approved by JFW September 27, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel-BIA/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/19/94  
**Work Order #:** A940387

Total Metals  
mg/Kg (ppm)  
Dry Weight Basis

**Sample Name:**  
**Lab Code:**

**Method Blank**  
**A940825-SB1**

**340009480101**  
**A940387-27**

**Analyte**

**Method**

**MRL**

Lead

7421

1

ND

6.2

Approved by     JFw     September 26, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/19/94  
**Date Extracted:** 8/25/94  
**Work Order #:** A940387

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

**Sample Name:**  
**Lab Code:**  
**Date Analyzed:**

**Method Blank**  
**A940825-SB1**  
**8/26/94**

**340009480101**  
**A940387-27**  
**8/26/94**

**Analyte**

**MRL**

Benzene	0.05	ND	0.07 <sup>a</sup>
Toluene	0.05	ND	ND
Ethylbenzene	0.05	ND	ND
Total Xylenes	0.05	ND	ND
GRO as Gasoline	5	ND	ND

<sup>a</sup> Result was confirmed qualitatively, using GC/MS techniques.

Approved by JFW September 26, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/19/94  
**Date Extracted:** 8/25/94  
**Work Order #:** A940387

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

**Sample Name:**  
**Lab Code:**  
**Date Analyzed:**

**Method Blank**  
**A940825-SB1**  
**8/26/94**

**340009480102**  
**A940387-28**  
**8/26/94**

<b>Analyte</b>	<b>MRL</b>		
Benzene	0.05	ND	ND
Toluene	0.05	ND	ND
Ethylbenzene	0.05	ND	ND
Total Xylenes	0.05	ND	ND
GRO as Gasoline	5	ND	ND

Approved by FEW September 26, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/19/94  
**Date Extracted:** 8/25/94  
**Date Analyzed:** 8/29,30/94  
**Work Order #:** A940387

**Diesel Range Organics**  
**EPA Methods 3540/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
Method Blank	A940825-SB1	10	ND <sup>b</sup>
340009480075	A940387-1 <sup>c</sup>	100	12,000 <sup>d</sup>
340009480076	A940387-2 <sup>c</sup>	100	17,000 <sup>d</sup>
340009480077	A940387-3	10	880
340009480078	A940387-4	10	5960
340009480079	A940387-5	10	93 <sup>a</sup>
340009480080	A940387-6	10	31
340009480081	A940387-7	100	13,000 <sup>d</sup>
340009480082	A940387-8	10	2950
340009480083	A940387-9	10	256 <sup>a</sup>
340009480084	A940387-10	10	60 <sup>a</sup>

- a** Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.  
**b** Result is from an analysis performed on September 1, 1994.  
**c** Result is from the analysis of a diluted sample, performed on September 3, 1994.

Approved by JFW September 27, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/19/94  
**Date Extracted:** 8/25/94  
**Date Analyzed:** 9/2,3/94  
**Work Order #:** A940387

Diesel Range Organics  
EPA Methods 3540/Modified 8100  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name	Lab Code	MRL	Diesel
340009480086	A940387-12	10	90
340009480088	A940387-14	10	4280
340009480089	A940387-15	10	4460
340009480090	A940387-16	10	4880
340009480091	A940387-17	10	4390
340009480092	A940387-18	10	82
340009480093	A940387-19	10	36
340009480094	A940387-20	10	33

Approved by IFW September 27, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/19/94  
**Date Extracted:** 8/25/94  
**Date Analyzed:** 9/10/94  
**Work Order #:** A940387

Diesel Range Organics  
EPA Methods 3540/Modified 8100  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name	Lab Code	MRL	Diesel
340009480085	A940387-11	10	29,000
340009480087	A940387-13	10	10,000

Approved by JEW September 26, 1994



**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Project No. 34000  
**Sample Matrix:** Soil

**Date Received:** 8/19/94  
**Date Extracted:** 8/27/94  
**Date Analyzed:** 9/9,10/94  
**Work Order #:** A940387

**Diesel Range Organics**  
**EPA Methods 3540/Modified 8100**  
**mg/Kg (ppm)**  
**Dry Weight Basis**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
Method Blank	A940827-SB1	10	ND
340009480095	A940387-21	100	13,000 <sup>b</sup>
340009480096	A940387-22	10	5570
340009480097	A940387-23	20	3230
340009480098	A940387-24	10	62 <sup>a</sup>
340009480099	A940387-25	10	26 <sup>a</sup>
340009480100	A940387-26	10	21 <sup>a</sup>

**a** Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

**b** Result is from the analysis of a diluted sample, performed on September 11, 1994.

Approved by JFW September 26, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Dept. of the Air Force  
Project: Bethel BIA/Work Order No. B-006  
Sample Matrix: Soil

Date Received: 8/26/94  
Date Analyzed: 9/1/94  
Work Order #: A940416

Solids, Total  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
340009480103	A940416-1	85.4
340009480104	A940416-2	88.9
340009480105	A940416-3	88.0
340009480106	A940416-4	85.4
340009480107	A940416-5	85.1
340009480108	A940416-6	82.9
340009480109	A940416-7	89.1
340009480110	A940416-8	84.4
340009480111	A940416-9	91.1
340009480112	A940416-10	90.1
340009480113	A940416-11	84.8
340009480114	A940416-12	86.8
340009480115	A940416-13	89.2
340009480116	A940416-14	81.2
340009480117	A940416-15	86.5
340009480118	A940416-16	87.5
340009480119	A940416-17	86.4
340009480120	A940416-18	82.1
340009480121	A940416-19	90.4
340009480122	A940416-20	82.0
340009480123	A940416-21	83.4
340009480124	A940416-22	86.8
340009480125	A940416-23	83.7
340009480126	A940416-24	86.8
340009480127	A940416-25	84.8

Approved by MB September 29, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Work Order No. B-006  
**Sample Matrix:** Soil

**Date Received:** 8/26/94  
**Date Analyzed:** 9/1/94  
**Work Order #:** A940416

Solids, Total (Continued)  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
340009480128	A940416-26	76.6
340009480129	A940416-27	85.5
340009480130	A940416-28	79.3
340009480131	A940416-29	88.5
340009480132	A940416-30	75.7
340009480133	A940416-31	82.2
340009480134	A940416-32	82.7
340009480135	A940416-33	88.4
340009480136	A940416-34	84.5
340009480137	A940416-35	92.0
340009480138	A940416-36	86.9
340009480139	A940416-37	88.9
340009480140	A940416-38	90.2
340009480141	A940416-39	89.4
340009480142	A940416-40	93.4
340009480144	A940416-42	90.0
340009480145	A940416-43	93.1

Approved by JFW September 27, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Work Order No. B-006  
**Sample Matrix:** Soil

**Date Received:** 8/26/94  
**Date Extracted:** 8/31/94  
**Date Analyzed:** 9/11,12/94  
**Work Order #:** A940416

**Diesel Range Organics**  
**EPA Methods 3540/Modified 8100**  
**mg/Kg (ppm)**

Sample Name	Lab Code	MRL	Diesel
Method Blank	A940831-SB1	10	ND
Method Blank	A940831-SB2	10	ND
340009480103	A940416-1	10	47 <sup>a</sup>
340009480104	A940416-2	10	75 <sup>a</sup>
340009480105	A940416-3	10	39 <sup>a</sup>
340009480107	A940416-5	10	330
340009480108	A940416-6	10	41 <sup>a</sup>
340009480109	A940416-7	10	102
340009480110	A940416-8	10	52 <sup>a</sup>
340009480111	A940416-9	10	36 <sup>a</sup>
340009480112	A940416-10	10	74 <sup>a</sup>
340009480113	A940416-11	10	54 <sup>a</sup>
340009480115	A940416-13	10	5930
340009480116	A940416-14	10	12 <sup>a</sup>
340009480117	A940416-15	10	84
340009480118	A940416-16	10	66
340009480119	A940416-17	10	36 <sup>a</sup>
340009480120	A940416-18	10	32 <sup>a</sup>
340009480121	A940416-19	10	22 <sup>a</sup>
340009480122	A940416-20	10	ND
340009480123	A940416-21	10	32 <sup>a</sup>
340009480124	A940416-22	10	632
340009480126	A940416-24	10	114 <sup>a</sup>
340009480127	A940416-25	10	329
340009480130	A940416-28	10	7030
340009480131	A940416-29	10	1440
340009480133	A940416-31	10	490
340009480134	A940416-32	10	1600
340009480135	A940416-33	10	69 <sup>a</sup>
340009480136	A940416-34	10	26 <sup>a</sup>

<sup>a</sup> Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

Approved by JFW September 27, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Work Order No. B-006  
**Sample Matrix:** Soil

**Date Received:** 8/26/94  
**Date Extracted:** 9/1/94  
**Date Analyzed:** 9/12/94  
**Work Order #:** A940416

**Diesel Range Organics**  
**EPA Methods 3550/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
Method Blank	A940901-SB1	10	ND
340009480137	A940416-35	10	53 <sup>a</sup>
340009480138	A940416-36	10	35 <sup>a</sup>
340009480139	A940416-37	10	4220
340009480140	A940416-38	10	3640
340009480141	A940416-39	10	3770
340009480142	A940416-40	10	2580
340009480144	A940416-42	10	4050
340009480145	A940416-43	10	2680

<sup>a</sup> Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

Approved by STFW September 27, 1994

# COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Dept. of the Air Force  
Project: Bethel BIA/Work Order No. B-006  
Sample Matrix: Soil

Date Received: 8/26/94  
Date Extracted: 8/31/94  
Date Analyzed: 9/11, 12/94  
Work Order #: A940416

Diesel Range Organics  
EPA Methods 3540/Modified 8100  
mg/Kg (ppm)

Sample Name	Lab Code	MRL	Diesel
Method Blank	A940831-SB1	10	ND
Method Blank	A940831-SB2	10	ND
340009480103	A940416-1	10	47 <sup>a</sup>
340009480104	A940416-2	10	75 <sup>a</sup>
340009480105	A940416-3	10	39 <sup>a</sup>
340009480106	A940416-4	100	9000 <sup>b</sup>
340009480107	A940416-5	10	330
340009480108	A940416-6	10	41 <sup>a</sup>
340009480109	A940416-7	10	102
340009480110	A940416-8	10	52 <sup>a</sup>
340009480111	A940416-9	10	36 <sup>a</sup>
340009480112	A940416-10	10	74 <sup>a</sup>
340009480113	A940416-11	10	54 <sup>a</sup>
340009480114	A940416-12	100	15,000 <sup>b</sup>
340009480115	A940416-13	10	5930
340009480116	A940416-14	10	12 <sup>a</sup>
340009480117	A940416-15	10	84
340009480118	A940416-16	10	66
340009480119	A940416-17	10	36 <sup>a</sup>
340009480120	A940416-18	10	32 <sup>a</sup>
340009480121	A940416-19	10	22 <sup>a</sup>
340009480122	A940416-20	10	ND
340009480123	A940416-21	10	32 <sup>a</sup>
340009480124	A940416-22	10	632
340009480125	A940416-23	100	16,000 <sup>b</sup>
340009480126	A940416-24	10	114 <sup>a</sup>
340009480127	A940416-25	10	329
340009480128	A940416-26	100	11,000 <sup>c</sup>
340009480129	A940416-27	100	8300 <sup>b</sup>
340009480130	A940416-28	10	7030
340009480131	A940416-29	10	1440
340009480132	A940416-30	100	11,000 <sup>b</sup>
340009480133	A940416-31	10	490
340009480134	A940416-32	10	1600
340009480135	A940416-33	10	69 <sup>a</sup>
340009480136	A940416-34	10	26 <sup>a</sup>

a Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

b Result is from the analysis of a diluted sample, performed on September 13, 1994.

c Result is from the analysis of a diluted sample, performed on September 16, 1994.

Approved by JFW October 10, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** Bethel BIA/Work Order No. B-006  
**Sample Matrix:** Soil

**Date Received:** 8/26/94  
**Date Extracted:** 9/1/94  
**Date Analyzed:** 9/12/94  
**Work Order #:** A940416

**Diesel Range Organics**  
**EPA Methods 3550/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
Method Blank	A940901-SB1	10	ND
340009480137	A940416-35	10	53 <sup>a</sup>
340009480138	A940416-36	10	35 <sup>a</sup>
340009480139	A940416-37	10	4220
340009480140	A940416-38	10	3640
340009480141	A940416-39	10	3770
340009480142	A940416-40	10	2580
340009480144	A940416-42	10	4050
340009480145	A940416-43	10	2680

<sup>a</sup> Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

Approved by JEW October 10, 1994

# COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Analyzed:** 9/9/94  
**Work Order #:** A940436

Solids, Total  
 EPA Method Modified 160.3  
 Percent (%)

Sample Name	Lab Code	Result
340009480146	A940436-1	88.6
340009480147	A940436-2	88.4
340009480148	A940436-3	85.0
340009480149	A940436-4	19.0
340009480150	A940436-5	87.5
340009480151	A940436-6	85.5
340009480152	A940436-7	30.4
340009480153	A940436-8	89.1
340009480154	A940436-9	27.0
340009480155	A940436-10	83.8
340009480156	A940436-11	83.2
340009480157	A940436-12	83.3
340009480158	A940436-13	83.2
340009480159	A940436-14	63.9
340009480160	A940436-15	63.8
340009480161	A940436-16	82.1
340009480162	A940436-17	31.9
340009480163	A940436-18	81.3
340009480164	A940436-19	33.6
340009480165	A940436-20	85.1
340009480166	A940436-21	84.3
340009480167	A940436-22	82.9
340009480168	A940436-23	84.0
340009480169	A940436-24	83.0
340009480170	A940436-25	87.8
340009480171	A940436-26	88.5
340009480172	A940436-27	37.8
340009480173	A940436-28	85.6
340009480174	A940436-29	90.5
340009480175	A940436-30	38.2
340009480176	A940436-31	84.1
340009480177	A940436-32	88.1
340009480178	A940436-33	83.0
340009480179	A940436-34	48.9
340009480180	A940436-35	46.0
340009480181	A940436-36	83.6
340009480182	A940436-37	82.5
340009480183	A940436-38	86.6
340009480184	A940436-39	87.1
340009480185	A940436-40	87.4
340009480186	A940436-41	84.2
340009480187	A940436-42	87.8
340009480188	A940436-43	84.0
340009480189	A940436-44	83.6
340009480190	A940436-45	82.0
340009480191	A940436-46	84.3

Approved by JFW October 25, 1994



**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Work Order #:** A940436

**Inorganic Parameters**  
**mg/Kg (ppm)**  
**Dry Weight Basis**

<b>Analyte:</b>	<b>Lead</b>
<b>Method:</b>	7421
<b>Method Reporting Limit:</b>	1
<b>Date Analyzed:</b>	9/29/94

<b>Sample Name</b>	<b>Lab Code</b>	
Method Blank	A940911-SB1	ND
340009480148	A940436-3	3
340009480149	A940436-4	6
340009480150	A940436-5	5
340009480151	A940436-6	4
340009480152	A940436-7	2
340009480153	A940436-8	3
340009480154	A940436-9	19
340009480155	A940436-10	3
340009480156	A940436-11	3
340009480157	A940436-12	3
340009480158	A940436-13	3
340009480159	A940436-14	3

Approved by JEW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Water

**Date Received:** 8/30/94  
**Work Order #:** A940436

**BTEX and GRO as Gasoline**  
**EPA Methods 5030/8020/Modified 8015**  
**µg/L (ppb)**

**Sample Name:**  
**Lab Code:**  
**Date Analyzed:**

**Method Blank**  
**A940908-WB1**  
**9/8/94**

**340009480192**  
**A940436-47**  
**9/8/94**

<b>Analyte</b>	<b>MRL</b>		
Benzene	0.5	ND	ND
Toluene	1	ND	ND
Ethylbenzene	1	ND	ND
Total Xylenes	1	ND	ND
GRO as Gasoline	50	ND	ND

Approved by   JFW   October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 9/8/94  
**Work Order #:** A940436

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	Method Blank	340009480148	340009480149
Lab Code:	A940908-SB1	A940436-3	A940436-4
Date Analyzed:	9/8/94	9/8/94	9/8/94

Analyte	MRL			
Benzene	0.05	ND	ND	ND
Toluene	0.05	ND	ND	ND
Ethylbenzene	0.05	ND	ND	0.77
Total Xylenes	0.05	ND	ND	5.79
GRO as Gasoline	5	ND	ND	19

Approved by FW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 9/8/94  
**Work Order #:** A940436

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	340009480150	340009480151	340009480152
Lab Code:	A940436-5	A940436-6	A940436-7
Date Analyzed:	9/8/94	9/8/94	9/8/94

Analyte	MRL			
Benzene	0.05	ND	ND	5.83
Toluene	0.05	ND	ND	ND
Ethylbenzene	0.05	ND	ND	1.89
Total Xylenes	0.05	ND	ND	6.92
GRO as Gasoline	5	ND	ND	48

Approved by JFW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 9/8/94  
**Work Order #:** A940436

BTEX and GRO as Gasoline  
EPA Methods-5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	340009480153	340009480154	340009480155
Lab Code:	A940436-8	A940436-9	A940436-10
Date Analyzed:	9/8/94	9/9/94	9/9/94

Analyte	MRL			
Benzene	0.05	ND	0.8 <sup>ab</sup>	ND
Toluene	0.05	ND	38 <sup>ab</sup>	ND
Ethylbenzene	0.05	ND	16 <sup>ab</sup>	ND
Total Xylenes	0.05	ND	110 <sup>ab</sup>	ND
GRO as Gasoline	5	ND	1000 <sup>ab</sup>	ND

- a MRL is elevated because of the low percent solids in the sample as received.  
b MRL is elevated because the sample required diluting.

Approved by JFW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 9/8/94  
**Work Order #:** A940436

**BTEX and GRO as Gasoline**  
**EPA Methods: 5030/8020/Modified 8015**  
**mg/Kg (ppm)**  
**Dry Weight Basis**

<b>Sample Name:</b>	<b>340009480156</b>	<b>340009480157</b>	<b>340009480158</b>
<b>Lab Code:</b>	<b>A940436-11</b>	<b>A940436-12</b>	<b>A940436-13</b>
<b>Date Analyzed:</b>	<b>9/9/94</b>	<b>9/9/94</b>	<b>9/9/94</b>

<b>Analyte</b>	<b>MRL</b>			
<b>Benzene</b>	<b>0.05</b>	<b>ND</b>	<b>ND</b>	<b>ND</b>
<b>Toluene</b>	<b>0.05</b>	<b>ND</b>	<b>0.57</b>	<b>ND</b>
<b>Ethylbenzene</b>	<b>0.05</b>	<b>ND</b>	<b>0.97</b>	<b>ND</b>
<b>Total Xylenes</b>	<b>0.05</b>	<b>ND</b>	<b>5.30</b>	<b>ND</b>
<b>GRO as Gasoline</b>	<b>5</b>	<b>ND</b>	<b>120<sup>a</sup></b>	<b>ND</b>

**a** Quantified as gasoline. The sample contained components that eluted in the C<sub>6</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.

Approved by JEW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 9/8/94  
**Work Order #:** A940436

**BTEX and GRO as Gasoline**  
**EPA Methods 5030/8020/Modified 8015**  
**mg/Kg (ppm)**  
**Dry Weight Basis**

**Sample Name:**  
**Lab Code:**  
**Date Analyzed:**

**340009480159**  
**A940436-14**  
**9/9/94**

**Analyte**

**MRL**

<b>Benzene</b>	<b>0.05</b>	<b>ND</b>
<b>Toluene</b>	<b>0.05</b>	<b>ND</b>
<b>Ethylbenzene</b>	<b>0.05</b>	<b>ND</b>
<b>Total Xylenes</b>	<b>0.05</b>	<b>ND</b>
<b>GRO as Gasoline</b>	<b>5</b>	<b>ND</b>

Approved by JEW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 9/4/94  
**Date Analyzed:** 9/19/20/94  
**Work Order #:** A940436

**Diesel Range Organics**  
**EPA Methods 3540/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
Method Blank	A940904-SB1	10	24
340009480146	A940436-1	10	3580
340009480147	A940436-2	10	2560
340009480160	A940436-15	20 <sup>c</sup>	185 <sup>ab</sup>
340009480161	A940436-16	10	55 <sup>a</sup>
340009480162	A940436-17	31 <sup>c</sup>	3950 <sup>b</sup>
340009480163	A940436-18	10	83 <sup>ab</sup>
340009480164	A940436-19	30 <sup>c</sup>	4370 <sup>b</sup>
340009480165	A940436-20	10	191 <sup>ab</sup>
340009480166	A940436-21	10	5040
340009480167	A940436-22	10	5080
340009480168	A940436-23	10	5340
340009480169	A940436-24	10	4930
340009480170	A940436-25	10	73 <sup>ab</sup>
340009480171	A940436-26	10	681
340009480172	A940436-27	20	4230 <sup>b</sup>
340009480173	A940436-28	10	81 <sup>ab</sup>
340009480174	A940436-29	10	71 <sup>ab</sup>

- a Analyte concentration is an estimate because this analyte was also found in the method blank.  
b Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.  
c MRL is elevated because of the low percent solids in the sample as received.

Approved by JFW/ October 25, 1994



**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 9/4/94  
**Date Analyzed:** 9/20/94  
**Work Order #:** A940436

**Diesel Range Organics**  
**EPA Methods 3540/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
340009480175	A940436-30	20 <sup>b</sup>	4170 <sup>c</sup>
340009480176	A940436-31	10	117 <sup>d</sup>
340009480177	A940436-32	10	5920
340009480179	A940436-34	200	17000 <sup>a</sup>
340009480183	A940436-38	100	7900 <sup>a</sup>
340009480187	A940436-42	100	8500 <sup>a</sup>
340009480189	A940436-44	100	17000 <sup>a</sup>
340009480190	A940436-45	100	16000 <sup>a</sup>

- a** Result is from the analysis of a diluted sample, performed on September 24, 1994. Dilution factor is 10.
- b** MRL is elevated because of the low percent solids in the sample as received.
- c** Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.
- d** Analyte concentration is an estimate because this analyte was also found in the method blank.

Approved by JFW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 9/4/94  
**Date Analyzed:** 9/18,19/94  
**Work Order #:** A940436

**Diesel Range Organics**  
**EPA Methods 3540/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
Method Blank	A940904-SB2	10	27
340009480178	A940436-33	10	431
340009480180	A940436-35	20	9090
340009480181	A940436-36	10	48 <sup>a</sup>
340009480182	A940436-37	10	23 <sup>a</sup>
340009480184	A940436-39	10	87 <sup>a</sup>
340009480185	A940436-40	10	87 <sup>a</sup>
340009480186	A940436-41	10	49 <sup>a</sup>
340009480188	A940436-43	10	4400
340009480191	A940436-46	10	3640

**a** Analyte concentration is an estimate because this analyte was also found in the method blank.

Approved by JFW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-007  
**Sample Matrix:** Soil

**Date Received:** 8/30/94  
**Date Extracted:** 10/11/94<sup>a</sup>  
**Date Analyzed:** 10/19,20/94  
**Work Order #:** A940436

Diesel Range Organics  
EPA Methods 3540/Modified 8100  
mg/Kg (ppm)

Sample Name	Lab Code	MRL	Diesel
Method Blank	A941011-SB1	10	ND
340009480160	A940436-15	10	143 <sup>b</sup>
340009480161	A940436-16	10	52
340009480163	A940436-18	10	21 <sup>b</sup>
340009480165	A940436-20	10	152
340009480170	A940436-25	10	28
340009480173	A940436-28	10	ND
340009480174	A940436-29	10	36 <sup>b</sup>
340009480176	A940436-31	10	ND
340009480181	A940436-36	10	ND
340009480182	A940436-37	10	ND
340009480184	A940436-39	10	ND
340009480185	A940436-40	10	20 <sup>b</sup>
340009480186	A940436-41	10	42 <sup>b</sup>

- a Samples were extracted 33 days past the end of the recommended maximum holding time.  
b Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

Approved by TFW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date Analyzed:** 9/15/94  
**Work Order #:** A940468

Solids, Total  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
340009480193	A940468-1	90.9
340009480194	A940468-2	87.9
340009480195	A940468-3	87.6
340009480196	A940468-4	86.0
340009480197	A940468-5	86.6
340009480198	A940468-6	82.4
340009480199	A940468-7	47.7
340009480200	A940468-8	74.9
340009480201	A940468-9	65.8
340009480202	A940468-10	83.0
340009480203	A940468-11	61.0
340009480204	A940468-12	80.5
340009480205	A940468-13	84.2
340009480206	A940468-14	85.2
340009480207	A940468-15	67.3
340009480208	A940468-16	66.9
340009480209	A940468-17	85.4
340009480210	A940468-18	48.6
340009480211	A940468-19	76.2
340009480212	A940468-20	86.8
340009480213	A940468-21	82.5
340009480214	A940468-22	84.0
340009480215	A940468-23	83.3
340009480216	A940468-24	83.3
340009480217	A940468-25	83.6
340009480218	A940468-26	81.9

Approved by JFW October 10, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date Extracted:** 9/12/94  
**Date Analyzed:** 9/15,16/94  
**Work Order #:** A940468

**Diesel Range Organics**  
**EPA Methods 3550/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
340009480193	A940468-1	10	20 <sup>a</sup>
340009480194	A940468-2	10	15 <sup>a</sup>
Method Blank	A940912-SB1	10	ND

- a** Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

Approved by JFW October 10, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date Extracted:** 9/15/94  
**Date Analyzed:** 9/22/94  
**Work Order #:** A940468

Diesel Range Organics  
 EPA Methods 3540/Modified 8100  
 mg/Kg (ppm)

Sample Name	Lab Code	MRL	Diesel
Method Blank	A940915-SB1	10	ND
340009480195	A940468-3	10	15
340009480196	A940468-4	10	16
340009480197	A940468-5	10	2880
340009480198	A940468-6	100	8000 <sup>a</sup>
340009480199	A940468-7	20	1520 <sup>b,c</sup>
340009480200	A940468-8	10	1380 <sup>c</sup>
340009480201	A940468-9	20	952 <sup>b,c</sup>
340009480202	A940468-10	10	7030
340009480203	A940468-11	20	3320 <sup>b,c</sup>
340009480204	A940468-12	10	367 <sup>c</sup>
340009480205	A940468-13	10	155 <sup>c</sup>
340009480206	A940468-14	100	14,000 <sup>a</sup>
340009480207	A940468-15	20	1180 <sup>b,c</sup>
340009480208	A940468-16	20	1190 <sup>b</sup>
340009480209	A940468-17	10	205 <sup>c</sup>
340009480210	A940468-18	20	1060 <sup>b,c</sup>
340009480211	A940468-19	10	414 <sup>c</sup>
340009480212	A940468-20	10	64
340009480213	A940468-21	10	88
340009480214	A940468-22	10	30 <sup>c</sup>

**a** Result is from the analysis of a diluted sample, performed on September 26, 1994.

**b** MRL elevated due to low percent solids.

**c** Quantified as diesel. The sample contained components that eluted in the C<sub>10</sub>-C<sub>28</sub> range, but the chromatogram did not match the typical diesel fingerprint.

Approved by JFW October 10, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date Extracted:** 9/15/94  
**Date Analyzed:** 9/26/94  
**Work Order #:** A940468

**Diesel Range Organics**  
**EPA Methods 3540/Modified 8100**  
**mg/Kg (ppm)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>MRL</b>	<b>Diesel</b>
Method Blank	A940915-SB2	10	ND
340009480215	A940468-23	10	ND
340009480216	A940468-24	10	ND
340009480217	A940468-25	10	1570
340009480218	A940468-26	100	15,000 <sup>a</sup>

<sup>a</sup> MRL is elevated because the sample required diluting.

Approved by JEW October 11, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Sludge

**Date Received:** 9/8/94  
**Date TCLP Performed:** 9/20/94  
**Date Analyzed:** 9/25-30/94  
**Work Order #:** A940468

**Toxicity Characteristic Leaching Procedure (TCLP)**  
**EPA Method 1311**  
**Metals**  
**mg/L (ppm) in TCLP Extract**

**Sample Name:**  
**Lab Code:** **Method Blank** **340009480219**  
**A940920-MB** **A940468-27**

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>	<b>Regulatory Limit*</b>		
Arsenic	3010/7060	0.01	5.0	ND	ND
Barium	3010/6010	0.5	100	ND	ND
Cadmium	3010/6010	0.01	1.0	ND	ND
Chromium	3010/6010	0.01	5.0	ND	ND
Lead	3010/6010	0.1	5.0	ND	ND
Mercury	7470	0.01	0.2	ND	ND
Selenium	3010/7740	0.01	1.0	ND	ND
Silver	3010/6010	0.01	5.0	ND	ND

\* From 40 CFR Part 261, et al., and *Federal Register*, March 29, 1990 and June 29, 1990

Approved by JEW October 11, 1994



**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date TCLP Performed:** 9/20/94  
**Date Analyzed:** 9/25-30/94  
**Work Order #:** A940468

**Toxicity Characteristic Leaching Procedure (TCLP)**  
**EPA Method 1311**  
**Metals**  
**mg/L (ppm) in TCLP Extract**

**Sample Name:** 340009480220 340009480221  
**Lab Code:** A940468-28 A940468-29

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>	<b>Regulatory Limit*</b>		
Arsenic	3010/7060	0.01	5.0	ND	ND
Barium	3010/6010	0.5	100	ND	ND
Cadmium	3010/6010	0.01	1.0	ND	ND
Chromium	3010/6010	0.01	5.0	ND	ND
Lead	3010/6010	0.1	5.0	ND	ND
Mercury	7470	0.01	0.2	ND	ND
Selenium	3010/7740	0.01	1.0	ND	ND
Silver	3010/6010	0.01	5.0	ND	ND

From 40 CFR Part 261, et al., and *Federal Register*, March 29, 1990 and June 29, 1990

Approved by IFW October 11, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date TCLP Performed:** 9/20/94  
**Date Analyzed:** 9/25-30/94  
**Work Order #:** A940468

**Toxicity Characteristic Leaching Procedure (TCLP)**  
**EPA Method 1311**  
**Metals**  
**mg/L (ppm) in TCLP Extract**

**Sample Name:** 340009480222 340009480223  
**Lab Code:** A940468-30 A940468-31

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>	<b>Regulatory Limit*</b>		
Arsenic	3010/7060	0.01	5.0	ND	ND
Barium	3010/6010	0.5	100	ND	ND
Cadmium	3010/6010	0.01	1.0	ND	ND
Chromium	3010/6010	0.01	5.0	ND	ND
Lead	3010/6010	0.1	5.0	ND	ND
Mercury	7470	0.01	0.2	ND	ND
Selenium	3010/7740	0.01	1.0	ND	ND
Silver	3010/6010	0.01	5.0	0.01	ND

\* From 40 CFR Part 261, et al., and *Federal Register*, March 29, 1990 and June 29, 1990

Approved by IFW October 11, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date TCLP Performed:** 9/20/94  
**Date Analyzed:** 9/25-30/94  
**Work Order #:** A940468

**Toxicity Characteristic Leaching Procedure (TCLP)**  
**EPA Method 1311**  
**Metals**  
**mg/L (ppm) in TCLP Extract**

**Sample Name:** 340009480224 340009480225  
**Lab Code:** A940468-32 A940468-33

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>	<b>Regulatory Limit*</b>		
Arsenic	3010/7060	0.01	5.0	ND	ND
Barium	3010/6010	0.5	100	ND	ND
Cadmium	3010/6010	0.01	1.0	ND	ND
Chromium	3010/6010	0.01	5.0	ND	ND
Lead	3010/6010	0.1	5.0	ND	ND
Mercury	7470	0.01	0.2	ND	ND
Selenium	3010/7740	0.01	1.0	ND	ND
Silver	3010/6010	0.01	5.0	ND	ND

\* From 40 CFR Part 261, et al., and *Federal Register*, March 29, 1990 and June 29, 1990

Approved by JFW October 11, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date TCLP Performed:** 9/20/94  
**Date Analyzed:** 9/25-30/94  
**Work Order #:** A940468

**Toxicity Characteristic Leaching Procedure (TCLP)**  
**EPA Method 1311**  
**Metals**  
**mg/L (ppm) in TCLP Extract**

**Sample Name:** 340009480226 340009480227  
**Lab Code:** A940468-34 A940468-35

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>	<b>Regulatory Limit*</b>		
Arsenic	3010/7060	0.01	5.0	ND	ND
Barium	3010/6010	0.5	100	0.5	ND
Cadmium	3010/6010	0.01	1.0	ND	ND
Chromium	3010/6010	0.01	5.0	ND	ND
Lead	3010/6010	0.1	5.0	ND	ND
Mercury	7470	0.01	0.2	ND	ND
Selenium	3010/7740	0.01	1.0	ND	ND
Silver	3010/6010	0.01	5.0	ND	ND

\* From 40 CFR Part 261, et al., and *Federal Register*, March 29, 1990 and June 29, 1990

Approved by JFW October 11, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date TCLP Performed:** 9/20/94  
**Date Analyzed:** 9/25-30/94  
**Work Order #:** A940468

**Toxicity Characteristic Leaching Procedure (TCLP)**  
**EPA Method 1311**  
**Metals**  
**mg/L (ppm) in TCLP Extract**

**Sample Name:** 340009480228      340009480229  
**Lab Code:** A940468-36      A940468-37

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>	<b>Regulatory Limit*</b>		
Arsenic	3010/7060	0.01	5.0	ND	ND
Barium	3010/6010	0.5	100	0.8	0.6
Cadmium	3010/6010	0.01	1.0	ND	ND
Chromium	3010/6010	0.01	5.0	ND	ND
Lead	3010/6010	0.1	5.0	ND	ND
Mercury	7470	0.01	0.2	ND	ND
Selenium	3010/7740	0.01	1.0	ND	ND
Silver	3010/6010	0.01	5.0	0.01	ND

\* From 40 CFR Part 261, et al., and *Federal Register*, March 29, 1990 and June 29, 1990

Approved by JFW October 11, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date TCLP Performed:** 9/20/94  
**Date Analyzed:** 9/25-30/94  
**Work Order #:** A940468

**Toxicity Characteristic Leaching Procedure (TCLP)**  
**EPA Method 1311**  
**Metals**  
**mg/L (ppm) in TCLP Extract**

**Sample Name:** 340009480230 340009480231  
**Lab Code:** A940468-38 A940468-39

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>	<b>Regulatory Limit*</b>		
Arsenic	3010/7060	0.005	5.0	0.006	0.008
Barium	3010/6010	0.5	100	0.8	0.6
Cadmium	3010/6010	0.01	1.0	ND	ND
Chromium	3010/6010	0.01	5.0	ND	ND
Lead	3010/6010	0.1	5.0	ND	ND
Mercury	7470	0.005	0.2	ND	ND
Selenium	3010/7740	0.01	1.0	ND	ND
Silver	3010/6010	0.01	5.0	ND	ND

From 40 CFR Part 261, et al., and *Federal Register*, March 29, 1990 and June 29, 1990

Approved by JFW October 11, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA - Bethel/WO# B-008  
**Sample Matrix:** Soil

**Date Received:** 9/8/94  
**Date TCLP Performed:** 9/20/94  
**Date Analyzed:** 9/25-30/94  
**Work Order #:** A940468

**Toxicity Characteristic Leaching Procedure (TCLP)**  
**EPA Method 1311**  
**Metals**  
**mg/L (ppm) in TCLP Extract**

**Sample Name:** 340009480232  
**Lab Code:** A940468-40

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>	<b>Regulatory Limit*</b>	
Arsenic	3010/7060	0.01	5.0	0.01
Barium	3010/6010	0.5	100	ND
Cadmium	3010/6010	0.01	1.0	ND
Chromium	3010/6010	0.01	5.0	ND
Lead	3010/6010	0.1	5.0	ND
Mercury	7470	0.01	0.2	ND
Selenium	3010/7740	0.01	1.0	ND
Silver	3010/6010	0.01	5.0	ND

\* From 40 CFR Part 261, et al., and *Federal Register*, March 29, 1990 and June 29, 1990

Approved by JFW October 11, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Elmendorf Air Force Base  
Project: BIA/Bethel AK/#34000  
Sample Matrix: Soil/Sludge

Date Received: 09/10/94  
Date Analyzed: 09/13/94  
Work Order No.: K945540K

Solids, Total  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
34000-948-0219	K945540-001	25.7
34000-948-0220	K945540-002	90.6
34000-948-0221	K945540-003	90.7
34000-948-0222	K945540-004	87.9
34000-948-0223	K945540-005	87.3
34000-948-0224	K945540-006	93.3
34000-948-0225	K945540-007	92.9
34000-948-0226	K945540-008	95.7
34000-948-0227	K945540-009	90.3
34000-948-0228	K945540-010	86.2

Approved by

*Richard A. Cray*

Date

*10/4/94*

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**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Elmendorf Air Force Base  
**Project:** BIA/Bethel AK/#34000  
**Sample Matrix:** Soil/Sludge

**Date Received:** 09/10/94  
**Date Analyzed:** 09/13/94  
**Work Order No.:** K945540K

**Solids, Total**  
**EPA Method Modified 160.3**  
**Percent (%)**

<b>Sample Name</b>	<b>Lab Code</b>	<b>Result</b>
34000-948-0229	K945540-01†	89.9
34000-948-0230	K945540-012	85.6
34000-948-0231	K945540-013	94.4
34000-948-0232	K945540-014	96.1

Approved by

*Richard A. Craven*  
AK-60

Date

*10/4/94*

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# Analytical Report

Client: Elmendorf AFB  
Project: BIA/Bethel AK/#34000  
Sample Matrix: Soil/Sludge

Service Request: K945540K  
Date Collected: 9/5/94  
Date Received: 9/10/94  
Date Extracted: 9/13/94

## Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)

EPA Methods 3540/8080

Units: mg/Kg (ppm)

Dry Weight Basis

	34000-948-0219	34000-948-0220	34000-948-0221
Sample Name:	0219	0220	0221
Lab Code:	K945540-001	K945540-002	K945540-003
Date Analyzed:	9/20-24/94	9/20-24/94	9/20-24/94

Analyte	MRL			
Alpha-BHC	0.01	<0.03(a)	ND	ND
Beta-BHC	0.03	<0.09(a)	ND	ND
Delta-BHC	0.01	<0.03(a)	ND	ND
Heptachlor	0.01	<0.03(a)	ND	ND
Aldrin	0.01	<0.03(a)	ND	ND
Gamma-BHC (Lindane)	0.01	<0.03(a)	ND	ND
Heptachlor Epoxide	0.01	<0.03(a)	ND	ND
Endosulfan I	0.01	<0.03(a)	ND	ND
Endrin	0.01	<0.03(a)	ND	ND
Endosulfan II	0.01	<0.08(b)	ND	ND
4,4'-DDD	0.01	0.8(c)	ND	ND
Endrin Aldehyde	0.01	0.2	0.06	ND
Endosulfan Sulfate	0.01	<0.03(a)	ND	ND
4,4'-DDT	0.01	<0.03(a)	ND	ND
4,4'-DDE	0.01	0.5(c)	1(c)	0.06
Dieldrin	0.01	0.05	0.09	ND
Methoxychlor	0.01	<0.03(a)	ND	ND
Toxaphene	0.02	<0.1(a)	ND	ND
Chlordane	0.3	<10(b)	ND	ND
PCBs: Aroclor 1016	0.1	<0.5(a)	ND	ND
Aroclor 1221	0.1	<0.3(a)	ND	ND
Aroclor 1232	0.1	<0.3(a)	ND	ND
Aroclor 1242	0.1	<0.3(a)	ND	ND
Aroclor 1248	0.1	<0.3(a)	ND	ND
Aroclor 1254	0.1	<0.3(a)	ND	ND
Aroclor 1260	0.1	<1(b)	ND	ND
		9	ND	ND

- a MRL is elevated because of the low percent solids in the sample as received.  
b MRLs are elevated because of matrix interferences.  
c Result is from the analysis of a diluted sample, performed on 9/22/94. Dilution factor: 10

Approved By: \_\_\_\_\_

Date: 9/27/94

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55405VG RSI - 3530 9/27/94

# Analytical Report

Client: Elmendorf AFB  
Project: BIA/Bethel AK/#34000  
Sample Matrix: Soil

Service Request: K945540K  
Date Collected: 9/5/94  
Date Received: 9/10/94  
Date Extracted: 9/13/94

## Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) EPA Methods 3540/8080 Units: mg/Kg (ppm) Dry Weight Basis

	34000-948-0222	34000-948-0223	34000-948-0224
Sample Name:	0222	0223	0224
Lab Code:	K945540-004	K945540-005	K945540-006
Date Analyzed:	9/20-24/94	9/20-24/94	9/20-24/94

Analyte	MRL			
Alpha-BHC	0.01	ND	ND	ND
Beta-BHC	0.03	ND	ND	ND
Delta-BHC	0.01	ND	ND	ND
Heptachlor	0.01	ND	ND	ND
Aldrin	0.01	ND	ND	ND
Gamma-BHC (Lindane)	0.01	ND	ND	ND
Heptachlor Epoxide	0.01	ND	ND	ND
Endosulfan I	0.01	ND	ND	ND
Endrin	0.01	ND	ND	ND
Endosulfan II	0.01	ND	ND	ND
4'-DDD	0.01	ND	ND	ND
Endrin Aldehyde	0.01	0.05	ND	3(b)
Endosulfan Sulfate	0.01	ND	ND	ND
4,4'-DDT	0.01	ND	ND	ND
4,4'-DDE	0.01	0.3(a)	0.3(a)	1(b)
Dieldrin	0.01	ND	ND	0.2(a)
Methoxychlor	0.02	ND	ND	ND
Toxaphene	0.3	ND	ND	ND
Chlordane	0.1	ND	ND	<1(c)
PCBs: Aroclor 1016	0.1	ND	ND	ND
Aroclor 1221	0.1	ND	ND	ND
Aroclor 1232	0.1	ND	ND	ND
Aroclor 1242	0.1	ND	ND	ND
Aroclor 1248	0.1	ND	ND	ND
Aroclor 1254	0.1	ND	ND	ND
Aroclor 1260	0.1	ND	ND	<0.3(c)
		ND	ND	ND

a Result is from the analysis of a diluted sample, performed on 9/22/94. Dilution factor: 10  
b Result is from the analysis of a diluted sample, performed on 9/22/94. Dilution factor: 100  
c MRLs are elevated because of matrix interferences.

Approved By: C. Lamb Date: 9/27/94

# Analytical Report

Client: Elmendorf AFB  
Project: BIA/Bethel AK/#34000  
Sample Matrix: Soil

Service Request: K945540K  
Date Collected: 9/5/94  
Date Received: 9/10/94  
Date Extracted: 9/13/94

## Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)

EPA Methods 3540/8080

Units: mg/Kg (ppm)

Dry Weight Basis

	34000-948-0225	34000-948-0226	34000-948-0227
Sample Name:	0225	0226	0227
Lab Code:	K945540-007	K945540-008	K945540-009
Date Analyzed:	9/20-24/94	9/20-24/94	9/20-24/94

Analyte	MRL			
Alpha-BHC	0.01	ND	ND	ND
Beta-BHC	0.03	ND	ND	ND
Delta-BHC	0.01	ND	ND	ND
Heptachlor	0.01	ND	ND	ND
Aldrin	0.01	ND	ND	ND
Gamma-BHC (Lindane)	0.01	ND	ND	ND
Heptachlor Epoxide	0.01	<0.03(a)	ND	ND
Endosulfan I	0.01	ND	ND	ND
Endrin	0.01	ND	ND	ND
Endosulfan II	0.01	ND	ND	ND
4,4'-DDD	0.01	ND	ND	ND
Endrin Aldehyde	0.01	0.02	0.1	0.3(b)
Endosulfan Sulfate	0.01	ND	ND	ND
4,4'-DDT	0.01	ND	ND	ND
4,4'-DDE	0.01	0.1	0.1(b)	0.2(b)
Dieldrin	0.01	ND	0.03	0.06
Methoxychlor	0.02	ND	ND	ND
Toxaphene	0.3	ND	ND	ND
Chlordane	0.1	<0.7(a)	ND	<0.7(a)
PCBs: Aroclor 1016	0.1	ND	ND	ND
Aroclor 1221	0.1	ND	ND	ND
Aroclor 1232	0.1	ND	ND	ND
Aroclor 1242	0.1	ND	ND	ND
Aroclor 1248	0.1	ND	ND	ND
Aroclor 1254	0.1	ND	ND	ND
Aroclor 1260	0.1	<0.3(a)	ND	<0.4(a)
		ND	ND	ND

a  
b

MRLs are elevated because of matrix interferences.

Result is from the analysis of a diluted sample, performed on 9/22/94. Dilution factor: 10

Approved By: A. Lamb

Date: 9/27/94

# Analytical Report

Client: Elmendorf AFB  
Project: BIA/Bethel AK/#34000  
Sample Matrix: Soil

Service Request: K945540K  
Date Collected: 9/5/94  
Date Received: 9/10/94  
Date Extracted: 9/13/94

## Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)

EPA Methods 3540/8080

Units: mg/Kg (ppm)

Dry Weight Basis

	34000-948-0228	34000-948-0229	34000-948-0230
Sample Name:	0228	0229	0230
Lab Code:	K945540-010	K945540-011	K945540-012
Date Analyzed:	9/20-24/94	9/20-25/94	9/20-25/94

Analyte	MRL			
Alpha-BHC	0.01	ND	ND	ND
Beta-BHC	0.03	ND	ND	<0.04(a)
Delta-BHC	0.01	ND	<0.04(a)	ND
Heptachlor	0.01	ND	ND	ND
Aldrin	0.01	ND	ND	ND
Gamma-BHC (Lindane)	0.01	<0.05(a)	<0.03(a)	<0.05(a)
Heptachlor Epoxide	0.01	ND	ND	ND
Endosulfan I	0.01	ND	ND	ND
Endrin	0.01	ND	ND	ND
Endosulfan II	0.01	<0.02(a)	<0.04(a)	ND
1,4'-DDD	0.01	0.2(b)	1(c)	0.03
Endrin Aldehyde	0.01	ND	ND	ND
Endosulfan Sulfate	0.01	ND	ND	ND
4,4'-DDT	0.01	0.02	0.1	0.03
4,4'-DDE	0.01	0.07	0.2(b)	ND
Dieldrin	0.01	ND	ND	ND
Methoxychlor	0.02	ND	ND	ND
Toxaphene	0.3	<0.7(a)	<0.7(a)	ND
Chlordane	0.1	ND	ND	ND
PCBs: Aroclor 1016	0.1	ND	<0.4(a)	ND
Aroclor 1221	0.1	ND	ND	ND
Aroclor 1232	0.1	ND	<0.4(a)	ND
Aroclor 1242	0.1	ND	<0.4(a)	ND
Aroclor 1248	0.1	ND	<0.4(a)	ND
Aroclor 1254	0.1	<0.4(a)	<0.4(a)	ND
Aroclor 1260	0.1	ND	ND	ND

a  
b  
c

MRLs are elevated because of matrix interferences.

Result is from the analysis of a diluted sample, performed on 9/22/94. Dilution factor: 10

Result is from the analysis of a diluted sample, performed on 9/22/94. Dilution factor: 100

Approved By:                     

Date: 9/27/94

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35405VQ BSI - 3530 (1) 9/27/94

# Analytical Report

Client: Elmendorf AFB  
Project: BIA/Bethel AK/#34000  
Sample Matrix: Soil

Service Request: K945540K  
Date Collected: 9/5/94  
Date Received: 9/10/94  
Date Extracted: 9/13/94

## Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)

EPA Methods 3540/8080

Units: mg/Kg (ppm)

Dry Weight Basis

	34000-948-	34000-948-	
Sample Name:	0231	0232	Method Blank
Lab Code:	K945540-013	K945540-014	K945540-MB
Date Analyzed:	9/20-25/94	9/20-25/94	9/20-24/94

Analyte	MRL			
Alpha-BHC	0.01	ND	ND	ND
Beta-BHC	0.03	ND	ND	ND
Delta-BHC	0.01	ND	ND	ND
Heptachlor	0.01	ND	ND	ND
Aldrin	0.01	ND	ND	ND
Gamma-BHC (Lindane)	0.01	<0.03(a)	ND	ND
Heptachlor Epoxide	0.01	ND	ND	ND
Endosulfan I	0.01	ND	ND	ND
Endrin	0.01	ND	ND	ND
Endosulfan II	0.01	ND	<0.04(a)	ND
4,4'-DDD	0.01	0.03	0.03	ND
Endrin Aldehyde	0.01	0.3(b)	1(c)	ND
Endosulfan Sulfate	0.01	ND	ND	ND
4,4'-DDT	0.01	ND	ND	ND
4,4'-DDE	0.01	ND	ND	ND
Dieldrin	0.01	0.05	0.03	ND
Methoxychlor	0.02	0.05	0.1(b)	ND
Toxaphene	0.3	ND	ND	ND
Chlordane	0.1	<0.7(a)	<0.7(a)	ND
PCBs: Aroclor 1016	0.1	ND	ND	ND
Aroclor 1221	0.1	ND	ND	ND
Aroclor 1232	0.1	ND	ND	ND
Aroclor 1242	0.1	ND	ND	ND
Aroclor 1248	0.1	ND	ND	ND
Aroclor 1254	0.1	ND	ND	ND
Aroclor 1260	0.1	<0.3(a)	<0.3(a)	ND
		0.2	ND	ND

- a MRL is elevated because of matrix interferences.  
b Result is from the analysis of a diluted sample, performed on 9/22/94. Dilution factor: 10  
c Result is from the analysis of a diluted sample, performed on 9/22/94. Dilution factor: 100

Approved By: N. Lantz

Date: 9/27/94

## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
Project: BIA/Bethel AK/#34000  
Sample Matrix: Sludge

Date Received: 09/10/94  
Work Order No.: K945540K

Volatile Organic Compounds  
EPA Method 8240 (Low Level)  
 $\mu\text{g/Kg}$  (ppb) Dry Weight Basis

Sample Name:  
Lab Code:  
Date Analyzed:

34000-948-0219  
K945540-001  
09/16/94

Analyte	MRL*	
Chloromethane	40	ND
Vinyl Chloride	40	ND
Bromomethane	40	ND
Chloroethane	40	ND
Trichlorofluoromethane (Freon 11)	40	ND
Trichlorotrifluoroethane (Freon 113)	40	ND
1,1-Dichloroethane	20	ND
Acetone	400	ND
Carbon Disulfide	400	ND
Methylene Chloride	20	ND
trans-1,2-Dichloroethane	20	ND
cis-1,2-Dichloroethane	20	ND
2-Butanone (MEK)	400	ND
1,1-Dichloroethane	20	ND
Chloroform	20	ND
1,1,1-Trichloroethane (TCA)	20	ND
Carbon Tetrachloride	20	ND
Benzene	20	ND
1,2-Dichloroethane	20	ND
Vinyl Acetate	200	ND
Trichloroethene (TCE)	20	ND
1,2-Dichloropropane	20	ND
Bromodichloromethane	20	ND
2-Chloroethyl Vinyl Ether	40	ND
trans-1,3-Dichloropropene	20	ND
2-Hexanone	200	ND
4-Methyl-2-pentanone (MIBK)	200	280
Toluene	20	ND
cis-1,3-Dichloropropene	20	ND
1,1,2-Trichloroethane	20	ND
Tetrachloroethene (PCE)	20	ND
Dibromochloromethane	20	ND
Chlorobenzene	20	ND
Ethylbenzene	20	ND
Styrene	20	ND
Total Xylenes	20	ND
Bromoform	20	ND
1,1,2,2-Tetrachloroethane	20	ND
1,3-Dichlorobenzene	20	ND
1,4-Dichlorobenzene	20	ND
1,2-Dichlorobenzene	20	ND

a MRLs are elevated because of the low percent solids in the sample as received.

Approved by Richard A. Craven Date 10/4/94

A-00

000010

## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
 Project: BIA/Bethel AK/#34000  
 Sample Matrix: Soil

Date Received: 09/10/94  
 Work Order No.: K945540K

Volatile Organic Compounds  
 EPA Method 8240 (Low Level)  
 $\mu\text{g/Kg}$  (ppb) Dry Weight Basis

Sample Name:	34000-948-0220	34000-948-0221	34000-948-0222
Lab Code:	K945540-002*	K945540-003	K945540-004
Date Analyzed:	09/20/94	09/15/94	09/15/94

Analyte	MRL			
Chloromethane	10	ND	ND	ND
Vinyl Chloride	10	ND	ND	ND
Bromomethane	10	ND	ND	ND
Chloroethane	10	ND	ND	ND
Trichlorofluoromethane (Freon 11)	10	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	10	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND
Acetone	100	ND	ND	ND
Carbon Disulfide	100	ND	ND	ND
Methylene Chloride	5	ND	9	10
trans-1,2-Dichloroethene	5	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND
2-Butanone (MEK)	100	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND
Chloroform	5	ND	ND	ND
1,1,1-Trichloroethane (TCA)	5	ND	ND	ND
Carbon Tetrachloride	5	ND	ND	ND
Benzene	5	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
Vinyl Acetate	50	ND	ND	ND
Trichloroethene (TCE)	5	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
Bromodichloromethane	5	ND	ND	ND
2-Chloroethyl Vinyl Ether	10	ND	ND	ND
trans-1,3-Dichloropropene	5	ND	ND	ND
2-Hexanone	50	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	50	ND	ND	ND
Toluene	5	ND	ND	ND
cis-1,3-Dichloropropene	5	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Tetrachloroethene (PCE)	5	ND	ND	ND
Dibromochloromethane	5	ND	ND	ND
Chlorobenzene	5	ND	ND	ND
Ethylbenzene	5	ND	ND	ND
Styrene	5	ND	ND	ND
Total Xylenes	5	ND	ND	ND
Bromoform	5	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND
1,3-Dichlorobenzene	5	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND

a Sample was analyzed one day past the end of the recommended maximum holding time. Initial analysis, performed *within* the recommended maximum holding time, failed CAS QC criteria. The reanalysis met our QC criteria. It is the opinion of CAS that the quality of the sample data has not been significantly affected.

Approved by Richard A. Cravens Date 10/4/94

000011



## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
 Project: BIA/Bethel AK/#34000  
 Sample Matrix: Soil

Date Received: 09/10/94  
 Work Order No.: K945540K

Volatile Organic Compounds  
 EPA Method 8240 (Low Level)  
 $\mu\text{g/Kg}$  (ppb) Dry Weight Basis

Sample Name:	34000-948-0223	34000-948-0224	34000-948-0225
Lab Code:	K945540-005	K945540-006	K945540-007
Date Analyzed:	09/20/94	09/15/94	09/15/94

Analyte	MRL			
Chloromethane	10	ND	ND	ND
Vinyl Chloride	10	ND	ND	ND
Bromomethane	10	ND	ND	ND
Chloroethane	10	ND	ND	ND
Trichlorofluoromethane (Freon 11)	10	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	10	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	ND
Acetone	100	ND	ND	ND
Carbon Disulfide	100	ND	ND	ND
Methylene Chloride	5	10	ND	7
trans-1,2-Dichloroethene	5	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND
2-Butanone (MEK)	100	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND
Chloroform	5	ND	ND	ND
1,1,1-Trichloroethane (TCA)	5	ND	ND	ND
Carbon Tetrachloride	5	ND	ND	ND
Benzene	5	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
Vinyl Acetate	50	ND	ND	ND
Trichloroethene (TCE)	5	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
Bromodichloromethane	5	ND	ND	ND
2-Chloroethyl Vinyl Ether	10	ND	ND	ND
trans-1,3-Dichloropropene	5	ND	ND	ND
2-Hexanone	50	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	50	ND	ND	ND
Toluene	5	ND	ND	ND
cis-1,3-Dichloropropene	5	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Tetrachloroethene (PCE)	5	ND	ND	ND
Dibromochloromethane	5	ND	ND	ND
Chlorobenzene	5	ND	ND	ND
Ethylbenzene	5	ND	ND	ND
Styrene	5	ND	ND	ND
Total Xylenes	5	ND	ND	ND
Bromoform	5	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND
1,3-Dichlorobenzene	5	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND

Approved by

*Richard A. Craven*

Date

*10/4/94*

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000012

## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
Project: BIA/Bethel AK/#34000  
Sample Matrix: Soil

Date Received: 09/10/94  
Work Order No.: K945540K

Volatile Organic Compounds  
EPA Method 8240 (Low Level)  
µg/Kg (ppb) Dry Weight Basis

Sample Name:  
Lab Code:  
Date Analyzed:

34000-948-0226  
K945540-008  
09/16/94

Analyte	MRL	
Chloromethane	10	ND
Vinyl Chloride	10	ND
Bromomethane	10	ND
Chloroethane	10	ND
Trichlorofluoromethane (Freon 11)	10	ND
Trichlorotrifluoroethane (Freon 113)	10	ND
1,1-Dichloroethene	5	ND
Acetone	100	ND
Carbon Disulfide	100	ND
Methylene Chloride	5	ND
trans-1,2-Dichloroethene	5	ND
cis-1,2-Dichloroethene	5	ND
2-Butanone (MEK)	100	ND
1,1-Dichloroethane	5	ND
Chloroform	5	ND
1,1,1-Trichloroethane (TCA)	5	ND
Carbon Tetrachloride	5	ND
Benzene	5	ND
1,2-Dichloroethane	5	ND
Vinyl Acetate	50	ND
Trichloroethene (TCE)	5	ND
1,2-Dichloropropane	5	ND
Bromodichloromethane	5	ND
2-Chloroethyl Vinyl Ether	10	ND
trans-1,3-Dichloropropene	5	ND
2-Hexanone	50	ND
4-Methyl-2-pentanone (MIBK)	50	ND
Toluene	5	ND
cis-1,3-Dichloropropene	5	ND
1,1,2-Trichloroethane	5	ND
Tetrachloroethene (PCE)	5	ND
Dibromochloromethane	5	ND
Chlorobenzene	5	ND
Ethylbenzene	5	ND
Styrene	5	ND
Total Xylenes	5	ND
Bromoform	5	ND
1,1,2,2-Tetrachloroethane	5	ND
1,3-Dichlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
1,2-Dichlorobenzene	5	ND

Approved by

*Richard A. Cramer*

Date

*10/9/94*

000013

## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
 Project: BIA/Bethel AK/#34000  
 Sample Matrix: Soil

Date Received: 09/10/94  
 Date Extracted: 09/16/94  
 Work Order No.: K945540K

Volatile Organic Compounds  
 EPA Method 8240  
 mg/Kg (ppm) Dry Weight Basis

Sample Name:	34000-948-	34000-948-
	0228	0229
Lab Code:	K945540-010	K945540-011
Date Analyzed:	09/17/94	09/17/94

Analyte	MRL*		
Chloromethane	2	ND	ND
Vinyl Chloride	2	ND	ND
Bromomethane	2	ND	ND
Chloroethane	2	ND	ND
Trichlorofluoromethane (Freon 11)	1	ND	ND
Trichlorotrifluoroethane (Freon 113)	2	ND	ND
1,1-Dichloroethene	1	ND	ND
Acetone	20	ND	ND
Carbon Disulfide	20	ND	ND
Methylene Chloride	1	ND	ND
trans-1,2-Dichloroethene	1	ND	ND
cis-1,2-Dichloroethene	1	ND	ND
2-Butanone (MEK)	20	ND	ND
1,1-Dichloroethane	1	ND	ND
Chloroform	1	ND	ND
1,1,1-Trichloroethane (TCA)	1	ND	ND
Carbon Tetrachloride	1	ND	ND
Benzene	1	ND	ND
1,2-Dichloroethane	1	ND	ND
Vinyl Acetate	10	ND	ND
Trichloroethene (TCE)	1	ND	ND
1,2-Dichloropropane	1	ND	ND
Bromodichloromethane	1	ND	ND
2-Chloroethyl Vinyl Ether	2	ND	ND
trans-1,3-Dichloropropene	1	ND	ND
2-Hexanone	10	ND	ND
4-Methyl-2-pentanone (MIBK)	10	ND	ND
Toluene	1	ND	ND
cis-1,3-Dichloropropene	1	ND	ND
1,1,2-Trichloroethane	1	ND	ND
Tetrachloroethene (PCE)	1	ND	ND
Dibromochloromethane	1	ND	ND
Chlorobenzene	1	ND	ND
Ethylbenzene	1	ND	ND
Styrene	1	ND	ND
Total Xylenes	1	ND	ND
Bromoform	1	ND	ND
1,1,2,2-Tetrachloroethane	1	ND	ND
1,3-Dichlorobenzene	1	1	ND
1,4-Dichlorobenzene	1	ND	ND
1,2-Dichlorobenzene	1	3	ND

a MRLs are elevated because of matrix interferences.

Approved by Richard A. Craven Date 10/4/94

000014

## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
 Project: BIA/Bethel AK/#34000  
 Sample Matrix: Soil

Date Received: 09/10/94  
 Work Order No.: K945540K

Volatile Organic Compounds  
 EPA Method 8240 (Low Level)  
 $\mu\text{g/Kg}$  (ppb) Dry Weight Basis

Sample Name:	34000-948	34000-948	34000-948
Lab Code:	0227	0230	0231
Date Analyzed:	K945540-009	K945540-012	K945540-013
	09/16/94	09/16/94	09/17/94

Analyte	MRL*			
Chloromethane	20	ND	ND	ND
Vinyl Chloride	20	ND	ND	ND
Bromomethane	20	ND	ND	ND
Chloroethane	20	ND	ND	ND
Trichlorofluoromethane (Freon 11)	20	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	20	ND	ND	ND
1,1-Dichloroethene	10	ND	ND	ND
Acetone	200	ND	ND	ND
Carbon Disulfide	200	ND	ND	ND
Methylene Chloride	10	ND	ND	ND
trans-1,2-Dichloroethene	10	ND	ND	ND
cis-1,2-Dichloroethene	10	ND	ND	ND
2-Butanone (MEK)	200	ND	ND	ND
1,1-Dichloroethane	10	ND	ND	ND
Chloroform	10	ND	ND	ND
1,1,1-Trichloroethane (TCA)	10	ND	ND	ND
Carbon Tetrachloride	10	ND	ND	ND
Benzene	10	ND	ND	ND
1,2-Dichloroethane	10	ND	ND	ND
Vinyl Acetate	100	ND	ND	ND
Trichloroethene (TCE)	10	1	ND	ND
1,2-Dichloropropane	10	ND	ND	ND
Bromodichloromethane	10	ND	ND	ND
2-Chloroethyl Vinyl Ether	20	ND	ND	ND
trans-1,3-Dichloropropene	10	ND	ND	ND
2-Hexanone	100	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	100	ND	ND	ND
Toluene	10	ND	ND	ND
cis-1,3-Dichloropropene	10	ND	ND	ND
1,1,2-Trichloroethane	10	ND	ND	ND
Tetrachloroethene (PCE)	10	85	ND	ND
Dibromochloromethane	10	ND	ND	ND
Chlorobenzene	10	ND	ND	ND
Ethylbenzene	10	ND	ND	ND
Styrene	10	ND	ND	ND
Total Xylenes	10	ND	ND	ND
Bromoform	10	ND	ND	ND
1,1,2,2-Tetrachloroethane	10	ND	ND	ND
1,3-Dichlorobenzene	10	ND	ND	ND
1,4-Dichlorobenzene	10	ND	ND	ND
1,2-Dichlorobenzene	10	ND	ND	ND

a MRLs are elevated because of matrix interferences.

Approved by Richard A. Cranan Date 10/4/94

000015

## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
 Project: BIA/Bethel AK/#34000  
 Sample Matrix: Soil

Date Received: 09/10/94  
 Date Extracted: 09/20/94  
 Work Order No.: K945540K

Volatile Organic Compounds  
 EPA Method 8240  
 mg/Kg (ppm) Dry Weight Basis

Sample Name:  
 Lab Code:  
 Date Analyzed:

34000-948-0232  
 K945540-014<sup>b</sup>  
 09/21/94

Analyte	MRL <sup>a</sup>	
Chloromethane	2	ND
Vinyl Chloride	2	ND
Bromomethane	2	ND
Chloroethane	2	ND
Trichlorofluoromethane (Freon 11)	2	ND
Trichlorotrifluoroethane (Freon 113)	2	ND
1,1-Dichloroethene	1	ND
Acetone	20	ND
Carbon Disulfide	20	ND
Methylene Chloride	1	ND
<i>trans</i> -1,2-Dichloroethene	1	ND
<i>cis</i> -1,2-Dichloroethene	1	ND
2-Butanone (MEK)	20	ND
1,1-Dichloroethane	1	ND
Chloroform	1	ND
1,1,1-Trichloroethane (TCA)	1	ND
Carbon Tetrachloride	1	ND
Benzene	1	ND
1,2-Dichloroethane	1	ND
Vinyl Acetate	10	ND
Trichloroethene (TCE)	1	ND
1,2-Dichloropropane	1	ND
Bromodichloromethane	1	ND
2-Chloroethyl Vinyl Ether	2	ND
<i>trans</i> -1,3-Dichloropropene	1	ND
2-Hexanone	10	ND
4-Methyl-2-pentanone (MIBK)	10	ND
Toluene	1	ND
<i>cis</i> -1,3-Dichloropropene	1	ND
1,1,2-Trichloroethane	1	ND
Tetrachloroethene (PCE)	1	ND
Dibromochloromethane	1	ND
Chlorobenzene	1	ND
Ethylbenzene	1	ND
Styrene	1	ND
Total Xylenes	1	ND
Bromoform	1	ND
1,1,2,2-Tetrachloroethane	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	1
1,2-Dichlorobenzene	1	ND
		3

a MRLs are elevated because of matrix interferences.

b Sample was analyzed two days past the end of the recommended maximum holding time. Initial analysis, performed *within* the recommended maximum holding time, failed CAS QC criteria. The reanalysis met our QC criteria. It is the opinion of CAS that the quality of the sample data has not been significantly affected.

Approved by Richard A. Crum Date 10/4/94

000013

## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
 Project: BIA/Bethel AK/#34000  
 Sample Matrix: Soil

Date Received: NA  
 Work Order No.: K945540K

Volatile Organic Compounds  
 EPA Method 8240 (Low Level)  
 $\mu\text{g/Kg}$  (ppb) Dry Weight Basis

Sample Name:	Method Blank	Method Blank	Method Blank
Lab Code:	K945540-MB	K945540-MB	K945540-MB
Date Analyzed:	09/15/94	09/16/94	09/20/94

Analyte	MRL			
Chloromethane	10	ND	ND	ND
Vinyl Chloride	10	ND	ND	ND
Bromomethane	10	ND	ND	ND
Chloroethane	10	ND	ND	ND
Trichlorofluoromethane (Freon 11)	10	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	10	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	ND
Acetone	100	ND	ND	ND
Carbon Disulfide	100	ND	ND	ND
Methylene Chloride	5	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND
cis-1,2-Dichloroethene	5	ND	ND	ND
2-Butanone (MEK)	100	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND
Chloroform	5	ND	ND	ND
1,1,1-Trichloroethane (TCA)	5	ND	ND	ND
Carbon Tetrachloride	5	ND	ND	ND
Benzene	5	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
Vinyl Acetate	50	ND	ND	ND
Trichloroethene (TCE)	5	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
Bromodichloromethane	5	ND	ND	ND
2-Chloroethyl Vinyl Ether	10	ND	ND	ND
trans-1,3-Dichloropropene	5	ND	ND	ND
2-Hexanone	50	ND	ND	ND
4-Methyl-2-pentanone (MIBK)	50	ND	ND	ND
Toluene	5	ND	ND	ND
cis-1,3-Dichloropropene	5	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Tetrachloroethene (PCE)	5	ND	ND	ND
Dibromochloromethane	5	ND	ND	ND
Chlorobenzene	5	ND	ND	ND
Ethylbenzene	5	ND	ND	ND
Styrene	5	ND	ND	ND
Total Xylenes	5	ND	ND	ND
Bromoform	5	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND
1,3-Dichlorobenzene	5	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND

Approved by



Date

10/4/94

000012

## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf Air Force Base  
 Project: BIA/Bethel AK/#34000  
 Sample Matrix: Soil

Date Received: NA  
 Date Extracted: 09/16, 20/94  
 Work Order No.: K945540K

Volatile Organic Compounds  
 EPA Method 8240  
 mg/Kg (ppm) Dry Weight Basis

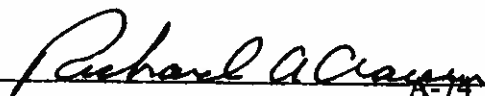
Sample Name:  
 Lab Code:  
 Date Analyzed:

Method Blank  
 K945540-MB  
 09/16/94

Method Blank  
 K945540-MB  
 09/20/94

Analyte	MRL		
Chloromethane	1	ND	ND
Vinyl Chloride	1	ND	ND
Bromomethane	1	ND	ND
Chloroethane	1	ND	ND
Trichlorofluoromethane (Freon 11)	1	ND	ND
Trichlorotrifluoroethane (Freon 113)	1	ND	ND
1,1-Dichloroethene	0.5	ND	ND
Acetone	10	ND	ND
Carbon Disulfide	10	ND	ND
Methylene Chloride	0.5	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND
cis-1,2-Dichloroethene	0.5	ND	ND
2-Butanone (MEK)	10	ND	ND
1,1-Dichloroethane	0.5	ND	ND
Chloroform	0.5	ND	ND
1,1,1-Trichloroethane (TCA)	0.5	ND	ND
Carbon Tetrachloride	0.5	ND	ND
Benzene	0.5	ND	ND
1,2-Dichloroethane	0.5	ND	ND
Vinyl Acetate	5	ND	ND
Trichloroethene (TCE)	0.5	ND	ND
1,2-Dichloropropane	0.5	ND	ND
Bromodichloromethane	0.5	ND	ND
2-Chloroethyl Vinyl Ether	1	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND
2-Hexanone	5	ND	ND
4-Methyl-2-pentanone (MIBK)	5	ND	ND
Toluene	0.5	ND	ND
cis-1,3-Dichloropropene	0.5	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND
Tetrachloroethene (PCE)	0.5	ND	ND
Dibromochloromethane	0.5	ND	ND
Chlorobenzene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Styrene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
Bromoform	0.5	ND	ND
1,1,2,2-Tetrachloroethane	0.5	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND

Approved by



Date

10/4/94

000013

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-009  
**Sample Matrix:** Soil

**Date Received:** 9/15/94  
**Date Analyzed:** 9/22/94  
**Work Order #:** A940499

Solids, Total  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
340009480234	A940499-1	83.0
340009480235	A940499-2	84.7
340009480236	A940499-3	57.7
340009480237	A940499-4	78.6
340009480238	A940499-5	91.8
340009480239	A940499-6	93.8
340009480240	A940499-7	91.1
340009480241	A940499-8	91.4
340009480242	A940499-9	91.9
340009480243	A940499-10	94.0
340009480244	A940499-11	89.8

Approved by JFW October 25, 1994



**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-009  
**Sample Matrix:** Soil

**Date Received:** 9/15/94  
**Work Order #:** A940499

**Total Metals**  
**mg/Kg (ppm)**  
**Dry Weight Basis**

<b>Sample Name:</b>	<b>340009480236</b>	<b>340009480237</b>	<b>340009480238</b>
<b>Lab Code:</b>	<b>A940499-3</b>	<b>A940499-4</b>	<b>A940499-5</b>

<b>Analyte</b>	<b>Method</b>	<b>MRL</b>			
Arsenic	7060	1	--	--	10
Cadmium	6010	1	--	--	ND
Chromium	6010	2	--	--	20
Lead	6010	20	ND	ND	ND

Approved by DFW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-009  
**Sample Matrix:** Water

**Date Received:** 9/15/94  
**Date Extracted:** 9/27/94  
**Work Order #:** A940499

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
 $\mu\text{g/L}$  (ppb)

**Sample Name:**  
**Lab Code:**  
**Date Analyzed:**

**Method Blank**  
**A940927-WB1**  
**9/27/94**

**Trip Blank**  
**A940499-12**  
**9/27/94**

**Analyte**

**MRL**

Benzene

0.5

ND

ND

Toluene

1

ND

ND

Ethylbenzene

1

ND

ND

Total Xylenes

1

ND

ND

GRO as Gasoline

50

ND

ND

Approved by JFW October 25, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Dept. of the Air Force  
Project: BIA-Bethel/Work Order No. B-009  
Sample Matrix: Soil

Date Received: 9/15/94  
Date Extracted: 9/27/94  
Work Order #: A940499

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

Sample Name:	Method Blank	340009480236	340009480237
Lab Code:	A940927-SB1	A940499-3	A940499-4
Date Analyzed:	9/27/94	9/27/94	9/27/94

Analyte

MRL

Benzene	0.05	ND	ND	ND
Toluene	0.05	ND	ND	ND
Ethylbenzene	0.05	ND	ND	ND
Total Xylenes	0.05	ND	ND	ND
GRO as Gasoline	5	ND	ND	ND

Approved by JEW October 25, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Dept. of the Air Force  
**Project:** BIA-Bethel/Work Order No. B-009  
**Sample Matrix:** Soil

**Date Received:** 9/15/94  
**Date Extracted:** 9/27/94  
**Work Order #:** A940499

BTEX and GRO as Gasoline  
EPA Methods 5030/8020/Modified 8015  
mg/Kg (ppm)  
Dry Weight Basis

**Sample Name:**  
**Lab Code:**  
**Date Analyzed:**

**340009480238**  
**A940499-5**  
**9/27/94**

<b>Analyte</b>	<b>MRL</b>	
Benzene	0.05	ND <sup>a</sup>
Toluene	0.05	ND <sup>a</sup>
Ethylbenzene	0.05	2.8 <sup>a</sup>
Total Xylenes	0.05	4.2 <sup>a</sup>
GRO as Gasoline	5	380 <sup>ab</sup>

- a** MRL is elevated 10 times that shown because the sample required diluting.  
**b** Quantified as gasoline. The sample contained components that eluted in the C<sub>6</sub>-C<sub>10</sub> range, but the chromatogram did not match the typical gasoline fingerprint.

Approved by JEW October 25, 1994

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Dept. of the Air Force  
Project: BIA-Bethel/Work Order No. B-009  
Sample Matrix: Soil

Date Received: 9/15/94  
Date Extracted: 9/21/94  
Date Analyzed: 9/24-10/5/94  
Work Order #: A940499

Diesel Range Organics  
EPA Methods 3540/Modified 8100  
mg/Kg (ppm)

Sample Name	Lab Code	MRL	Diesel
Method Blank	A940921-SB1	10	ND
340009480234	A940499-1	10	32 <sup>a</sup>
340009480235	A940499-2	10	29 <sup>a</sup>
340009480236	A940499-3	10	17 <sup>a</sup>
340009480237	A940499-4	10	416 <sup>a</sup>
340009480238	A940499-5	10	4550
340009480239	A940499-6	10	ND
340009480240	A940499-7	10	ND
340009480241	A940499-8	10	206 <sup>a</sup>
340009480242	A940499-9	10	17 <sup>a</sup>
340009480243	A940499-10	10	ND
340009480244	A940499-11	10	ND

a Quantified as diesel. The sample contained biogenic components that eluted in the C<sub>10</sub>-C<sub>28</sub> range. The chromatogram did not match the typical diesel fingerprint.

Approved by JPW November 3, 1994

**COLUMBIA ANALYTICAL SERVICES, INC.**

**Analytical Report**

**Client:** Elmendorf Air Force Base  
**Project:** BIA Bethell/#3400  
**Sample Matrix:** Soil

**Date Received:** 09/22/94  
**Date Analyzed:** 09/23/94  
**Work Order No.:** K945804K

Solids, Total  
EPA Method Modified 160.3  
Percent (%)

Sample Name	Lab Code	Result
34000948-0236	K945804-001	57.8
34000948-0237	K945804-002	79.7
34000948-0238	K945804-003	91.3

Approved by Richard A. Craun Date 10/4/94

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## COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf AFB  
Project: BIA Bethell/#3400  
Sample Matrix: Soil

Service Request: K945804K  
Date Collected: 9/13/94  
Date Received: 9/22/94  
Date Extracted: 9/23/94

## Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)

EPA Methods 3540/8080

Units: mg/Kg (ppm)

Dry Weight Basis

Sample Name:	34000948-0236	34000948-0237	34000948-0238
Lab Code:	K945804-001	K945804-002	K945804-003
Date Analyzed:	9/29/94	9/29/94	9/29/94

Analyte	MRL			
Alpha-BHC	0.01	ND	ND	ND
Beta-BHC	0.03	ND	ND	ND
Delta-BHC	0.01	ND	ND	ND
Heptachlor	0.01	ND	ND	ND
Aldrin	0.01	ND	ND	ND
Gamma-BHC (Lindane)	0.01	ND	ND	ND
Heptachlor Epoxide	0.01	ND	ND	ND
Endosulfan I	0.01	ND	ND	ND
Endrin	0.01	ND	ND	ND
Endosulfan II	0.01	ND	ND	ND
4,4'-DDD	0.01	ND	ND	ND
Endrin Aldehyde	0.01	ND	ND	ND
Endosulfan Sulfate	0.01	ND	ND	ND
4,4'-DDT	0.01	ND	ND	ND
4,4'-DDE	0.01	ND	ND	ND
Dieldrin	0.01	ND	ND	ND
Methoxychlor	0.02	ND	ND	ND
Toxaphene	0.3	ND	ND	ND
Chlordane	0.1	ND	ND	ND
PCBs: Aroclor 1016	0.1	ND	ND	ND
Aroclor 1221	0.1	ND	ND	ND
Aroclor 1232	0.1	ND	ND	ND
Aroclor 1242	0.1	ND	ND	ND
Aroclor 1248	0.1	ND	ND	ND
Aroclor 1254	0.1	ND	ND	ND
Aroclor 1260	0.1	ND	ND	ND

Approved By: TFamDate: 9/30/94

3S30060194

5804SVQ.TFI - 3S30 10/4/94

# COLUMBIA ANALYTICAL SERVICES, INC.

## Analytical Report

Client: Elmendorf AFB  
Project: BIA Bethell/#3400  
Sample Matrix: Soil

Service Request: K945804K  
Date Collected: NA  
Date Received: NA  
Date Extracted: 9/23/94

### Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)

EPA Methods 3540/8080

Units: mg/Kg (ppm)

Dry Weight Basis

Sample Name: Method Blank  
Lab Code: K945804-MB  
Date Analyzed: 9/28/94

Analyte	MRL	
Alpha-BHC	0.01	ND
Beta-BHC	0.03	ND
Delta-BHC	0.01	ND
Heptachlor	0.01	ND
Aldrin	0.01	ND
Gamma-BHC (Lindane)	0.01	ND
Heptachlor Epoxide	0.01	ND
Endosulfan I	0.01	ND
Endrin	0.01	ND
Endosulfan II	0.01	ND
1,4'-DDD	0.01	ND
Endrin Aldehyde	0.01	ND
Endosulfan Sulfate	0.01	ND
4,4'-DDT	0.01	ND
4,4'-DDE	0.01	ND
Dieldrin	0.01	ND
Methoxychlor	0.02	ND
Toxaphene	0.3	ND
Chlordane	0.1	ND
PCBs: Aroclor 1016	0.1	ND
Aroclor 1221	0.1	ND
Aroclor 1232	0.1	ND
Aroclor 1242	0.1	ND
Aroclor 1248	0.1	ND
Aroclor 1254	0.1	ND
Aroclor 1260	0.1	ND

Approved By: TRW

Date: 9/30/94

3S30/060194

5804SVG TFI - 3S30 (2) 10/4/94

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**APPENDIX B**  
**CHAIN-OF-CUSTODY FORMS**

# CHAIN OF CUSTODY

Order Name: 11 CEOS/CEOR

Call Number:

BPA# : F65

Page 1 of 2

## Reports and Invoice to:

Mr Carl A Hornig 11CEOS/CEOR 21885 2nd St Elmendorf AFB AK 99506-4420 Phone (907)552-1617 Fax 552-4601

Laboratory: Columb Analy Serv

4684 Business Park Blvd # D

Anchororage, AK 99503

PH: 5630846 Fax 5632975

POC: Jane Whitsett

Sample Prefix		Project Name/Number/Location		Phone:		Fax:		Sample Amount					
Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	EST-CHAR	ELAB-CHAR	FCIP	FCIP	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE	CONTAINER CONDITION	Notes	Sample Amount Liters
0048	A940324-1	8-3-94 11:50 Hrs	Soil					X	X	7421 (Leak)	Field Screen	Grab Sample	1-402
0049	A940324-2	8-3-94 12:10 Hrs	Soil					X	X		Field Screen	Grab Sample	1-402
0050	A940324-3	8-3-94 12:30 Hrs	Soil					X	X		Field Screen	Grab Sample	1-402
0051	A940324-4	8-3-94 12:50 Hrs	Soil					X	X		Field Screen	Grab Sample	1-402
0052	A940324-5	8-3-94 1:10 PM Hrs	Soil					X	X		Field Screen	Grab Sample	1-402
0053	A940324-6	8-3-94 1:30 PM Hrs	Soil					X	X		Field Screen	Grab Sample	1-402
0054	A940324-7	8-3-94 1:50 PM Hrs	Soil					X	X		Field Screen	Grab Sample	1-402
0055	A940324-8	8-3-94 2:10 PM Hrs	Soil					X	X		Field Screen	Grab Sample	1-402

Relinquished By:		Relinquished By:	
Signature	Time	Signature	Time
Shah Alam	9:46	David R. Patti	9:49
Printed Name: A.H.M. SHAH ALAM	Date: 8-4-94	Printed Name: David R. Patti	Date: 8-5-94
Received By:		Received at Laboratory By:	
Signature: Sharon Horne	Time: 9:49	Signature: Sharon Horne	Time: 9:49
Printed Name: SHARON HORNE	Date: 8-5-94	Printed Name: SHARON HORNE	Date: 8-5-94

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	% CHAR	USAF FULL CHAR	TEMP	TEMP	RELAP	8020	7424	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE	Amount Liters
0056	PA40324-9	8-3-94 2:30 PM	Top Middle Bottom	SOIL					X	X	X	Field Seams 1021 PPM Grab Sample	1-402
0057	PA40324-10	8-3-94 2:50 PM	Top Middle Bottom	SOIL					X	X	X	Field Seams 529 PPM Grab Sample	1-402
0058	PA40324-11	8-3-94 3:10 PM	Top Middle Bottom	SOIL					X	X	X	477 PPM Grab Sample	1-402
0059	PA40324-12	8-3-94 3:30 PM	Top Middle Bottom	SOIL					X	X	X	1208 PPM	1-402
0060	PA40324-13	8-3-94 3:50 PM	Top Middle Bottom	SOIL					X	X	X	751 PPM	1-402
0061	PA40324-14	8-3-94 4:10 PM	Top Middle Bottom	SOIL					X	X	X	751 PPM	1-402
0062	PA40324-15	8-3-94 4:30 PM	Top Middle Bottom	SOIL					X	X	X	835 PPM	1-402
0063	PA40324-16	8-3-94 4:45 PM	Top Middle Bottom	SOIL					X	X	X	NA TRIP Blank	1-402
		94 Hrs	Top Middle Bottom										
		94 Hrs	Top Middle Bottom										
		94 Hrs	Top Middle Bottom										
		94 Hrs	Top Middle Bottom										
		94 Hrs	Top Middle Bottom										
		94 Hrs	Top Middle Bottom										
		94 Hrs	Top Middle Bottom										

# CHAIN OF CUSTODY

Customer Name: 11 CEOS/CEOR  
Call Number:

BPA# : F6 4

Page 1 of 2

## Reports and Invoice to:

Mr Carl A Hornig 11CEOS/CEOR 21885 2nd St Elmendorf AFB AK 99506-4420 Phone (907)552-1617 Fax 552-4601

Special Instructions: Regular Handling Level 3 data

Cooler Temp Bottle = 2.9°C JFW

Laboratory: Columb Analy Serv

4684 Business Park Blvd # D

Anchorage, AK 99503

PH: 5630846 Fax 5632973

POC: Jane Whitsett

Sample Prefix 34000948		Project Name/Number/Location BIA/Bethel/34000/Bethel, Alaska		Phone: 907-543-2160 Fax:		TTL GALS: QTY CONT: CONT TYPE: CONT SIZE		CONTAINER CONDITION		Sample Amount Liters	
Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	% CHAR	USAF CHAR	FULL CHAR	OBS	FEEL	FEEL	7421 LEAD
0064	1994357	8-6-94 10:22 Hrs	SOIL								
0065	-2	8-6-94 12:26 Hrs	SOIL								
0066	-3	8-8-94 13:40 Hrs	SOIL								
0067	-4	8-8-94 15:30 Hrs	SOIL								
0068	-5	8-9-94 7:37 Hrs	SOIL								
0069	-6	8-9-94 10:28 Hrs	SOIL								
0070	-7	8-9-94 10:28 Hrs	SOIL								
<p>Relinquished By: <u>Shan Alam</u> Time: <u>8:30</u> Date: <u>8-11-94</u></p> <p>Received By: <u>David R. Smith</u> Time: <u>11:35 PM</u> Date: <u>8/11/93</u></p> <p>Signature: <u>Shan Alam</u> Time: <u>8:30</u> Date: <u>8-11-94</u></p> <p>Printed Name: <u>A.M. SHAN ALAM</u> Time: <u>8-11-94</u></p> <p>Signature: <u>David R. Smith</u> Time: <u>11:35</u> Date: <u>8-12-94</u></p> <p>Printed Name: <u>David R. Smith</u> Time: <u>11:39</u> Date: <u>8-12-94</u></p> <p>Signature: <u>David R. Smith</u> Time: <u>11:35 PM</u> Date: <u>8/11/93</u></p> <p>Printed Name: <u>David R. Smith</u> Time: <u>11:39</u> Date: <u>8/12/94</u></p>											

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF CHAR	FULL CHAR	OBS	Temp	Temp	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Amount Liters
0071	194635	8-10-94 13:42 Hrs	Soil								Cont Cond: Excavation Grab Sample	1-4oz
0072	-8	8-10-94 14:49 Hrs	Soil								Cont Cond: Excavation Grab Sample	1-4oz
0073	-9	8-10-94 15:45 Hrs	Soil								Cont Cond: Excavation Grab Sample	1-4oz
0074	-10	NA 94 Hrs	Soil								Cont Cond: Excavation Grab Sample	1-4oz
	-11		Soil								Cont Cond: TRIP BLANK	1-4oz
		94 Hrs	Top								Cont Cond:	
		94 Hrs	Middle								Notes	
		94 Hrs	Bottom								Cont Cond:	
		94 Hrs	Top								Notes	
		94 Hrs	Middle								Cont Cond:	
		94 Hrs	Bottom								Notes	
		94 Hrs	Top								Cont Cond:	
		94 Hrs	Middle								Notes	
		94 Hrs	Bottom								Cont Cond:	
		94 Hrs	Top								Notes	
		94 Hrs	Middle								Cont Cond:	
		94 Hrs	Bottom								Notes	
		94 Hrs	Top								Cont Cond:	
		94 Hrs	Middle								Notes	
		94 Hrs	Bottom								Cont Cond:	
		94 Hrs	Top								Notes	
		94 Hrs	Middle								Cont Cond:	
		94 Hrs	Bottom								Notes	
		94 Hrs	Top								Cont Cond:	
		94 Hrs	Middle								Notes	
		94 Hrs	Bottom								Cont Cond:	
		94 Hrs	Top								Notes	
		94 Hrs	Middle								Cont Cond:	
		94 Hrs	Bottom								Notes	



Cust Name: 11 CEOS/CEOR  
Call Number:

# CHAIN CUSTODY

BPA# F65  
Page 1 of 3

## Reports and Invoice to:

Mr Carl A Hornig 11CEOS/CEOR 21885 2nd St Elmendorf AFB AK 99506-4420 Phone (907)552-1617 Fax 552-4601  
Special Instructions: REGULAR HANDLING LEVE 3 DATA

Laboratory: Columb Analy Serv  
4684 Business Park Blvd # 1  
Anchorage, AK 99503

PH: 5630846 Fax: 5632973  
POC: Jane Whitsett

Sample Prefix		Project Name/Number/Location		BIA/BETHEL/34000/BETHEL, ALASKA													
34000 948		SHAH ALAM		Phone: 907-543-2160 Fax:													
Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF CHAR	FULL CHAR	OBS	TEMP	TEMP	LEAD	TTL GALS: QTY	CONT TYPE: CONT SIZE	CONTAINER CONDITION	Sample Amount Liters		
0075	AA0387-1	8-11-94 11:45Hrs	Top	SOIL													
0076	-2	8-11-94 12:30Hrs	Middle	SOIL					X					TB-15	1-40		
0077	-3	8-11-94 13:18Hrs	Bottom	SOIL					X					Excavation Grab Sample	1-40		
0078	-4	8-11-94 14:10Hrs	Top	SOIL					X					TB-15	1-40		
0079	-5	8-11-94 15:16Hrs	Middle	SOIL					X					Excavation Grab Sample	1-40		
0080	-6	8-11-94 15:17Hrs	Bottom	SOIL					X					TB-15	1-40		
0081	-7	8-12-94 7:48Hrs	Top	SOIL					X					Excavation Grab Sample	1-40		
0082	-8	8-12-94 8:45Hrs	Middle	SOIL					X					TB-15	1-40		
Relinquished By:		Time:		7:15		Signature:		Relinquished By:		Time:		8:30		Signature:		Relinquished By:	
A.H.M. SHAH ALAM		Date:		8-17-94		Signature:		Relinquished By:		Time:		8:55		Signature:		Relinquished By:	
AIRWAY BILL# 4742996		Date:		8-17-94		Signature:		Relinquished By:		Time:		8:55		Signature:		Relinquished By:	
AIRWAY BILL# 4742996		Date:		8-17-94		Signature:		Relinquished By:		Time:		8:55		Signature:		Relinquished By:	
AIRWAY BILL# 4742996		Date:		8-17-94		Signature:		Relinquished By:		Time:		8:55		Signature:		Relinquished By:	
AIRWAY BILL# 4742996		Date:		8-17-94		Signature:		Relinquished By:		Time:		8:55		Signature:		Relinquished By:	

Comments: Trip Blank rec'd was a water sample contained in one 40ml VOA vial.

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF CIAR	FULL CIAR	OBS	TEMP 8100	TEMP 8015	8020	7421	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE: CONTAINER CONDITION	Amount Liters
0083	AA40387-9	8-12-94 9:15 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0084	-10	8-12-94 10:53 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0085	-11	8-12-94 11:48 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0086	-12	8-12-94 13:58 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0087	-13	8-12-94 14:45 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0088	-14	8-12-94 15:25 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0089	-15	8-13-94 9:04 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0090	-16	8-13-94 10:12 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0091	-17	8-13-94 11:05 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0092	-18	8-13-94 13:15 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0093	-19	8-13-94 14:40 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0094	-20	8-13-94 14:40 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											
0095	-21	8-13-94 8:15 Hrs	Top SOIL										Cont Cond: TB-15	1-403
			Middle						X				Notes Excavation Grab Sample	
			Bottom											



## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF CIAR	FULL CIAR	TSS	8100	8015	8020	Loc'd	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Amount Liters
0096	A 940387-22	8-15-94 8:40 Hrs	Top Middle Bottom						X				Cont Cond: TB-15 Notes: Excavation Grab Sample	1-403
0097	-23	8-15-94 10:40 Hrs	Top Middle Bottom						X				Cont Cond: TB-15 Notes: Excavation Grab Sample	1-403
0098	-24	8-15-94 14:05 Hrs	Top Middle Bottom						X				Cont Cond: TB-15 Notes: Excavation Grab Sample	1-403
0099	-25	8-15-94 14:39 Hrs	Top Middle Bottom						X				Cont Cond: TB-15 Notes: Excavation Grab Sample	1-403
0100	-26	8-15-94 15:35 Hrs	Top Middle Bottom						X				Cont Cond: TB-15 Notes: Excavation Grab Sample	1-403
0101	-27	8-10-94 9:30 Hrs	Top Middle Bottom						X	X	X	X	Cont Cond: TB-12 Notes: TB-12	1-403
0102	-28	NA Hrs	Top Middle Bottom						X	X	X	X	Cont Cond: TRIP BLANK Notes: TRIP BLANK	1-403
		94 Hrs	Top Middle Bottom										Cont Cond: Notes	
		94 Hrs	Top Middle Bottom										Cont Cond: Notes	
		94 Hrs	Top Middle Bottom										Cont Cond: Notes	
		94 Hrs	Top Middle Bottom										Cont Cond: Notes	
		94 Hrs	Top Middle Bottom										Cont Cond: Notes	
		94 Hrs	Top Middle Bottom										Cont Cond: Notes	
		94 Hrs	Top Middle Bottom										Cont Cond: Notes	
		94 Hrs	Top Middle Bottom										Cont Cond: Notes	

# CHAIN OF CUSTODY

Customer Name: 11 CEOS/CEOR  
Call Number:

BPA# : F6536494  
Page 1 of 4

## Reports and Invoice to:

Mr Carl A Hornig 11CEOS/CEOR 21885 2nd St Elmendorf AFB AK 99506-4420 Phone (907)552-1617 Fax 552-4601  
Special Instructions: REGULAR HANDLING LEVEL 3 DATA

Laboratory: Columb Analy Serv

4684 Business Park Blvd # D  
Anchorage, AK 99503

PH: 5630846 Fax: 5632973

POC: Jane Whitsett

Sample Prefix		Project Name/Number/Location		BIA / 34000 / BETHEL, ALASKA		Phone:		907-543-2160		907-543-2160		Fax:		907-543-2160		Sample Amount Liters																																																													
Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF FULL CILAR CHAR	OBS	TCLP	TCLP	9100M	TTL GALS QTY CONT:	CONT TYPE:	CONT SIZE:	CONTAINER CONDITION																																																															
0103		8-20-94 8:25 Hrs	SOL							X					Cont Cond:		1-4 oz																																																												
0104		8-20-94 9:19 Hrs	SOL							X					Cont Cond:		1-4 oz																																																												
0105		8-20-94 10:30 Hrs	SOL							X					Cont Cond:		1-4 oz																																																												
0106		8-20-94 11:15 Hrs	SOL							X					Cont Cond:		1-4 oz																																																												
0107		8-20-94 11:54 Hrs	SOL							X					Cont Cond:		1-4 oz																																																												
0108		8-20-94 13:05 Hrs	SOL							X					Cont Cond:		1-4 oz																																																												
0109		8-20-94 13:50 Hrs	SOL							X					Cont Cond:		1-4 oz																																																												
0110		8-20-94 14:20 Hrs	SOL							X					Cont Cond:		1-4 oz																																																												
<table border="1"> <thead> <tr> <th colspan="4">Relinquished By:</th> <th colspan="4">Relinquished By:</th> <th colspan="4">Relinquished By:</th> </tr> <tr> <th>Signature</th> <th>Time</th> <th>Date</th> <th>Printed Name</th> <th>Signature</th> <th>Time</th> <th>Date</th> <th>Printed Name</th> <th>Signature</th> <th>Time</th> <th>Date</th> <th>Printed Name</th> <th>Signature</th> <th>Time</th> <th>Date</th> <th>Printed Name</th> </tr> </thead> <tbody> <tr> <td>Shah Alam</td> <td>7:04</td> <td>8-25-1994</td> <td>A.H.M. SHAH ALAM</td> <td>Gary Egeberg</td> <td>10:30</td> <td>8-26-94</td> <td>Gary Egeberg</td> <td>Richard Wise</td> <td>10:50</td> <td>8-26-94</td> <td>Richard Wise</td> <td>Received at Laboratory By:</td> <td></td> <td></td> <td></td> </tr> <tr> <td>ALBAY BILL # 4742-9616</td> <td>8:00</td> <td>8-25-1994</td> <td>NORTHERN AIR CARLO</td> <td>Richard Wise</td> <td>10:30</td> <td>8-26-94</td> <td>Richard Wise</td> <td>Received at Laboratory By:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>																		Relinquished By:				Relinquished By:				Relinquished By:				Signature	Time	Date	Printed Name	Signature	Time	Date	Printed Name	Signature	Time	Date	Printed Name	Signature	Time	Date	Printed Name	Shah Alam	7:04	8-25-1994	A.H.M. SHAH ALAM	Gary Egeberg	10:30	8-26-94	Gary Egeberg	Richard Wise	10:50	8-26-94	Richard Wise	Received at Laboratory By:				ALBAY BILL # 4742-9616	8:00	8-25-1994	NORTHERN AIR CARLO	Richard Wise	10:30	8-26-94	Richard Wise	Received at Laboratory By:							
Relinquished By:				Relinquished By:				Relinquished By:																																																																					
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ALBAY BILL # 4742-9616	8:00	8-25-1994	NORTHERN AIR CARLO	Richard Wise	10:30	8-26-94	Richard Wise	Received at Laboratory By:																																																																					

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF CHAR	FULL CHAR	OBS	TCIP	TCIP	TTI, GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Amount Liters
C111		8-20-94 15:18 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C112		8-20-94 15:19 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C113		8-20-94 16:23 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C114		8-20-94 17:24 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C115		8-22-94 7:59 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C116		8-22-94 8:42 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C117		8-22-94 9:35 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C118		8-22-94 11:38 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C119		8-22-94 12:50 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C120		8-22-94 12:51 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C121		8-22-94 13:37 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C122		8-22-94 17:25 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g
C123		8-22-94 18:31 Hrs	Top Middle Bottom								Cont Cond: Notes Grab Sample (TB-15)	1-40g

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF Full Char	TCLP	TCLP	8100 M	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE: CONTAINER CONDITION	Amount Liters
0124		8-23-94 9:27 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0125		8-23-94 11:33 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0126		8-23-94 13:24 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0127		8-23-94 14:16 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0128		8-23-94 15:11 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0129		8-23-94 16:18 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0130		8-23-94 16:19 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0131		8-23-94 16:57 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0132		8-23-94 17:30 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0133		8-23-94 18:15 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0134		8-24-94 7:47 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0135		8-24-94 8:36 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal
0136		8-24-94 9:16 Hrs	Top Middle Bottom						X	Cont Cond: Notes EXCAVATION Grab Sample TB-15	1-4 gal

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF CIAR	FULL CIAR	OBS	TCLP	TCLP 8100M	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Amount Liters
0137		8-24-94 11:23 Hrs	Top Middle Bottom SOIL							X	Cont Cond: TB-15 Notes: EXCELVATION Grab Sample	1-4 g
0138		8-24-94 13:50 Hrs	Top Middle Bottom SOIL							X	Cont Cond: TB-15 Notes: EXCELVATION Grab Sample	1-4 g
0139		8-24-94 15:35 Hrs	Top Middle Bottom SOIL							X	Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	1-4 g
0140		8-24-94 16:35 Hrs	Top Middle Bottom SOIL							X	Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	1-4 g
0141		8-24-94 16:35 Hrs	Top Middle Bottom SOIL							X	Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	1-4 g
0142		8-24-94 17:15 Hrs	Top Middle Bottom SOIL							X	Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	1-4 g
0143		NA 94 Hrs	Top Middle Bottom TRIP BLANK							X	Cont Cond: TB-2 Notes: TRIP BLANK	1-4 g
0144		8-24-94 17:40 Hrs	Top Middle Bottom SOIL							X	Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	1-4 g
0145		8-24-94 18:20 Hrs	Top Middle Bottom SOIL							X	Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	1-4 g
		94 Hrs	Top Middle Bottom								Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	
		94 Hrs	Top Middle Bottom								Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	
		94 Hrs	Top Middle Bottom								Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	
		94 Hrs	Top Middle Bottom								Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	
		94 Hrs	Top Middle Bottom								Cont Cond: TB-2 Notes: EXCELVATION Grab Sample	

# CHAIN OF CUSTODY

Customer Name: 11 CEOS/CEOR  
Call Number:

BPA# : F65094  
Page 1 of 4

## Reports and Invoice to:

Mr Carl A Homig 11CEOS/CEOR 21885 2nd St Elmendorf AFB AK 99506-4420 Phone (907)552-1617 Fax 552-4601  
Special Instructions: REGULAR HANDLING LEVEL 3 DATA  
PLEASE EXPEDITE PROCESSING. THANK YOU

Laboratory: Columb Analy Serv  
4684 Business Park Blvd # D  
Anchorage, AK 99503  
PH: 5630846 Fax: 5632973  
POC: Jane Whitsett

Sample Prefix	Project Name/Number/Location	Phone	Lab Ref	Date/Time Sampled	Matrix	Color	USAF FULL CHAR %	REL %	REL %	REL %	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Sample Amount Liters
3400948	SHAH ALAM/BILL VAGT	907-543-2160									907-543-2160	
0146	A940 436 -1	8-25-94 1035 Hrs	Soil								TB-2	1-4 oz
0147	-2	8-25-94 1145 Hrs	Soil								Excavation Grab Sample	1-4 oz
0148	-3	8-25-94 1140 Hrs	Soil								Excavation Grab Sample	1-4 oz
0149	-4	8-25-94 1140 Hrs	Soil								Excavation Grab Sample	1-4 oz
0150	-5	8-25-94 1140 Hrs	Soil								Excavation Grab Sample	1-4 oz
0151	-6	8-25-94 1145 Hrs	Soil								Excavation Grab Sample	1-4 oz
0152	-7	8-25-94 1140 Hrs	Soil								Excavation Grab Sample	1-4 oz
0153	-8	8-25-94 1145 Hrs	Soil								Excavation Grab Sample	1-4 oz
Relinquished By: Signature: Time: Relinquished By: Signature: Time:												
A.H.M. SHAH ALAM 8-29-1994 15:10 300												
Received By: Signature: Time: Received By: Signature: Time:												
NORTHERN AIR CARGO 8-29-1994 15:30 8-30-94												
Received at Laboratory By: Signature: Time: Received at Laboratory By: Signature: Time:												
J. O. E. O. T. T. 8-30-94 3:20 PM												

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF FULL CHAR	OBS	TEMP 8100	TEMP 8015	Lead 8020	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE: CONTAINER CONDITION	Amount Liters
0154	-9	8-25-94 1430 Hrs	Top Middle Bottom	Silt					X	X	TB-12 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0155	-10	8-25-94 1435 Hrs	Top Middle Bottom	Silt					X	X	TB-12 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0156	-11	8-25-94 1440 Hrs	Top Middle Bottom	Silt					X	X	TB-12 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0157	-12	8-25-94 1450 Hrs	Top Middle Bottom	Silt					X	X	TB-12 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0158	-13	8-25-94 1455 Hrs	Top Middle Bottom	Silt					X	X	TB-12 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0159	-14	8-25-94 1500 Hrs	Top Middle Bottom	Silt					X	X	TB-12 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0160	-15	8-25-94 1510 Hrs	Top Middle Bottom	Silt				X			TB-15 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0161	-16	8-25-94 1505 Hrs	Top Middle Bottom	Silt				X			TB-15 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0162	-17	8-25-94 1530 Hrs	Top Middle Bottom	Silt				X			TB-15 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0163	-18	8-25-94 1535 Hrs	Top Middle Bottom	Silt				X			TB-15 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0164	-19	8-25-94 1600 Hrs	Top Middle Bottom	Silt				X			TB-15 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0165	-20	8-25-94 1603 Hrs	Top Middle Bottom	Silt				X			TB-15 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g
0166	-21	8-25-94 1735 Hrs	Top Middle Bottom	Silt				X			TB-15 Cont Cond: Confirmation Notes: Excavation Grab Sample	1-4g

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	% CHAR	USAF FULL CHAR	OBS	#P	#P	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Amount Liters
0167	-22	8-25-94 1755 Hrs	Top Middle Bottom							TB-2 Cont Cond: Bottom Confirmation	1-403
0168	-23	8-25-94 1810 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0169	-24	8-25-94 1815 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0170	-25	8-26-94 13:30 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0171	-26	8-26-94 1405 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0172	-27	8-26-94 1520 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0173	-28	8-26-94 1618 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0174	-29	8-26-94 1625 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0175	-30	8-26-94 16:30 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0176	-31	8-26-94 16:35 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0177	-32	8-26-94 17:00 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0178	-33	8-26-94 1815 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403
0179	-34	8-27-94 750 Hrs	Top Middle Bottom					X		Notes: Excavation Grab Sample Cont Cond: Bottom Confirmation	1-403



## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF Full Char	OBS	TEMP	#ELP	Lead	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Amount Liters
0180	-35	8-27-94 750 Hrs	Top Middle Bottom					X	8100	8015	TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0181	-36	8-27-94 855 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0182	-37	8-27-94 1010 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0183	-38	8-27-94 1120 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0184	-39	8-27-94 1330 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0185	-40	8-27-94 1630 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0186	-41	8-27-94 1705 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0187	-42	8-29-94 9:10 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0188	-43	8-29-94 10:45 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0189	-44	8-29-94 1305 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0190	-45	8-29-94 1306 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0191	-46	8-29-94 1430 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
0192	-47	8-29-94 1500 Hrs	Top Middle Bottom					X			TB-2 Cont Cond: Notes: EXCAVATION Grab Sample	1-403
											TRIP BLANK	1-403

Company Name: 11 CEOS/CEOR

Call Number:

# CHAIN OF CUSTODY

BPA# : F65094

Page 1 of 4

## Reports and Invoice to:

Mr Carl A Homig 11CEOS/CEOR 21885 2nd St Elmendorf AFB AK 99506-4420 Phone (907)552-1617 Fax 552-4601

Special Instructions: Regular Handling Level 3 Data

Laboratory: Columb Analy Serv

4684 Business Park Blvd # D

Anchorage, AK 99503

PH: 5630846 Fax: 5632973

POC: Jane Philsett

Sample Prefix	Project Name/Number/Location	Sampled By:	Date/Time	Matrix	Color	%	USAF	FULL	CHAR	OBS	TCLP	Phone:	907-552-4600	Fax:	907-552-4601	TTL GALS:	QTY	CONT:	CONT TYPE:	CONT SIZE:	Sample Amount
0193	0193	8/29/94	8:29	Soil																	1.463
0194	0194	8/29/94	16:30	Soil																	
0195	0195	9/1/94	10:21	Soil																	
0196	0196	9/1/94	11:41	Soil																	
0197	0197	9/1/94	12:55	Soil																	
0198	0198	9/1/94	15:19	Soil																	
0199	0199	9/1/94	16:47	Soil																	
0200	0200	9/1/94	16:48	Soil																	
<p>Relinquished By: <u>William Vant</u> Time: <u>0730</u> Date: <u>9/7/94</u> Relinquished By: <u>John C. Nelson</u> Time: <u>9:45 AM</u> Date: <u>9-8-94</u></p> <p>Received By: <u>William Vant</u> Time: <u>0800</u> Date: <u>9/7/94</u> Received By: <u>John C. Nelson</u> Time: <u>9:45</u> Date: <u>9-8-94</u></p> <p>Signature: <u>William Vant</u> Printed Name: <u>William Vant</u> Signature: <u>John C. Nelson</u> Printed Name: <u>John C. Nelson</u></p>																					

# CHAIN OF CUSTODY

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Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF Full Char	TCLP	TCLP 9100M	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Amount Liters
0201	-9	9/1 94 Hrs 1744	Top Middle Bottom					X	TB-2 Cont Cond: Excavation Grab & sidewall Notes	1-602
0202	-10	9/2 94 Hrs 1055	Top Middle Bottom						TB-2 Cont Cond: Excavation Grab & bottom Notes	
0203	-11	9/2 94 Hrs 1335	Top Middle Bottom						TB-2 Cont Cond: Excavation Grab & bottom Notes	
0204	-12	9/2 94 Hrs 1320	Top Middle Bottom						TB-2 Cont Cond: Excavation Grab & bottom Notes	
0205	-13	9/2 94 Hrs 1440	Top Middle Bottom						TB-2 Cont Cond: Excavation Grab & bottom Notes	
0206	-14	9/2 94 Hrs 1510	Top Middle Bottom						TB-2 Cont Cond: Excavation Grab & bottom Notes	
0207	-15	9/2 94 Hrs 1650	Top Middle Bottom						TB-2 Cont Cond: Excavation Grab & bottom Notes	
0208	-16	9/2 94 Hrs 1730	Top Middle Bottom						TB-2 Cont Cond: Excavation Grab & bottom Notes	
0209	-17	9/3 94 Hrs 735	Top Middle Bottom						TB-6 Cont Cond: Excavation Grab & bottom Notes	
0210	-18	9/3 94 Hrs 825	Top Middle Bottom						TB-6 Cont Cond: Excavation Grab & bottom Notes	
0211	-19	9/3 94 Hrs 1030	Top Middle Bottom						TB-6 Cont Cond: Excavation Grab & bottom Notes	
0212	-20	9/3 94 Hrs 1150	Top Middle Bottom						TB-6 Cont Cond: Excavation Grab & bottom Notes	
0213	-21	9/3 94 Hrs 1355	Top Middle Bottom						TB-6 Cont Cond: Excavation Grab & bottom Notes	

# CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF CLAR	FULL CHAR	OBS	TEST	REMARKS	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE CONTAINER CONDITION	Amount Liters
0214	-22	9/3 94 1530 Hrs	Top Middle Bottom								TB-6 Cont Cond: Notes: Excavation Grab Station	1-8074
0215	-23	9/3 94 1730 Hrs	Top Middle Bottom								TB-6 Cont Cond: Notes:	
0216	-24	9/3 94 1730 Hrs	Top Middle Bottom								TB-6 Cont Cond: Notes:	
0217	-25	9/5 94 840 Hrs	Top Middle Bottom								TB-6 Cont Cond: Notes: side wall	
0218	-26	9/5 94 1030 Hrs	Top Middle Bottom								TB-6 Cont Cond: Notes:	
0219	-27	9/5 94 1310 Hrs	Top Middle Bottom								Cont Cond: 2000 Notes: Sewer Lagoon	1-8074
0220	-28	9/5 94 1330 Hrs	Top Middle Bottom								HA-21 Cont Cond: Notes:	
0221	-29	9/5 94 1345 Hrs	Top Middle Bottom								HA-21 Cont Cond: Notes:	
0222	-30	9/5 94 1400 Hrs	Top Middle Bottom								HA-21 Cont Cond: Notes:	
0223	-31	9/5 94 1415 Hrs	Top Middle Bottom								HA-21 Cont Cond: Notes:	
0224	-32	9/5 94 1545 Hrs	Top Middle Bottom								W65T HA-21 Cont Cond: Notes:	
0225	-33	9/5 94 1600 Hrs	Top Middle Bottom								W65T HA-21 Cont Cond: Notes:	
0226	-34	9/5 94 1615 Hrs	Top Middle Bottom								W65T HA-21 Cont Cond: Notes:	

## CHAIN OF CUSTODY

Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	%	USAF CHAR	FULL CHAR	OBS	Pct <sup>+</sup>	Pct <sup>+</sup>	TTL GALS: QTY CONT: CONT TYPE: CONT SIZE	CONTAINER CONDITION	Amount Liters
0227	-35	9/5 94 Hrs 1630	Top Middle Bottom								6657 HA-71		
0228	-36	9/5 94 Hrs 1730	Top Middle Bottom								HA-71		
0229	-37	9/5 94 Hrs 1745	Top Middle Bottom								HA-71		
0230	-38	9/5 94 Hrs 1800	Top Middle Bottom								HA-71		
0231	-39	9/5 94 Hrs 1815	Top Middle Bottom								HA-71		
0232	-40	9/5 94 Hrs 1830	Top Middle Bottom								HA-71		
0233	-41	9/5 94 Hrs 1900	Top Middle Bottom								Cont Cond: Top Blank		1.439
		94 Hrs	Top Middle Bottom								Cont Cond:		
		94 Hrs	Top Middle Bottom								Cont Cond:		
		94 Hrs	Top Middle Bottom								Cont Cond:		
		94 Hrs	Top Middle Bottom								Cont Cond:		
		94 Hrs	Top Middle Bottom								Cont Cond:		
		94 Hrs	Top Middle Bottom								Cont Cond:		
		94 Hrs	Top Middle Bottom								Cont Cond:		
		94 Hrs	Top Middle Bottom								Cont Cond:		
		94 Hrs	Top Middle Bottom								Cont Cond:		

**Call Number:** 110

BPA# : F62501-94

Page 1 of 2

### Reports and Invoice to:

**Laboratory:** *Columb Analy Serv*

Mr Carl A Hornig  
IICEOS/CEOR 21885 2nd St Elmendorf AFB AK 99506-4420 Phone (907)552-1617 Fax 552-4601  
Special Investigations Q-2  
**Laboratory:** 4684 Business Park Blvd # D Columbia Analy Serv

Special Instructions: REGULAR HANDLING LEVEL 3 DATA

**PH: 5630846 Fax: 5632973**

POC: **Jane Whitsett**

Sample Prefix 34000 948		Project Name/Number/Location SHAH ALAM / BILL VAGT		Phone: 907-543-2160		Fax: 907-543-2160		TTL GALS: QTY CONT: CONT TYPE: CONT SIZE		Sample Amount Liters	
Sample Number	Lab Ref Number	Date/Time Sampled	Matrix	Color	% CHLOR	USAF FULL CHLOR	8000 8000 8000	8015 8020	Lead 7421	HA-18	HA-19
0234	A940804	9-13-94 0935Hrs	Top Middle Bottom							HA-18	HA-19
0235	-1	9-13-94 0936Hrs	Top Middle Bottom							HA-18	HA-19
0236	-2	9-13-94 0955Hrs	Top Middle Bottom							HA-18	HA-19
0237	-3	9-13-94 0956Hrs	Top Middle Bottom							HA-18	HA-19
0238	-4	9-13-94 1512Hrs	Top Middle Bottom							HA-18	HA-19
0239	-5	9-13-94 1535Hrs	Top Middle Bottom							HA-18	HA-19
0240	-6	9-13-94 1543Hrs	Top Middle Bottom							HA-18	HA-19
0241	-7	9-13-94 1544Hrs	Top Middle Bottom							HA-18	HA-19
0242	-8	9-13-94 1545Hrs	Top Middle Bottom							HA-18	HA-19
Relinquished By:		Signature		Time		Relinquished By:		Signature		Time	
Shah Alam		Carl A. Horney		1600		Relinquished By:		Signature		Time	
A.H. M. SHAH ALAM		Date		9-14-1994		Relinquished By:		Signature		Time	
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## CHAIN OF CUSTODY

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