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Draft-Final
Remedial Investigation Report
Volume 1
Report
Former Umiat Air Force Station
Umiat, Alaska

Contract No. DACA85-93-D-0009
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Prepared for:

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Table of Contents

Table of Contents (Cont.)

Table of Contents (Cont.)

List of Tables

List of Illustrations

List of Acronyms

AAC	Alaska Administrative Code
ACL	alternative cleanup level
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
ADOT	Alaska Department of Transportation
ADOT&PF	Alaska Department of Transportation and Public Facilities
AFS	Air Force Station
ARARs	applicable or relevant and appropriate requirements
ASC	Analytical Services Center
AST	aboveground storage tank
BGS	below ground surface
BLM	Bureau of Land Management
BNA	base/neutral and acid extractable organic compounds
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeter
CQAR	chemical quality assurance report
cy	cubic yard
DDD	dichlorodiphenyldichloroethane
DDT	dichlorodiphenyltrichloroethane
DoD	United States Department of Defense
DQO	data quality objective
DRO	diesel-range organics
E & E	Ecology and Environment, Inc.
EPA	United States Environmental Protection Agency
ERA	ecological risk assessment
F	Fahrenheit
FS	feasibility study
GRO	gasoline-range organics
HHRA	human health risk assessment
IDW	investigation-derived waste
MCL	maximum contaminant level
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
NPDL	North Pacific Division Laboratory
NPR-4	Naval Petroleum Reserve No. 4

OSC	Oil Spill Consultants, Inc.
PAH	polynuclear aromatic hydrocarbon
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCBs	polychlorinated biphenyls
Pest/PCB	pesticides/polychlorinated biphenyls
pg/g	picograms per gram
POL	petroleum, oil, and lubricant
ppm	parts per million
QA	quality assurance
QC	quality control
RAR	risk assessment report
RBCs	risk-based concentrations
RI	remedial investigation
RIR	remedial investigation report
RRO	residual-range organics
2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TRPH	total recoverable petroleum hydrocarbons
TSCA	Toxic Substances Control Act
USAED Alaska	United States Army Engineer District, Alaska
USAF	United States Air Force
UST	underground storage tank
VOC	volatile organic compound

Executive Summary

Under Contract No. DACA85-93-D-0009, Delivery Order No. 40, for the United States Army Engineer District, Alaska, Ecology and Environment, Inc., (E & E) was tasked to complete the second phase (Phase II) of a remedial investigation (RI) for the Formerly Used Defense Site at the former Umiat Air Force Station (AFS), Umiat, Alaska. The Phase I RI activities previously were executed under a separate contract action. This draft-final RI report (RIR) presents the results of the Phase II RI activities and incorporates the Phase I findings (presented previously in the draft Phase I RIR [E & E 1995a]).

Although the former Umiat AFS is not a National Priorities List site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the remedial activities performed under this contract follow the CERCLA process. In accordance with the CERCLA process, a baseline human health and ecological risk assessment report (RAR) also was prepared for the site and submitted concurrently under separate cover. During development of this draft RIR, factors used in the development of the RAR (e.g., contaminants of concern and exposure pathways) were incorporated. However, the RAR conclusions were unavailable to integrate into the RIR summary and conclusions.

Other documents also were prepared for the site:

- *Former Umiat AFS Work Plan for Field Investigation* (E & E 1994);
- *Former Umiat AFS Community Relations Work Plan* (E & E 1995);
- *Former Umiat AFS Risk Assessment Work Plan* (E & E 1995b);
- *Draft Umiat Remedial Investigation Project Report* (E & E 1995a);
- *Historical Site Uses at the Former Umiat AFS* (technical memorandum; E & E 1996b);

- *Phase II Remedial Investigation Work Plans for the Former Umiat AFS* (E & E 1996a);
- *Dioxin Evaluation Technical Memorandum for Soils at the Former Umiat AFS* (E & E 1997a); and
- *Delivery Order—Remedial Design for PCB Material Removal at the Former Umiat AFS* (E & E 1997b).

Information from these previous documents was incorporated in this RIR where needed; however, detailed information presented within other reports is not repeated in this RIR.

The Phase II sampling effort included surface soil samples, soil borings, monitoring wells, and surface water and sediment samples. The objectives of the Phase II sampling and analysis program were to:

- Delineate soil and characterize groundwater contamination (petroleum, oil, and lubricants [POLs]; pesticides; and polychlorinated biphenyls [PCBs]) at the 11 previously defined areas;
- Collect soil samples from known areas of contamination for risk assessment;
- Collect surface water and sediment samples from the Colville River and two area lakes for risk assessment;
- Define possible contaminant migration pathways (surface water and groundwater) to potential receptors (the Colville River and surface water bodies); and
- Confirm the presence or absence of dioxins.

To accomplish these objectives, E & E performed the following activities during the Phase II RI fieldwork:

- Drilled 187 soil borings and collected surface and subsurface soil samples down to the top of groundwater. Soil samples were field screened for POLs, PCBs, or dichlorodiphenyltrichloroethane (DDT) chlorinated pesticides using immunoassay field screening kits. Approximately 20% of the field screening samples also were sent off site for laboratory analyses to check the accuracy of the field screening methodology;
- Completed 20 of the soil borings as groundwater monitoring wells and collect one groundwater sample from each well. Groundwater

samples were used to characterize groundwater contamination and potential contaminant migration. The full extent of groundwater contamination was not intended or delineated during the RI;

- Collected 81 surface soil samples to delineate the extent of contamination in surface soils and/or for the risk assessment;
- Collected 18 collocated surface water and sediment samples for risk assessment; and
- Conducted a topographic and planimetric survey of the site, including location and elevation of each sampling location and monitoring well.

The RI activities at the former Umiat AFS focused on three main areas: the Airstrip Operations Complex and Runway Lake (labeled *Unit A* for the purposes of this report), the Main Gravel Pad and Floatplane Lake (Unit B), and the Landfill and associated seasonal stream (Unit C).

The Colville River floodplain consists of unconsolidated, poorly sorted, poorly stratified sand and gravel. The Landfill lies in the floodplain of the Colville River and also is dominated by the sand and gravel sediment. During the development of the former Umiat AFS, sandy gravel was excavated from the Colville River floodplain and laid on the wetlands to form gravel pads capable of supporting vehicles and buildings. Therefore, the gravel pad areas (Units A and B) are predominantly sandy gravels. The gravel pads vary in thickness from approximately 2 feet near the edges of the pad to 10 feet closer to the center of the pad. In the undeveloped wetland areas adjacent to the gravel pads and roadways, the main sediment type exposed at the surface is organic silt. This surficial organic silt ranges in thickness of up to approximately 8 feet and overlies the sandy gravels common to the Colville River floodplain.

Groundwater beneath the gravel pads occurs at approximately 2 feet to 5 feet below ground surface (BGS) in a suprapermafrost, unconfined aquifer. Although local differences occur between the three units, groundwater across the entire site generally flows slowly to the north-northeast, mirroring the land surface topography and the flow of the Colville River.

Permafrost was encountered in 29 of the 259 soil borings (combined Phase I and II), at depths ranging from 2 feet to 12 feet BGS. E & E believes that permafrost is continuous beneath the site but that the depth to the top of the permafrost varies mostly because of thawing effects from surface features. During the August 1996 Phase II sampling effort, permafrost did not appear to be disrupting the groundwater flow in the shallow aquifer.

The analytical results from the RI were compared to the applicable regulatory guidance levels and risk-based concentrations. Comparing contamination to these highly conservative guidance values represents a "worst-case scenario" in E & E's opinion. E & E believes that alternative cleanup levels (ACLs) or risk-based cleanup levels, developed according to Alaska Department of Environmental Conservation (ADEC) guidance, are more appropriate for the former Umiat AFS site. Because the results of the risk assessment were unavailable during the development of this RIR, ACLs will be developed in the forthcoming feasibility study (FS).

Contamination at the Airstrip Operations Complex (Unit A) is mainly petroleum-based and is present in the surface and subsurface soils and groundwater. In soils, gasoline-range organics (GRO), diesel-range organics (DRO), and residual-range organics (RRO) range up to 390 milligrams per kilogram (mg/kg), 22,000 mg/kg, and 24,000 mg/kg, respectively. In addition to United States Department of Defense-related activities, subsurface contamination also appears to be originating from the Umiat Enterprises, Inc., bulk fuel storage area. The estimated volume of petroleum contaminated soil in Unit A is 12,500 cubic yards (cy). At one location separate from the petroleum contaminants, chlorinated pesticide (DDT) is present in surface soils up to 4.67 mg/kg. The estimated volume of DDT-contaminated soil in Unit A is 100 cy. Groundwater contamination in Unit A includes GRO; DRO; benzene; total benzene, toluene, ethylbenzene, and total xylenes (BTEX); dissolved lead; dissolved iron; and total thallium, but the volume of contaminated groundwater is unknown. No contaminants were detected above the screening levels in Unit A sediment and surface water samples. Contamination appears to be well-delineated in Unit A. Additional data from within Unit A are unnecessary to complete the forthcoming FS.

At the Main Gravel Pad (Unit B), contamination occurs in surface soil, subsurface soil, and groundwater. Contaminants include petroleum, chlorinated pesticides, PCBs, metals, and low levels of dioxins. In soils, GRO was found up to 2,200 mg/kg, DRO up to 140,000 mg/kg, total recoverable petroleum hydrocarbons up to 130,000 mg/kg, total BTEX up to 100.5 mg/kg, and benzene up to 0.6 mg/kg. The estimated volume of petroleum-contaminated soil in Unit B is 16,300 cy. Chlorinated pesticides (DDT and dichlorodiphenyldichloroethane [DDD]) in Unit B soils range up to 200 mg/kg DDT, and the corresponding pesticide-contaminated soil volume is estimated to be 2,365 cy. PCB contamination above 10 mg/kg (the Toxic Substances Control Act [TSCA] for soils in unrestricted, residential settings) is localized to a single location in Unit B. The location (fomerly known as *Area 7*) is estimated to contain 200 cy of PCB-contaminated soil. The

maximum concentration for PCBs in soils is 912 mg/kg. A single unfiltered groundwater sample collected in the middle of the PCB-contaminated soil contained PCBs at 240 micrograms per liter (μg/L). The PCB-contaminated soils and the associated groundwater are scheduled for removal under a separate contract action (E & E 1996b). Metals found above the screening levels in surface and subsurface soils include lead, antimony, arsenic, copper, and iron. The extent of metals contamination in soils has not been delineated; thus, no soil volumes have been estimated for these contaminants. Dioxins were found in soils at concentrations of up to 610 picograms per gram (pg/g) of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD; TEQ). Only two locations were sampled for dioxin, so the extent of contamination has not been delineated. However, the sample with the highest dioxin concentration is collocated with the PCBs (in former Area 7) scheduled for removal. The remaining dioxins (at 160 pg/g of 2,3,7,8-TCDD TEQ), although above the default risk-based screening levels, are well below the likely dioxin cleanup level of 1,000 pg/g. Groundwater contamination throughout Unit B consisted of GRO ranging up to 20,000 μg/L, DRO up to 46,400 μg/L, benzene up to 91.4 μg/L, total BTEX up to 703.4 μg/L, total polynuclear aromatic hydrocarbons + BTEX up to 790 μg/L, DDD up to 1.47 μg/L, PCBs up to 240 μg/L, and thallium up to 6.3 μg/L. The volume of contaminated groundwater is unknown. No contaminants were detected above the screening levels in Unit B sediments or surface waters (collected from Floatplane Lake). Contamination within Unit B has been delineated sufficiently to allow successful completion of the forthcoming FS.

Area C contamination affects surface soil, subsurface soil, groundwater, and sediment. Contaminants include petroleum, chlorinated pesticides, PCBs, and metals. Area C surface soil samples contained lead, arsenic, beryllium, and iron above screening levels, up to 598 mg/kg, 8.4 mg/kg, 0.37 mg/kg and 27,800 mg/kg, respectively. Lead is attributable to a lead-acid battery present and appears to be localized. Petroleum, PCBs, and chlorinated pesticides were detected above screening levels in Unit C subsurface soils. PCBs in soils are limited to the north portion of the Landfill, and the concentrations detected (up to 0.224 mg/kg) are less than cleanup levels specified under TSCA. DDT (38.2 mg/kg), DDD (31.4 mg/kg), DRO (1,300 mg/kg), and RRO (4,200 mg/kg) contamination above screening levels in subsurface soil appears to be limited to one location. The soil volume for these contaminants is estimated to be 410 cy. The distribution of DRO and GRO in Unit C groundwater has not been well-characterized but suggests that there may be a petroleum groundwater plume originating from an unknown source in the south portion of the Landfill. Concentrations for the two parameters ranged to 76,100 μg/L and 761 μg/L, respectively.

The plume appears to be traveling north. Chlorinated pesticides (DDT and DDD; 31.1 μg/L and 17.3 μg/L, respectively) were detected in the groundwater at locations that have these pesticides in subsurface soil. These contaminants probably are adhered to suspended solids in groundwater, and there is no evidence that they have migrated. Surface water and sediment samples were collected in the seasonal stream exiting the Landfill. No analytes were detected above screening levels in surface waters. PCBs were detected above screening levels up to 17.8 mg/kg in each of the three collected sediment samples. This contamination likely originates from a source within the Landfill. Although the PCB-contaminated sediment could migrate via surface water, collocated surface water samples do not indicate that contaminants are migrating actively off site. The extent of PCB-contaminated sediments has not been well characterized. A preliminary estimated volume of 300 cy has been assigned based on the available data. The Phase II sampling effort at Unit C was based on the Phase I results, which did not show any contamination above screening levels. As such, the density of sampling points in the Phase II fieldwork did not delineate the extent of contamination. Further sampling and analysis are recommended by E & E at Unit C in order to delineate PCB contamination in sediments. Because petroleum contamination in groundwater may be transporting the PCBs from a subsurface source to stream sediments, additional groundwater and subsurface soil samples also are recommended in Unit C to delineate contamination and attempt to locate subsurface contaminant sources.

1 Introduction

Under Contract No. DACA85-93-D-0009, Delivery Order No. 40, for the United States Army Engineer District, Alaska, (USAED Alaska) Ecology and Environment, Inc., (E & E) was tasked to complete the second phase (Phase II) of a remedial investigation (RI) for the Formerly Used Defense Site at the former Umiat Air Force Station (AFS), Umiat, Alaska. The Phase I RI activities executed previously under a separate contract action. This draft-final RI report (RIR) presents the results of the Phase II RI activities and incorporates the Phase I findings presented previously in the draft Phase I RIR (E & E 1995a).

1.1 Site Location and History

The former Umiat AFS lies within Sections 9 and 10, Township 1S, Range 1W, Umiat Meridian, at latitude 69°22'4"N and longitude 152°08'35"N West. The site is approximately 120 miles southwest of Prudhoe Bay, within the Colville River Valley north of the Brooks Range in northern Alaska (see Figure 1-1). This remote site is accessible by airplane and, depending on conditions, by boat during summer and overland snow route during winter. Umiat is used as a lodge and stopover location for guided trips in the region.

The former Umiat AFS comprises 8,000 acres adjacent to the Colville River (see Figure 1-2). Of the 8,000 acres, 115 are developed with a gravel pad and airstrip. The developed area is elevated by gravel approximately 4 feet to 6 feet above the surrounding tundra. Additionally, a 15-acre Landfill, used until the early 1970s, is located approximately 0.5 mile east of the main gravel pad.

What is now the former Umiat AFS site was withdrawn from public domain as part of the 23-million-acre Naval Petroleum Reserve No. 4 (NPR-4), also known as *NPR-Alaska (NPR-A)*. Beginning in 1944, the United States Navy performed construction at Umiat to support resource exploration within NPR-4, and by the end of 1945, the main gravel pad and airstrip were completed. Additional construction and occupation of Umiat Camp continued until suspension of Navy-sponsored exploration activities in 1953. The United States Air

Force (USAF) assumed custodial responsibility at Umiat in late 1953, establishing the 8,000-acre Umiat AFS. In June 1955, USAF returned the Umiat facility to the Navy, and in 1960, the Navy transferred the 8,000-acre Umiat AFS to the Bureau of Land Management (BLM). Current ownership of the facility resides with the Alaska Department of Transportation and Public Facilities (ADOT&PF), with leases for buildings and space granted to the Federal Aviation Administration, Alaskan Region; Umiat Enterprises, Inc.; Alascom; Alaska Department of Fish and Game; Geophysical Services, Inc.; and BLM (LCMF, Inc. 1996).

1.2 Scope and Objectives

The overall scope of services to be provided under Delivery Order No. 40 includes implementation of community relations activities at the site, risk assessment activities, preparation of a work plan to implement a second phase of RI fieldwork for further site characterization and risk assessment, preparation of this RIR, and the associated risk assessment report (RAR).

Phase I of the RI fieldwork was performed during August 1994. A draft RIR was prepared (E & E 1995a). However, the extent of contamination was not characterized fully in 1994 because of the limited number of samples collected. In addition, the Phase I fieldwork was not designed to fully evaluate remedial alternatives or to complete a baseline risk assessment. Therefore, a Phase II RI was conducted in August 1996 to collect the data required to complete these unfulfilled tasks.

This RIR combines the results of the 1994 and 1996 field investigation and was prepared concurrently with the baseline human health risk assessment (HHRA) and ecological risk assessment (ERA). The RAR was submitted concurrently under separate cover. This RIR is a companion document to the RAR and numerous other documents prepared in support of the overall scope for the former Umiat AFS. Summary information from previous documents was integrated into this RIR. However, detailed information presented in the other documents is not repeated in this RIR. For reference, the additional documents include:

- *Former Umiat AFS Work Plan for Field Investigation* (E & E 1994);
- *Former Umiat AFS Community Relations Work Plan* (E & E 1995);
- *Former Umiat AFS Risk Assessment Work Plan* (E & E 1995b);
- *Draft Umiat Remedial Investigation Project Report* (E & E 1995a);
- *Historical Site Uses at the Former Umiat AFS* (technical memorandum; E & E 1996b);

- *Phase II Remedial Investigation Work Plans for the Former Umiat AFS* (E & E 1996a);
- *Dioxin Evaluation Technical Memorandum for Soils at the Former Umiat AFS* (E & E 1997a); and
- *Delivery Order—Remedial Design for PCB Material Removal at the Former Umiat AFS* (E & E 1997b).

1.3 Document Organization

The previous documents (listed above) describe 11 areas of concern at the former Umiat AFS. The delineation of these 11 areas and other newly defined areas of concern is discussed in Section 4. These 11 areas are separated physically into three discrete locations: the Airstrip Operations Complex, the Main Gravel Pad, and the Landfill. To fulfill the objectives required under the Comprehensive Environmental Response, Compensation, and Liability Act process, the 11 original areas were grouped into three management units: Units A, B, and C. Table 1-1 provides a breakdown of the new management units. Unit A consists of the Airstrip Operations Complex (previously described as *Area 1*) and Runway Lake. Previously defined Areas 2 through 10, Floatplane Lake, and other newly defined areas of concern on the Main Gravel Pad were grouped into Unit B. The Landfill Area River (previously defined as *Area 11*) and the seasonal stream leading from the Landfill to the Colville River were redefined as *Unit C*.

This document is organized into six sections. Sections 2 and 3 provide overall site background information and the fieldwork methodology, respectively. Section 4 discusses the nature and extent of contamination. Prefacing the main discussion in Section 4 are details of the subsurface exploration results, a rationale for the regulatory guidance and other screening levels, and a summary of the analytical data quality assurance issues. The detailed discussion of the nature and extent of contamination at the site was divided into three subsections representing the management units defined for the former Umiat AFS: Unit A—the Airstrip Operations Complex, Unit B—the Main Gravel Pad, and Unit C—the Landfill.

Section 5 provides the summary and conclusions for Units A, B, and C. References used for the preparation of this RIR are provided in Section 6. Appendices A through E provide photodocumentation, soil boring logs and a monitoring well construction diagram, applicable or relevant and appropriate requirements (ARARS) and to-be-considered criteria (TBCs), the chemical quality assurance report (CQAR), and chemical characteristics, respectively. Appendix F, the project laboratory analytical data, is provided in Volume 2 of this RIR.

Table 1-1

**MANAGEMENT UNIT DEFINITIONS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA**

Previously Defined Areas	Newly Defined Management Unit
1	Unit A (Airstrip Complex)
2-10	Unit B (Main Gravel Pad)
11	Unit C (Landfill)

2 Regional Characteristics

2.1 Umiat Vicinity Physiography

The Umiat area consists of an upland plateau located in the Arctic Foothills Province north of the Brooks Range. Generally, the foothills slope to the north, with elevations ranging from 3,500 feet in the south to 400 feet in the north. Across the major portion of the Umiat vicinity, relief is minor except near the major drainages, such as the Colville River, where fluvial erosion has produced high sandstone and shale bluffs with lower floodplain areas. The former Umiat AFS is located within the abandoned floodplain of the Colville River, where the surrounding elevation is approximately 275 feet above mean sea level. In general, the Umiat topography is moderately undulated, with rounded features. The most prominent features of the area are the long ridges formed from outcroppings of sandstone beds (Reed 1958).

2.2 Climate

The former Umiat AFS is located in the arctic climatic division of Alaska. Climatic data recorded over 13 years (for which data area available) between 1948 and 1995 indicate an average annual temperature of 9.9° Fahrenheit (F). However, because of factors such as the length of daylight and the extreme northern latitude, the summer and winter temperatures vary greatly. As shown in Table 2-1, the average daily temperatures in July and February are 64.5°F and -24.4°F, respectively. The maximum thawing index is 92°F days, whereas the maximum freezing index is 8,075°F days (Selkregg 1977). The average annual precipitation is 5.38 inches, classifying the former Umiat AFS as an arid region. Prevailing airflow originates from the west, but easterly winds blow from May to October. Mean wind speeds average 6.9 miles per hour.

2.3 Previous Investigations

The Alaska Department of Environmental Conservation (ADEC) identified environmental concerns at the former Umiat AFS first in 1972 with the discovery of a dichlorodiphenyltrichloroethane (DDT) cache in one of the old Navy warehouses at the site. DDT historically had been applied at the site to control mosquitoes (Reed 1958). During a subsequent site visit in 1972, ADEC inventoried the quantity of DDT and notified the Naval Petroleum Oil Shale Reserves branch of these concerns. In 1973, the Naval Petroleum Oil Shale Reserves contracted Pacific Architects and Engineers, Inc., to provide cleanup services at the site. Five thousand six hundred sixty pounds of DDT was removed from the former Umiat AFS and was properly disposed of off site (Dalton 1973b). During the same removal action, junk equipment, scrap metal, and approximately 85,000 crushed drums were buried in "stable areas of the (Colville River) floodplain" (Dalton 1973a, ADEC 1973).

Since 1973, many site inspections and investigations have been conducted by the United States Environmental Protection Agency (EPA), ADEC, ADOT&PF, and USAED Alaska. Numerous waste management problems at the former Umiat AFS were documented. Observations included numerous oil spill sites, several solid waste dumps, and the presence of leaking 55-gallon drums and polychlorinated biphenyl- (PCB-) containing transformers. Also, debris buried at the Landfill had begun to surface in the Colville River flood channel.

More recently (circa 1992), USAED Alaska contracted E & E to perform a visual inspection of Umiat to update previous information and to document additional areas at the site for further investigation. E & E identified 11 areas of concern.

In 1994, Oil Spill Consultants, Inc., (OSC) was contracted by USAED Alaska to remove the following from the site: 19,609 gallons of petroleum product, 905 drums, 14 transformers, three regulators, 10 cubic yards of PCB-contaminated soil, 7,135 gallons of gray water, 300 gallons of PCB liquids, and 132 gallons of transformer rinsate (OSC 1995). That year, E & E conducted the first phase of an RI that included collection of 143 surface and subsurface soil samples from 52 soil borings. The objectives of the 1994 RI were to estimate the horizontal and vertical extents of soil contamination at the 11 areas of concern. Groundwater, surface water, and sediment samples were not collected during the 1994 fieldwork. Petroleum contamination in the surface and subsurface soils was the most prevalent constituent found. Other contaminants included pesticides (mainly DDT), PCBs, and lead.

Although valuable information was collected, the limited number of soil borings did not allow the extent of contamination to be defined clearly. In addition, the 1994 data were

inadequate to perform an HHRA or ERA. As a result, USAED Alaska tasked E & E to perform a second phase (Phase II) of the RI in 1996 to fill these data gaps.

The objectives, scope, and results of the Phase II RI are presented in subsequent sections herein.

2.4 Regional Geology

Umiat is located in the northern foothills section of the Arctic Foothills Province of Alaska. Generally, the foothills slope to the north and elevations range from 3,500 feet in the south to 400 feet in the north. Regionally, Umiat is situated on an upland plateau, which exhibits little relief and has moderately undulating topography. The topography surrounding the plateau varies from long, parallel ridges comprising sandstone in the south to nearly flat in the north (USAED Alaska 1968). Locally, major streams and rivers, such as the Collville River, have down-cut through the sandstone and shale, producing high vertical bluffs.

The former Umiat AFS lies within the Colville River floodplain. The unconsolidated deposits of the floodplain in the Umiat vicinity consist mainly of interbedded alluvial gravel, sand, and silt of Quaternary Age. Borehole logs indicate that the alluvial deposits range from 23 feet to 71 feet thick (Williams 1970). In some areas, the Quaternary alluvium is overlain by an organic mat. The unconsolidated sediments are underlain by late Cretaceous sandstones, shales, and conglomerates deposited following erosion of the uplifted rocks of the Brooks Range. At the former Umiat AFS, permafrost is ubiquitous in the subsurface and has been shown to extend to 800 feet deep into Cretaceous bedrock (Williams 1970). Based on subsurface borings conducted by E & E, the active permafrost layer varies from 3 feet to approximately 15 feet below ground surface (BGS) under the gravel pad and 2 feet to 3 feet BGS under the surrounding wetlands and vegetated areas. The gravel pad and airstrip at Umiat consist mostly of poorly graded, dark brown, sandy gravels taken from the river floodplain with a maximum size of approximately 15 centimeters (cm). Organic silts are also present in the soil.

Uplift of the Brooks Range produced east-west-trending anticlinal folds in the Cretaceous Age strata. Umiat is situated on a major fold known as *the Umiat anticline*, which is the location of numerous small oil seeps that were investigated by the Bureau of Mines, Terrestrial Department of Mines, in 1943 (Reed 1958).

As a result of the oil seeps, oil exploration began in the former Umiat AFS vicinity along the Umiat anticline. Exploration began with drilling test well 1 in 1945 and concluded with completion of test well 11 in 1952 (Reed 1958). Results of drilling the 11 test wells

indicate that several Cretaceous Age sandstones are capable of producing oil. Oil-producing sandstones were penetrated as shallow as 248 feet BGS (Reed 1958). Tests performed on shallow Cretaceous sandstones yielded oil at rates of 5 barrels to 250 barrels per day. These shallow sandstones likely are the sources of oil observed at the numerous seeps in the Umiat vicinity. An oil seep is located in the Colville River riverbed upstream from Umiat Mountain; however, this location is downstream of the former Umiat AFS Main Gravel Pad, airstrip, and Landfill (O.J. Smith 1997).

2.5 Regional Hydrology

2.5.1 Groundwater

Groundwater at Umiat occurs above and below the ubiquitous permafrost. Groundwater that occurs in unconsolidated sediments above permafrost is called *suprapermafrost*, and groundwater that occurs below continuous permafrost is called *subpermafrost*. Shallow, suprapermafrost groundwater occurs in the unconsolidated Quaternary alluvial deposits at Umiat. The thickness of this suprapermafrost alluvial aquifer is variable because of thaw bulbs located beneath lakes and rivers that do not freeze to the bottom during winter (Williams 1970), and because of developed areas such as the gravel pad and roadways. However, the top of the shallow suprapermafrost groundwater near Umiat is commonly found between 2 feet and 5 feet BGS. Groundwater extends to the top of permafrost, which is commonly 2 feet to 3 feet in the wetlands and undeveloped areas and as deep as 15 feet BGS but highly variable in the developed and gravel pad areas. Deep subpermafrost groundwater at Umiat has been encountered at 3,303 feet and at 6,212 feet in deep bedrock aquifers and is brackish or saline (Williams 1970).

The groundwater gradient in the suprapermafrost alluvial aquifer is fairly flat and generally flows toward the north and east (see Figures 4-1 and 4-2). However, the flow direction is altered locally by depth to permafrost, stratigraphy, surface water bodies, and water uptake by vegetation (Williams 1970). Groundwater likely drains into Seabee Creek and the Colville River.

At Umiat, no wells are known to have been drilled into suprapermafrost or subpermafrost aquifers for the purpose of obtaining potable water (O.J. Smith 1995). Furthermore, no evidence as to whether the groundwater of the Umiat area has been investigated for the purpose of potable water supplies was found.

2.5.2 Surface Water

Surface water occurs as rivers, streams, shallow ponds, and lakes near the former Umiat AFS. The major surface water feature in the Umiat area is the Colville River, which flows to the east (and eventually north), discharging into the Arctic Ocean. The mean annual surface water runoff for the Umiat vicinity is approximately 1 cubic foot per second per square mile. Peak runoff into the river occurs from late May to early July and is approximately 10 cubic feet per second per square mile. Flooding commonly occurs in the lower stretches of the river because of the combination of snowmelt, rainfall, and ice jamming (Balding 1977). During seasonal snowmelt, water flows in a small channel between the former Umiat AFS and the Colville River. The seasonal channel runs through the old Landfill (Unit C).

Because the shallow depth of permafrost restricts infiltration of surface water and precipitation, many wetland areas occur in the Umiat vicinity. Shallow ponds and lakes (less than 5 feet deep) are prevalent. Three lakes are located near the Main Gravel Pad and airstrip: one near the east end of the airstrip, one near the west end of the airstrip (Runway Lake), and one north of the Main Gravel Pad (Floatplane Lake). Floatplane Lake is used by floatplanes during summer.

2.6 Local Water Supply

Water from the Colville River is used for human consumption (O.J. Smith 1995). Umiat residents collect water from the Colville River east of the former Umiat AFS, at the end of the gravel road. No other water use (e.g., industrial) is known in this area. Figure 2-1 identifies water supply locations.

2.7 Demography

Umiat is located on the Colville River, 75 miles south of Harrison Bay and 340 miles north-northwest of Fairbanks. Transportation to Umiat is via charter aircraft from Fairbanks or Prudhoe Bay. Umiat has a lodge but no banks, Laundromats, schools, or churches. No public water, sewage, or electricity systems exist. Electrical needs in the Umiat area are served by individually owned diesel-powered generators. The area is serviced by a mail plane and has telephones, radio, and television.

Approximately eight people intermittently live at the former Umiat AFS and run a lodge that hosts various workers and visitors each year. Between 22 and 50 workers intermittently stay in Umiat, mainly during summer. Two Alascom workers maintain

transmitters, two Alaska Department of Fish and Game personnel investigate wildlife numbers, and ARCO sends approximately 12 people each year to work on ongoing projects. Additionally, an estimated 32 temporary workers and hunting guides are present during summer. As many as 70 visitors may be at the lodge or in the area for hunting or fishing (O.J. Smith 1997).

2.8 Ecology

The former Umiat AFS is in the Arctic Foothills, an area characterized by rolling hills and plateaus that extend from the Brooks Range in the south to the arctic coastal plain in the north. The region is predominantly treeless and is vegetated with herbaceous plant communities (Gallant et al. 1995). In general, the Umiat vicinity is densely vegetated with 6- to 12-inch dwarf heath shrubs, dwarf birches, and willows, intermingled with herbaceous species and, in places, 3- to 8-foot-tall alders and willows. The tall alders and willows occasionally form thickets, especially on slopes and floodplains (Churchill 1955). Cotton grass tussock heath tundra and dwarf shrub vegetative communities are located on off-river hills, terraces above the active floodplain, and ridges (Mould 1977, Kessel and Cade 1958). These communities consist of woody plants varying in size from 1 foot to 3 feet and are dominated by dwarf birch (Kessel and Cade 1958). In poorly drained areas in the valley bottoms or around ponds and lakes, sedges and grasses are the dominant species. A species list of plants found in the Umiat vicinity is included in the ERA.

Large mammals found at Umiat or that migrate through the vicinity include moose, caribou, muskox, and brown bears. Moose found along the Colville River are at the northern extent of the species' range (Alaska Department of Natural Resources [ADNR] 1997). The Teshekpuk Lake Caribou Herd migrates through Umiat. Caribou were seen on site and near the site during the RI fieldwork. Brown bears travel river corridors on the North Slope and feed in riparian habitats during spring and summer (ADNR 1997). Furbearing animals found in the Umiat vicinity include wolves, arctic and red foxes, and wolverines (ADNR 1997). Hares, ground squirrels, lemmings, voles, and shrews are the small mammals commonly found in the area (Selkregg 1977). A species list of mammals found in the Umiat vicinity is included in the baseline ERA.

The Colville River corridor provides important breeding and brooding habitats for numerous migratory birds (ADNR 1997). A species list of birds found near the former Umiat AFS is included in the baseline ERA. A flock of willow ptarmigan was seen on site during the Phase II fieldwork. The spectacled eider is a threatened species known to occur in the

coastal portion of the North Slope. However, because this bird nests along the coast, it is not considered a species of concern in the Umiat area (MacDonald 1997).

The Colville River stretches northeast past the former Umiat AFS to the Beaufort Sea. The Colville River supports anadromous and freshwater fish populations, including salmon, arctic greyling, and whitefish. A species list of the fish found in the Colville River near the former Umiat AFS is included in the baseline ERA. Runway and Floatplane Lakes are located within the former Umiat AFS; however, these lakes freeze solid during winter and do not support fish populations (E. Smith 1997).

A more detailed description of the ecology in the Umiat area is included in the baseline ERA.

Table 2-1

CLIMATIC DATA FOR UMIAT, ALASKA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Mean annual temperature	9.9°F
Mean annual high temperature	18.6°F
Mean annual low temperature	1.1°F
Mean July temperature	53.2°F
Mean July high temperature	64.5°F
Mean February temperature	-24.4°F
Maximum thawing index	920°F days
Maximum freezing index	8075°F days
Mean annual precipitation	5.38"
Mean August precipitation	1.06"
Mean annual snowfall	33.7"
Mean annual wind speed	6.9 mph
Prevailing wind direction (November through April)	West
Prevailing wind direction (May through October)	East

Key:

Thawing index: = Sum of the thawing degree days over the period of one year, whereas thawing degree days are computed by subtracting 32°F from the average daily temperature.
Freezing index = Sum of the freezing degree days over the period of one year, whereas freezing degree days are computed by subtracting the average daily temperature from 32°F.

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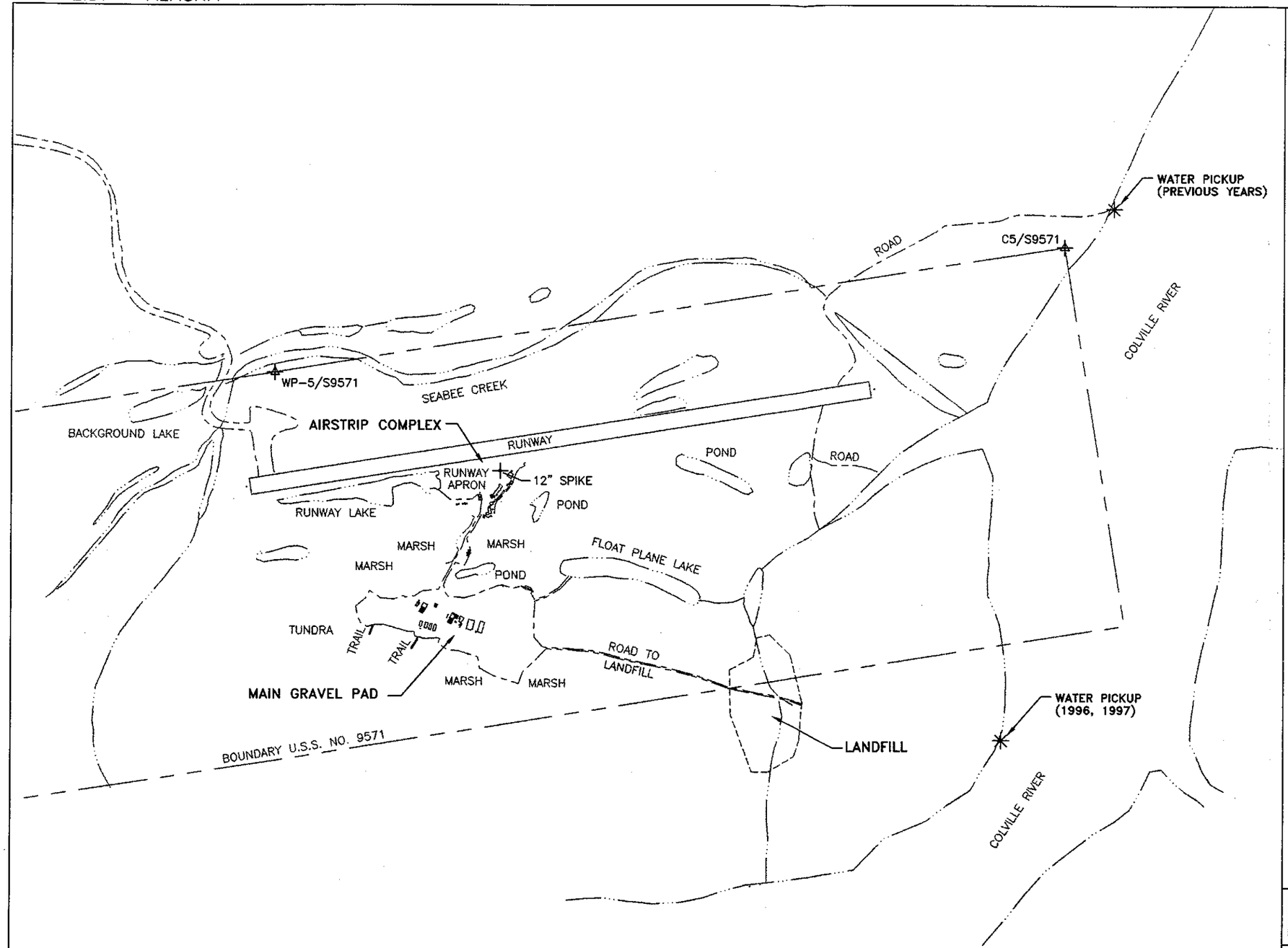

LEGEND

- EDGE OF GRAVEL
- EDGE OF WATER
- C5/S9571 — BLM WITNESS POST
- 12" SPIKE — ASSUMED ELEVATION FOR FOR TOPOGRAPHIC SURVEY

N

SCALE IN FEET

0 1,000 2,000 3,000

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ANCHORAGE, ALASKA

Figure 2-1

LOCAL WATER SUPPLY MAP

FORMER UMIAT AIR FORCE STATION

UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S228B	2/97	

Plotted: 03/10/97

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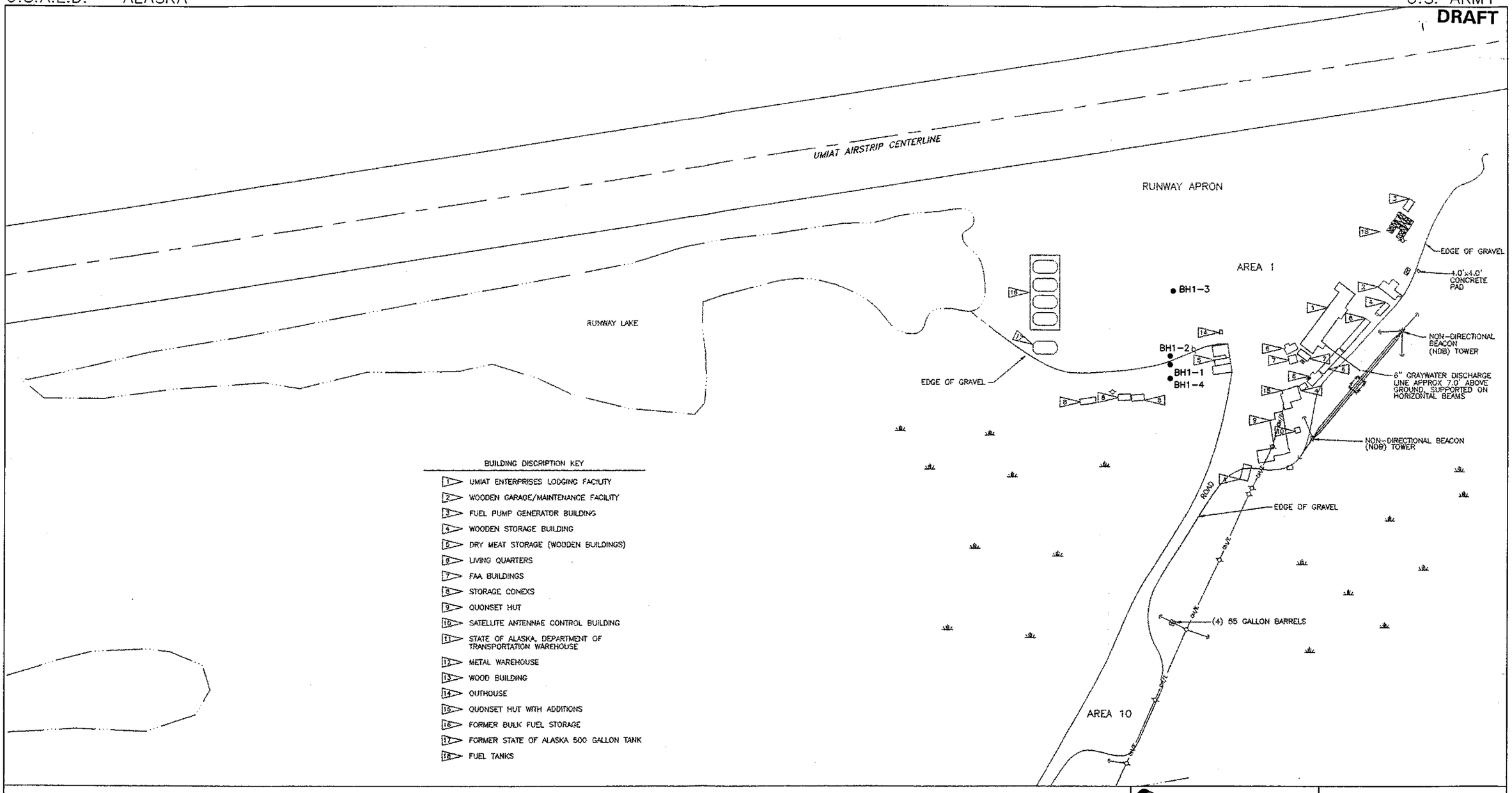

BUILDING DISCRIPTION KEY

1. UMIAT ENTERPRISES LODGING FACILITY
2. WOODEN GARAGE/MAINTENANCE FACILITY
3. FUEL PUMP GENERATOR BUILDING
4. WOODEN STORAGE BUILDING
5. DRY MEAT STORAGE (WOODEN BUILDINGS)
6. LIVING QUARTERS
7. FAA BUILDINGS
8. STORAGE CONEXS
9. QUONSET HUT
10. SATELLITE ANTENNAE CONTROL BUILDING
11. STATE OF ALASKA, DEPARTMENT OF TRANSPORTATION WAREHOUSE
12. METAL WAREHOUSE
13. WOOD BUILDING
14. OUTHOUSE
15. QUONSET HUT WITH ADDITIONS
16. FORMER BULK FUEL STORAGE
17. FORMER STATE OF ALASKA 500 GALLON TANK
18. FUEL TANKS

N

SCALE IN FEET

0 150 300 450

LEGEND

BH1-2 ●	1994 RI SAMPLE LOCATION
– – – – – –	EDGE OF GRAVEL
—·—·—	EDGE OF WATER
	UTILITY POLE
	TUNDRA

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ANCHORAGE, ALASKA

Figure 3-1

1994 RI SAMPLE LOCATION MAP

AIRSTRIP COMPLEX

UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S206B	3/97	

BUFF Plotted: 03/10/97

LEGEND

- BH3–3 • 1994 RI SAMPLE LOCATION
- EDGE OF GRAVEL
- EDGE OF WATER
- UTILITY POLE
- OH/E OVERHEAD ELECTRIC
- TUNDRA

(4) 55 GALLON BARRELS

BH10–4
BH10–2
BH10–5
BH10–3
BH10–6
BH10–1
BH10–7

AREA 10

POND

FLOAT PLANE LAKE

BH7–5
BH7–1
BH7–3
BH7–4
BH7–2
BH7–6

AREA 7

TRAIL

BH3–2
BH3–1
BH3–3

AREA 4

AREA 3

BH4–1

EDGE OF GRAVEL

BH2–6
BH2–4
BH2–5
BH2–1
BH2–3
BH2–2

AREA 2

8" STAND PIPE

CEMENT PAD

GSI

EDGE OF GRAVEL

BH2–7
BH2–8

BH6–2
BH6–1
BH6–3

AREA 5

AREA 6

BH6–4

BH5–1
BH5–2
BH5–3

TRAIL

CRANE ON TRACTS

EDGE OF GRAVEL

TRAIL

AREA 8

ROAD TO LANDFILL

BH8–2
BH8–1
BH8–3
BH8–4

BH9–3
BH9–4
BH9–2
BH9–1

AREA 9

STORAGE AREA
(ABOVE GROUND TANKS, TREATED TIMBERS AND CONEX TRAILERS)

TRACK VEHICLE & VEHICLE TRAILER STORAGE AREA

ASSORTED FUEL TANK STORAGE AREA

BUILDING DESCRIPTION KEY

1. UMIAT ENTERPRISES LODGING FACILITY
2. WOODEN GARAGE/MAINTENANCE FACILITY
3. FUEL PUMP GENERATOR BUILDING
4. WOODEN STORAGE BUILDING
5. DRY MEAT STORAGE (WOODEN BUILDINGS)
6. LIVING QUARTERS
7. FAA BUILDINGS
8. STORAGE CONEXS
9. QUONSET HUT
10. SATELLITE ANTENNAE CONTROL BUILDING
11. STATE OF ALASKA, DEPARTMENT OF TRANSPORTATION WAREHOUSE
12. METAL WAREHOUSE
13. WOOD BUILDING
14. OUTHOUSE
15. QUONSET HUT WITH ADDITIONS

N

SCALE IN FEET

0 150 300 450

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ANCHORAGE, ALASKA

Figure 3–2
1994 RI SAMPLE LOCATION MAP
MAIN GRAVEL PAD

UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S208B	3/97	

BUFF Plotted: 03/10/97

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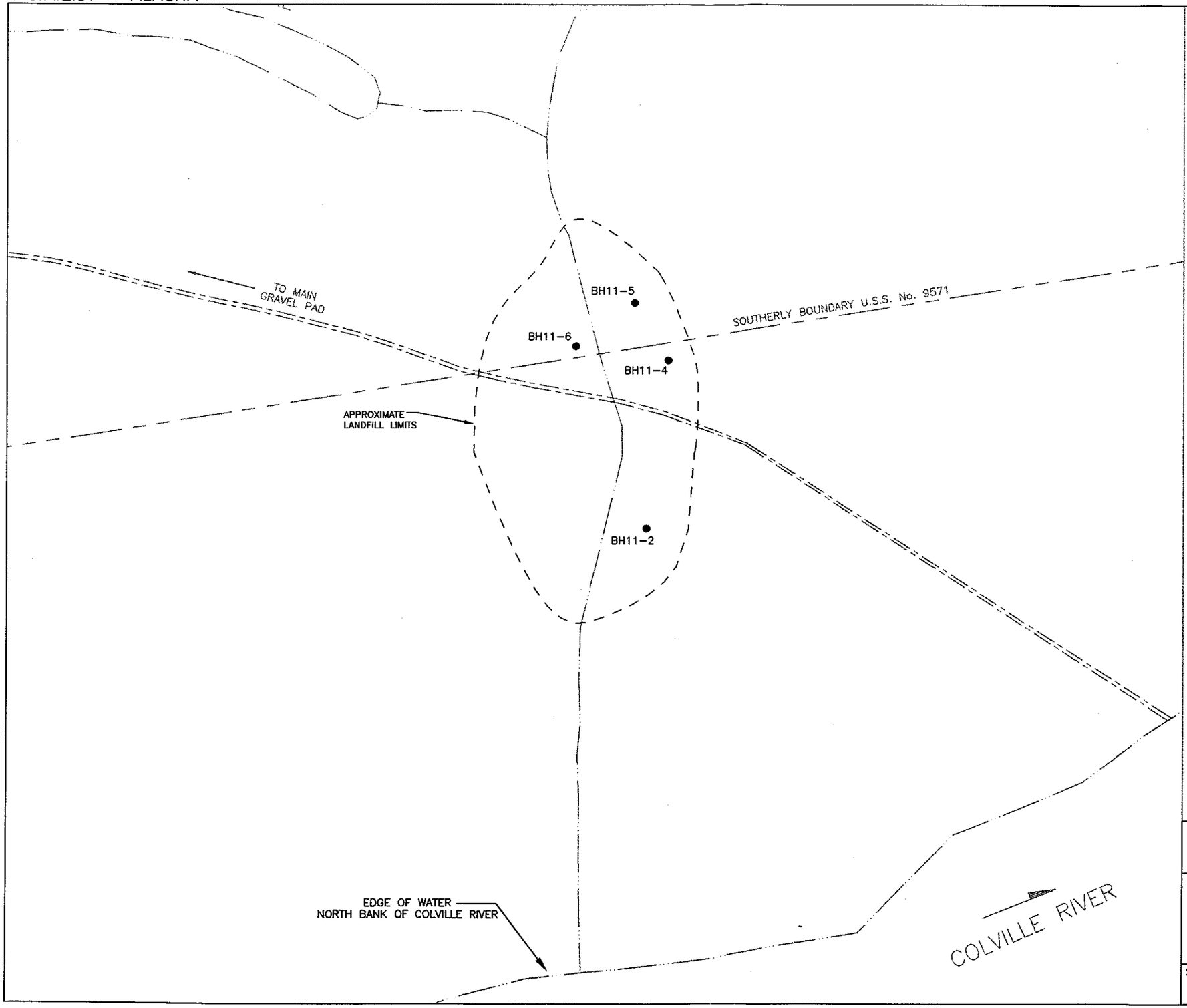

LEGEND

- BH11–4 ● 1994 RI SAMPLE LOCATION
- EDGE OF GRAVEL
- EDGE OF WATER
- RIVER FLOW DIRECTION

N

SCALE IN FEET

0 300 600 900

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ANCHORAGE, ALASKA

Figure 3–3

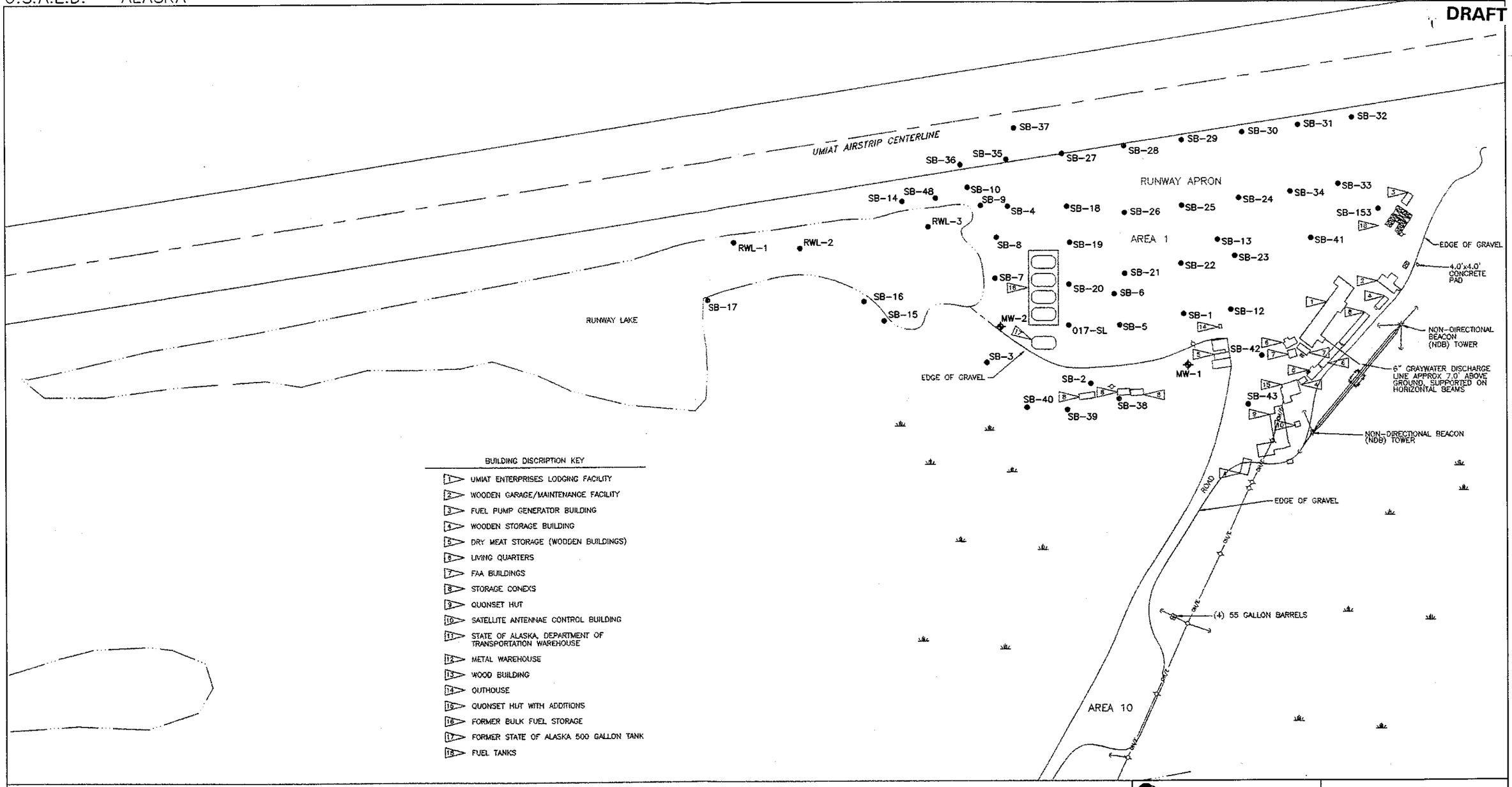
1994 RI SAMPLE LOCATION MAP

LANDFILL

UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S230B	3/97	

BUFF Plot 03/10/97



BUILDING DISCRIPTION KEY

1. UMIAT ENTERPRISES LODGING FACILITY
2. WOODEN GARAGE/MAINTENANCE FACILITY
3. FUEL PUMP GENERATOR BUILDING
4. WOODEN STORAGE BUILDING
5. DRY MEAT STORAGE (WOODEN BUILDINGS)
6. LIVING QUARTERS
7. FAA BUILDINGS
8. STORAGE CONEXS
9. QUONSET HUT
10. SATELLITE ANTENNAE CONTROL BUILDING
11. STATE OF ALASKA, DEPARTMENT OF TRANSPORTATION WAREHOUSE
12. METAL WAREHOUSE
13. WOOD BUILDING
14. OUTHOUSE
15. QUONSET HUT WITH ADDITIONS
16. FORMER BULK FUEL STORAGE
17. FORMER STATE OF ALASKA 500 GALLON TANK
18. FUEL TANKS

SCALE IN FEET

0 150 300 450

LEGEND

017-SL●	1996 RI SAMPLE LOCATION
SB-12 ●	1996 RI SAMPLE LOCATION
MW-1 ◈	1996 RI MONITORING WELL LOCATION
– – – – – –	EDGE OF GRAVEL
——·——·——	EDGE OF WATER
◇	UTILITY POLE
⁂	TUNDRA

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Figure 3-4
UNIT A
1996 RI SAMPLE LOCATION MAP
AIRSTRIP COMPLEX
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S207B	3/97	

BUFF Plotted: 03/10/97

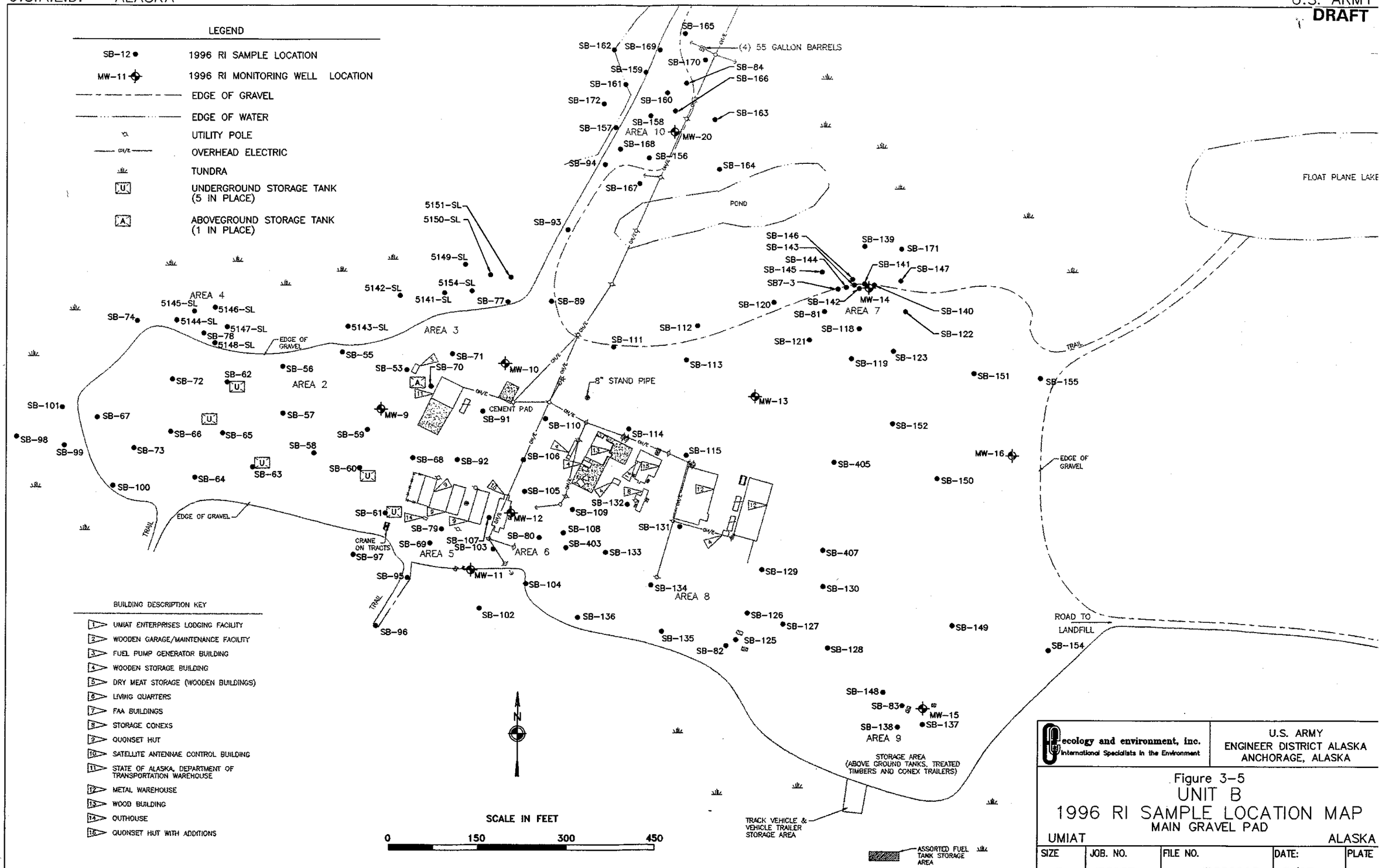

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Figure 3-5
UNIT B
1996 RI SAMPLE LOCATION MAP
MAIN GRAVEL PAD
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S209B	3/97	

BUFF Plotted: 03/10/97

DRAFT

POND

POND

FPL–5

FPL–4

FPL–6

FLOAT PLANE LAKE

FPL–2

FPL–3

FPL–1

TO LANDFILL

MARSH

LEGEND

EDGE OF GRAVEL

EDGE OF WATER

FPL–1 1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION

TUNDRA

N

SCALE IN FEET

0 200 400 600

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Figure 3–6
UNIT B
1996 SAMPLE LOCATION MAP
FLOAT PLANE LAKE
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S238B	3/97	

BUFF Plotted: 03/07/97

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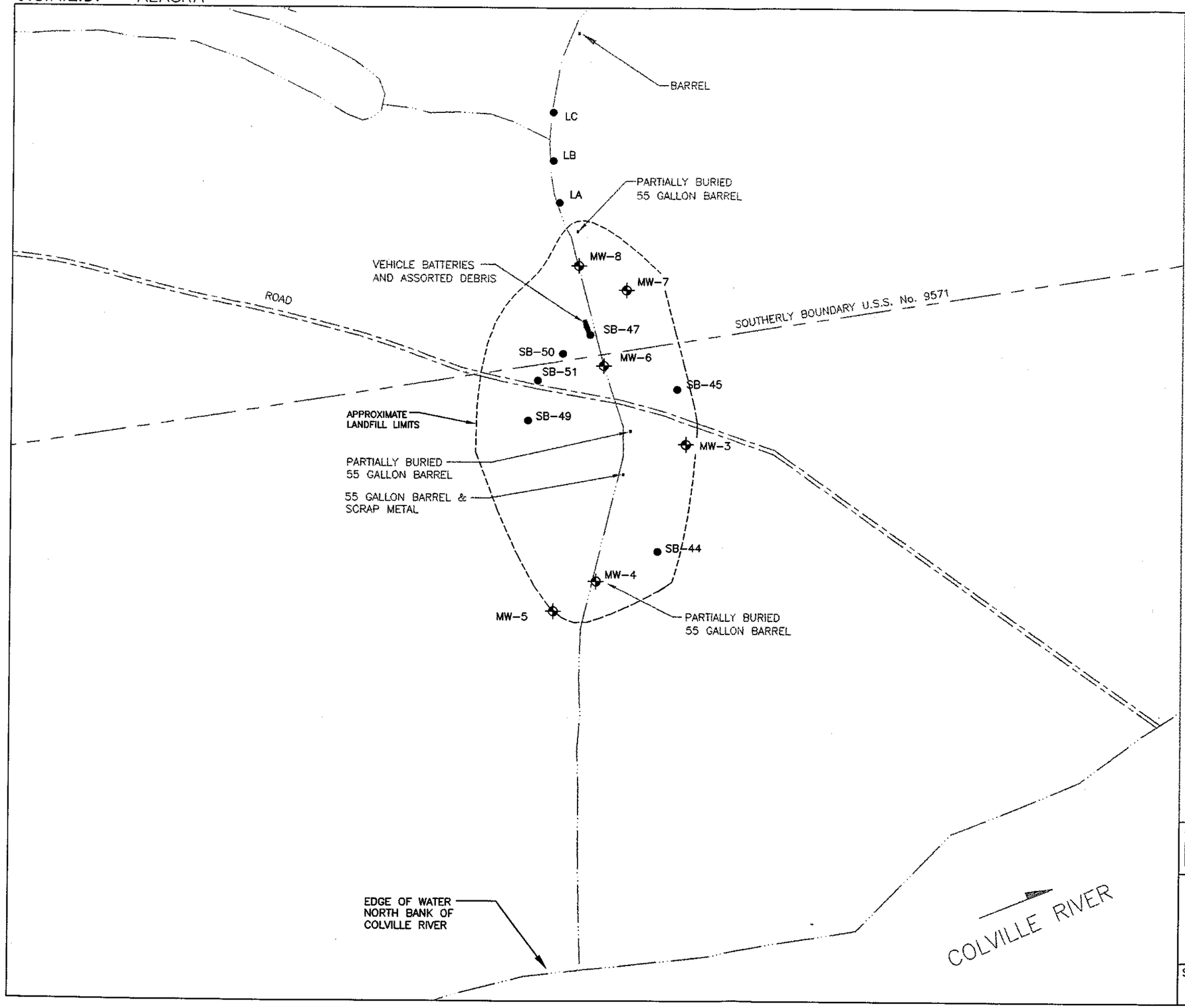

LEGEND

MW-7 ⊕	1996 RI MONITORING WELL LOCATION
LA ●	1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
SB-47 ●	1996 RI SAMPLE LOCATION
– – – – – –	EDGE OF GRAVEL
———	EDGE OF WATER
	RIVER FLOW DIRECTION

N

SCALE IN FEET

0 300 600 900

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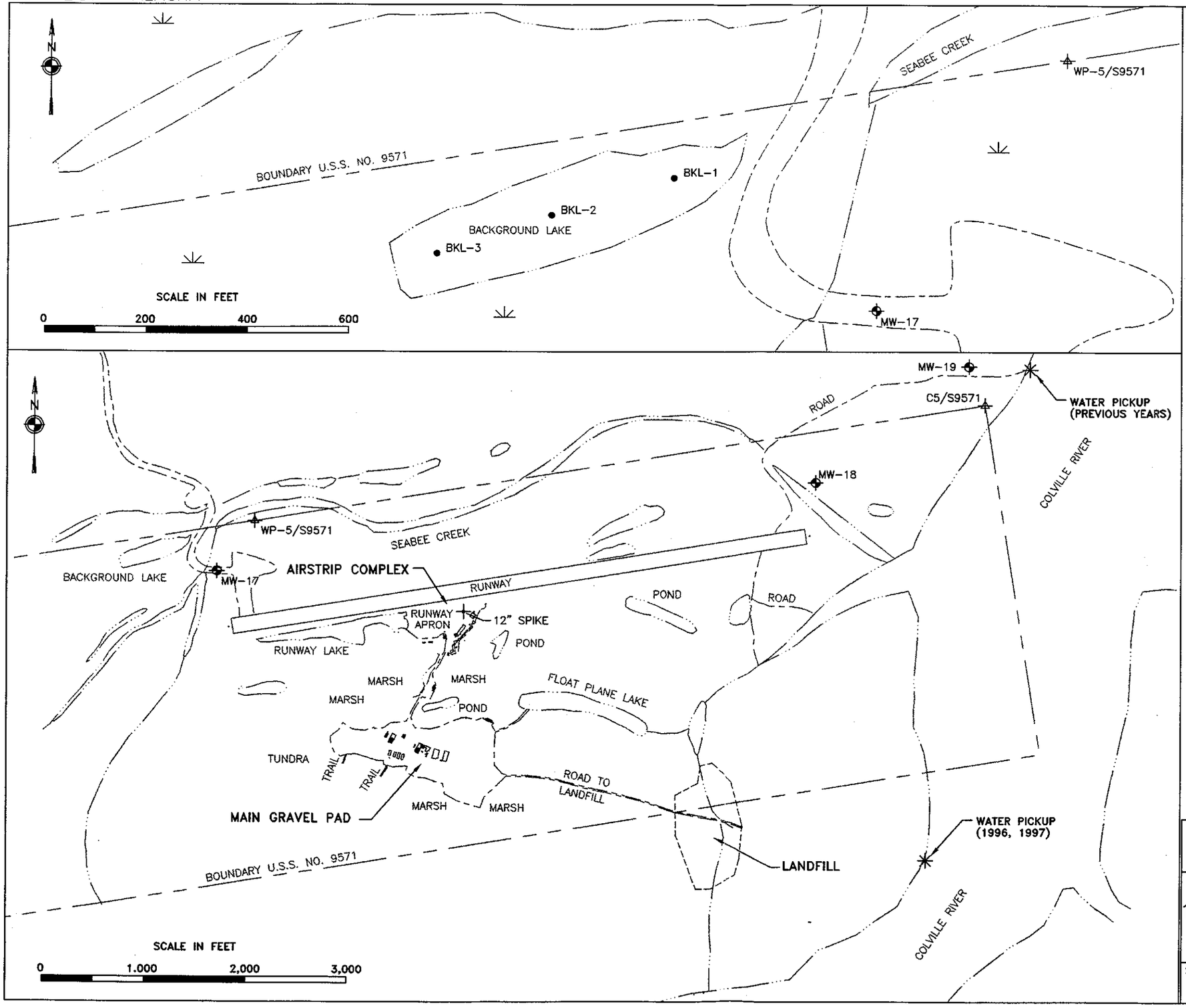
ANCHORAGE, ALASKA

Figure 3-7
UNIT C
1996 RI SAMPLE LOCATION MAP
LANDFILL
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S231B	3/97	

BUFF Plotted: 03/10/97



LEGEND

- EDGE OF GRAVEL
- EDGE OF WATER
- 1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- 1996 RI MONITORING WELL
- C5/S9571 BLM WITNESS POST
- 12" SPIKE ASSUMED ELEVATION FOR FOR TOPOGRAPHIC SURVEY
- TUNDRA

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ANCHORAGE, ALASKA

Figure 3-8

1996 RI BACKGROUND SAMPLE MAP

FORMER UMIAT AIR FORCE STATION

UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S244B	3/97	

BUFF Plotted: 03/10/97

4 Nature and Extent of Contamination

Analytical results for Phase I of the RI are presented in the draft Umiat RI project report (E & E 1995a), whereas Phase II analytical results are discussed in this document and are organized by sampling location (Unit A, Unit B, and Unit C). Groundwater contours for the Phase II sampling effort are shown in Figures 4-1 and 4-2. The Phase I and Phase II analytical results were used to determine the extent of contamination described in this section. Figures 4-3 through 4-23 estimate the extent of contamination based on samples exceeding the regulatory guidance levels or risk-based concentrations (RBCs) described in Section 4.2. These illustrations contain areas shaded with different colors, indicating contamination at specific depths. For example, soil contamination at the surface (0 feet to 1 foot BGS) is shown in green and soil contamination at the groundwater interface (which varies from approximately 2 feet to 4 feet BGS) is shown in orange. This method was chosen to visually depict contamination because it could be applied at each area and therefore was the most consistent, most informative, and least confusing method for the reader. Cross sections are used to dissect many of the most contaminated locations and provide a detailed view of the contamination as it extends into the subsurface and intersects groundwater.

4.1 Subsurface Exploration Results

Exposed at the surface of the former Umiat AFS are Quaternary Age unconsolidated deposits consisting of two distinct sediment types: sandy gravels and organic-rich silts. Borehole logs for soil borings are in Appendix B. Soil physical parameter analytical results are in Appendix F.

The Colville River floodplain consists of unconsolidated, poorly sorted, poorly stratified sand and gravel. Unit C (the Landfill) lies in the Colville River floodplain and therefore is dominated by the sandy gravel sediment type. Individual gravel clasts are up to 15 cm in diameter and typically are well-rounded. During the development of Umiat, sandy gravel was excavated from the Colville River floodplain and laid as "fill" on the wetlands to

form a surface capable of supporting vehicles and buildings. Therefore, on the Main Gravel Pad, airstrip, and roadways, the predominant sediment exposed at the surface is sandy gravel. Across these developed areas, the surficial layer of sandy gravel fill varies in thickness from approximately 2 feet near the edges of the pad to 6 feet closer to the center of the pad.

In the undeveloped, wetland areas adjacent to the Main Gravel Pad and roadways, the main sediment type exposed at the surface is organic silt. This silt is typically dark gray, contains minor amounts of sand, and supports various types of vegetation including grasses and alders. This surficial organic silt ranges in thickness up to approximately 8 feet and in undisturbed locations overlies sandy gravels common to the Colville River floodplain.

Groundwater occurs at approximately 2 feet to 5 feet BGS in a suprapermafrost, unconfined aquifer. Groundwater across the entire site (Units A, B, and C combined) flows generally to the north-northeast, mirroring the land surface topography and the flow of the Colville River. The maximum groundwater elevation difference (head) measured across the site on August 19 and 20, 1996, was 11.83 feet. (The maximum groundwater elevation was 100.49 feet in MW-11 in Unit B, and the minimum elevation was 88.66 in MW-18, which is located along the road northeast of the Main Gravel Pad.)

Groundwater under Unit A (Airstrip Operations Complex) is virtually flat, mirroring the surface topography. The maximum head measured across Unit A on August 19, 1996, was 0.01 foot. No groundwater contour map was created for Unit A because of this very flat gradient. Groundwater under Unit B (Main Gravel Pad) flows approximately north-northeast toward the wetlands on the north side of the pad. The maximum head measured across Unit B on August 19, 1996, was 2.14 feet. (The maximum elevation was 100.49 feet in MW-11, and the minimum elevation was 98.35 in MW-20.) Figure 4-1 shows the estimated groundwater contours (elevations) in Unit B. Groundwater under Unit C (Landfill) flows approximately north-northeast, mirroring the regional flow of the Colville River (see Figure 4-2). The maximum head measured across Unit C on August 19 and 20, 1996, was 2.15 feet. (The maximum elevation was 92.85 feet in MW-4, and the minimum elevation was 90.70 in MW-8.)

The shallow, suprapermafrost groundwater beneath Umiat likely is frozen for seven months or more each year. This, combined with a very slight groundwater gradient, results in very slow groundwater movement and contaminant transport. No aquifer testing (e.g., slug tests and pump tests) were conducted.

Groundwater-to-surface-water interaction was not investigated specifically. The groundwater level measured in MW-4 along the southern edge of the Landfill (adjacent to the Colville River) was 92.85 feet on August 20, 1996. The elevation of the Colville River

immediately southeast of MW-4 was 93.20 feet on August 23, 1996. Although the groundwater-to-surface-water interaction was not investigated specifically, groundwater likely discharges to the Colville River during periods of low surface water flow (winter) and receives water from the Colville River during high surface water periods (spring).

Permafrost was encountered in 29 of the 259 soil borings (combined Phase I and II), at depths ranging from 2 feet to greater than 12 feet BGS (see Table 4-1). Permafrost was identified by the samples and/or soil cuttings containing small ice crystals and by the abrupt decrease in the drilling rate. The depth to permafrost beneath much of the site must be estimated because many soil borings were not drilled deep enough to encounter permafrost. E & E believes that permafrost is continuous beneath the site but that the depth to the top of permafrost varies mostly because of thawing caused by surface features. For example, permafrost under the developed areas (Main Gravel Pad and airstrip) and near the Colville River is generally deeper than in the undisturbed areas of the site, where the natural vegetation acts as an insulating layer.

4.2 Regulatory Levels and Risk-Based Concentrations

The sample analytical results from the Umiat Phase II RI are compared to the applicable regulatory guidance level RBCs outlined in this subsection. The regulatory guidance levels and RBCs are used only as benchmarks against which to compare the concentrations of contaminants in soil, sediment, and water samples collected at Umiat. Comparing the analytical data to these benchmark levels also allowed E & E to calculate areal extent and volumes of contaminated media (soil and groundwater). Based on presumed exposure scenarios that are detailed further in the companion Umiat RAR, comparing contamination at Umiat to the highly conservative, very stringent, regulatory guidance values (mainly ADEC North Slope Numeric Cleanup Levels) represents, in E & E's opinion, a "worst-case scenario."

Sample analytical results were compared to the state and federal guidance levels applicable to the site (see Tables 4-2 through 4-4). Most subsurface soil and groundwater contamination at the former Umiat AFS is attributable to leaking aboveground storage tanks (ASTs), AST-associated piping, and leaking drums. Because the facility is located on the North Slope, ADEC's *Interim Guidance Levels for Non-UST Contaminated Soil, North Slope Numeric Cleanup Levels* (18 Alaska Administrative Code [AAC] 75, July 1991) was used to provide benchmark values against which to compare petroleum contamination in soil. The North Slope levels were designed for guard pads and roads. E & E also has applied the

levels to Unit C, the Landfill, because it is a man-made feature, is constructed mainly of gravel, hosts very little vegetation, and has a road over its top. Table 4-2 provides the ADEC North Slope Cleanup Levels. As discussed in Section 4.3, the correlation between field screening results and off-site analytical data is adequate to allow the use of field screening data to characterize contamination at the former Umiat AFS. To evaluate subsurface soil samples that were field screened for diesel-range petroleum hydrocarbons, a benchmark concentration of 200 parts per million (ppm) was chosen by E & E. This value is intended to identify soils that were likely to exceed DRO concentrations of 200 milligrams per kilogram (mg/kg; thus exceeding ADEC North Slope Cleanup Levels). The analytical results for PCBs in soil were compared to the 10-mg/kg guidance level specified for residential settings (EPA PCB Spill Cleanup Policy as per 40 Code of Federal Regulations [CFR] 761), as shown in Table 4-3. To evaluate soil samples that were field screened for PCBs, a benchmark concentration of 10 ppm was chosen by E & E to identify soils that were likely to exceed the EPA guidance value of 10 mg/kg. Soil VOC, BNA, and pesticide results were compared to the EPA, Region 3, RBCs, as shown in Table 4-3 (EPA 1996). Because of an unacceptable correlation between field screening data and the off-site analytical results for chlorinated pesticides, the field screening data were not used. Analytical results for metals in soil first were compared to the highest background concentrations naturally occurring at Umiat. Soil metals concentrations that exceeded background then were compared to EPA, Region 3, RBCs. For metals in soil, the EPA, Region 3, RBC values and the highest background concentrations are presented in Table 4-3.

The analytical results for surface water and groundwater were compared to concentrations specified in State of Alaska maximum contaminant levels (MCLs; 18 AAC 80) as amended through May 18, 1994; State of Alaska Water Quality Standards (18 AAC 70); and EPA, Region 3, RBCs, as shown in Table 4-4.

E & E believes that alternative cleanup levels (ACLs) or risk-based cleanup levels, developed according to ADEC guidance (18 AAC 75, Article 3), are appropriate for the former Umiat AFS site. ACLs are calculated to be protective of human health (using site-specific assumptions). Only the contamination that exceeds ACLs (and that is therefore potentially harmful to human health) would require remediation. Therefore, the areal extent and volume of soil and groundwater requiring remediation would be reduced significantly using ACLs versus the ADEC guidance or RBCs. ACLs (or risk-based cleanup levels) will be developed in the feasibility study (FS), which will be a separate document prepared after this RIR.

In this RIR, E & E compares the analytical data to the regulatory levels and RBCs discussed above. Sample results at or above the applicable benchmark levels have been shaded on the applicable analytical data tables presented below. In the FS, E & E will compare contamination at Umiat to the regulatory levels and to the proposed risk-based cleanup levels to be calculated in the HHRA and ERA. With each set of cleanup goals (regulatory levels and ACLs), E & E will present the estimated areal extent and volume of contaminated media. This will allow for quick comparison of the areal extent, volume, and remedial costs associated with each cleanup scenario.

4.3 Analytical Data Quality Assurance

The data quality and data usability for the former Umiat AFS Phase II RI are summarized in the following subsections. Additionally, the QA review of the data collected in December 1996, to evaluate the presence or absence of dioxins/furans, is presented in the dioxin technical memorandum (E & E 1997a) located in Appendix D.

4.3.1 Data Quality Objectives

The analytical data were evaluated based on the data quality objectives (DQOs) presented in the Phase II Umiat work plan (E & E 1996a). The overall DQO is to produce data of known and documented quality in order to support the baseline HHRA and ERA, support decision-making regarding contamination at the former Umiat AFS source areas, identify potential requirements for remedial action based on risk and ARARs, and assist in estimating and focusing remedial engineering options in the FS.

4.3.2 Field Laboratory

On-site field screening was performed on 448 soil samples to identify petroleum hydrocarbons quantitated as diesel, chlorinated pesticides, and PCBs. Field screening results provide estimated concentrations and tentative identification of the analytes of concern in order to guide field sampling activities. The field data presented below were evaluated based on precision, accuracy, representativeness, completeness, and comparability (PARCC), including the manufacturer's recommendations, PARCC, and the DQOs listed in the Phase II Umiat work plan (E & E 1996a). This evaluation and a comparison of field laboratory data with off-site laboratory data indicate that the field laboratory data met the objectives described above for petroleum hydrocarbons and PCBs. Field screening data for chlorinated pesticides

were not used because of poor correlation with off-site analytical data. Specific field analyses validations are presented below.

4.3.2.1 Petroleum Hydrocarbons

Two hundred sixty-seven soil samples were screened for petroleum hydrocarbons using the Ensys Envirogard enzyme-linked immunosorbent assays and EPA Method 4030. The assay does not differentiate between various fuels or petroleum components; rather, the result is a composite of individual petroleum fuel components in the sample. The method reports the petroleum hydrocarbons quantitated as diesel in ranges as follows: <25 ppm, 25-125 ppm, 125-625 ppm, and >625 ppm.

Of the 267 field screening samples, 59 (approximately 24%) were also sent off site for laboratory confirmation analyses and a broader spectrum of analyses. The off-site laboratory reported GRO using Method AK-101 and DRO using Method AK-102. A comparison of the field screening results to the off-site laboratory results is presented in Table 4-5. Approximately 93% of the field screening samples, which also were analyzed by the off-site laboratory, correctly identified the presence or absence of petroleum hydrocarbons. Sixty-four percent of the field screening samples, reported concentration range, agreed within a factor of 2 of the reported off-site laboratory concentration. False negative results were reported in nine field screening samples. However, seven of the corresponding off-site sample results were within a factor of 3 of the field screening detection limits. The discrepancies in these results may be attributed to anthropogenic variations because the samples were collocated. Additionally, biogenic materials (naturally occurring organics) in the soil also may bias the off-site results because the off-site laboratory procedures used to assess petroleum hydrocarbons are not specific to petroleum hydrocarbons (E & E 1995a). Overall, the field laboratory met its objective of identifying areas of petroleum contamination and guiding further sampling activities.

4.3.2.2 Dichlorodiphenyltrichloroethane

One hundred twenty soil samples were screened for DDT, all within Unit B, using the Ensys Envirogard enzyme-linked immunosorbent assays and EPA Method 4042. The assay result is a composite of DDT, its metabolites (e.g., dichlorodiphenyldichloroethane [DDD] and DDE), and other structurally similar compounds in the sample. The method reports the chlorinated pesticide concentrations quantitated as DDT in ranges as follows: <0.2 ppm, 0.2-1 ppm, 1-10 ppm, and >10 ppm.

In addition to the 120 field screening samples, 24 (approximately 20%) also were sent off site for laboratory confirmation analyses and a broader spectrum of analyses. The off-site laboratory reported DDT using EPA Method 8080A. A comparison of the field screening results to the off-site laboratory results is presented in Table 4-6.

The field screening data contained an unusually high percentage of false positives and false negatives when compared to the off-site analytical data. Unknown matrix effects (soil type, moisture content, naturally occurring organics, and other contaminants) may be responsible for reducing the usually very reliable DDT immunoassay analysis. Because of this poor correlation with the off-site data, E & E chose not to use the field screening pesticide data for any purpose. Thus, pesticide data are limited to the much smaller data set provided by off-site analysis.

4.3.2.3 Polychlorinated Biphenyls

Sixty-four soil samples were screened for PCBs using the Ensys Envirogard enzyme-linked immunosorbent assays and EPA Method 4020. The assay does not differentiate between the individual PCBs; rather, the result is a composite of the individual PCBs in the sample. The method reports the PCB concentration quantitated as Aroclor 1248 in ranges as follows: <1 ppm, 1-5 ppm, 5-10 ppm, 10-50 ppm, and >50 ppm.

Of the 64 field screening samples, 14 (approximately 22%) also were sent off site for laboratory confirmation analyses and a broader spectrum of analyses. The off-site laboratory reported PCBs using EPA Method 8080A. A comparison of the field screening results to the off-site laboratory results is presented in Table 4-7. Approximately 79% of the field screening samples, which also were analyzed by the off-site laboratory, correctly identified the presence or absence of PCBs. The correlation at 10 ppm or greater was 100%. False positive results were reported in three of the field screening samples. The discrepancies in these results may be attributed to anthropogenic variations because the samples were collocated. Additionally, the presence of petroleum hydrocarbons up to 42,000 mg/kg may have induced reactivity in the immunoassay. Overall, the field laboratory met its objective of identifying areas of PCB contamination and guiding further sampling activities.

4.3.3 Off-Site Laboratory

North Pacific Division Laboratory (NPDL) evaluated all analytical data generated by the off-site laboratory for PARCC. Details of the data validation are presented in the CQAR in Appendix D.

As noted in the CQAR, NPDL concluded that all soil, sediment, surface water, and groundwater data met QA/QC requirements set forth by USAED Alaska (1990) and the EPA Functional Guidelines (EPA 1994) and were not affected adversely by the following data qualifications:

- **VOC analysis:** Approximately 17% of the VOC results (1508 individual analytical results) are considered estimates because holding times, blanks, surrogates, matrix spikes, and laboratory control samples did not meet established QC criteria;
- **BNA analysis:** Approximately 6% of the BNA results (309 individual analytical results) are considered estimates because blanks and surrogates did not meet established QC criteria;
- **Polynuclear aromatic hydrocarbon analysis:** Approximately 8% of the PAH results (58 individual analytical results) are considered estimates because holding times and surrogates did not meet established QC criteria;
- **Pesticide/polychlorinated biphenyl analysis:** Approximately 12% of the Pest/PCB results (424 individual analytical results) are considered estimates because holding times, continuing calibrations, and surrogates did not meet established QC criteria;
- **GRO, DRO, and RRO analysis:** All of the GRO, DRO, and RRO results are considered estimates because reporting limits, holding times, surrogates, and laboratory control samples did not meet established QC criteria;
- **Total recoverable petroleum hydrocarbon analysis:** One TRPH result is considered estimated because the matrix spike and laboratory control sample did not meet established QC criteria;
- **Inorganic analysis:** Approximately 28% of the inorganic results (600 individual analytical results) are considered estimates because blanks, matrix spikes, duplicates, laboratory control samples, and dilutions did not meet established QC criteria; and
- **General Chemistry:** Approximately 50% of the general chemistry results (eight individual analytical results) are considered estimates because duplicates did not meet established QC results.

E & E used the recommendations in the CQAR and the EPA Contract Laboratory Program guidelines to assign data qualifiers to the analytical results, as shown in Table 4-8. The following data qualifiers were applied: sample concentrations considered to be estimates are flagged *J*, data results obtained using estimated detection limits are flagged *UJ*, and results that may be attributable to blank contamination are flagged *B*. Based on the qualifications

applied, the data are not impacted adversely and are considered usable for the purpose of this investigation.

4.3.4 Quality Assurance/Quality Control Sample Results

Trip blank and rinsate sample results are presented in Table 4-9. No contamination was present in the soil trip blanks. The common laboratory contaminants chloroform and toluene were detected in aqueous trip blanks and rinsates and are attributed to laboratory contamination. Additionally, the presence of chloroform may be from the deionized water used to prepare the blanks or from an artifact from the acidic preservation. Acetone detected in one trip blank is attributed to laboratory contamination. Calcium detected in the rinsates is attributed to the deionized water used in sample preparation.

Overall, the blind laboratory duplicate and triplicate data agreed and are comparable. A minority of the data comparison did not agree. The discrepancies could not be resolved analytically and are attributed to matrix interferences and anthropogenic variations.

4.3.5 Analytical Data Quality Objectives Assessment

E & E reviewed the qualified analytical data to determine their ability to meet the project DQOs in the Umiat Phase II work plan (E & E 1996a). The following data use limitations were identified:

- A fraction of data results was flagged *J* to indicate that the quantitative accuracy is questionable. Although the results are estimated and are still usable, the precise concentration is questionable. Data flagged *H* are considered biased high, *L* is considered biased low, and *K* is an unknown bias;

- Results identifying common laboratory contaminants believed to be the result of field and/or laboratory contamination were flagged *B*. These results are viewed as having an estimated detection limit. The chemical of concern may or may not be present in the sample, but the result could be masked by field- and/or laboratory-introduced contamination by the same chemical of concern;

- Limitations were placed on the usability of 13% of VOC data (1,137 analytes), 8% of BNA data (388 analytes), 34% of PAH data (245 analytes), 32% of Pest/PCB data (1,132 analytes), and 10% of metals data (267 analytes), because requested analytical detection limits were not achieved. The presence or absence of a chemical of concern cannot be confirmed at the action level because the practical quantitation limit was elevated above the required action level as a result of unavoidable matrix effects and/or limitations in the analytical methods.

Overall, PARCC parameters for the analytical data were achieved and the data meet the needs for characterizing the extent of contamination, ERA, and HHRA.

4.4 Background Results

4.4.1 Soil Samples

Three surface soil samples (316SS, 318SS, and 320SS) and three subsurface soil samples (317SB, 319SB, and 321SB) were collected during installation of background locations MW-17, MW-18, and MW-19. All samples were analyzed for metals. Additionally, one surface soil sample (316SB) and one subsurface soil sample (317SB) were analyzed for GRO, DRO, RRO, VOCs, BNA, and Pest/PCBs. The analytical results are presented in Tables 4-10 through 4-13. Low concentrations of GRO (up to 7.2 mg/kg), DRO (up to 18 mg/kg), and RRO (up to 51 mg/kg) were detected but are significantly below the regulatory guidance or screening levels. These low levels of petroleum compounds are attributed to either naturally occurring organics in the soil and organic matter and/or petroleum-derived from natural surface seeps in this petroleum-rich province. Similarly, low concentrations of 1,3,5-trimethylbenzene; benzene; p-cyrene; 4-methylphenol; 4,4'-DDE; and 4,4'-DDT were detected well below the regulatory guidance or screening levels. Chlorinated pesticides were sprayed as insect control over much of Umiat, and low concentrations of DDT and DDD in soil are common. Only naturally occurring arsenic and beryllium were detected at concentrations that exceed regulatory guidance or screening levels.

4.4.2 Groundwater Samples

Three groundwater samples (345GW through 347GW) were collected from MW-17, MW-18, and MW-19, respectively, and were analyzed for GRO, DRO, TRPH, VOCs, PAHs, Pest/PCBs, and total and dissolved metals. The analytical results are presented in Table 4-14. Low concentrations of GRO (up to 128 micrograms per liter [μg/L]) and DRO (up to 262 μg/L) were detected in two wells. As with low levels of petroleum detected in background soils, the petroleum compounds detected in background groundwater are attributable to naturally occurring petroleum. Acetone and chloroform also were detected in all three wells but are attributed to laboratory blank contamination. No other organic analytes were detected. Ten metals were detected at concentrations that exceed the established regulatory guidance or screening levels. These results are attributed to the natural concentration contained in soil particles suspended in the groundwater. Acid preservation also increases the metals concentration in the water sample by dissolving metals particles adhering

to suspended sediments. Dissolved (filtered) manganese (up to 9,840 μg/L), iron (up to 415 μg/L), and thallium (up to 4.9 μg/L) exceeded the established regulatory guidance or screening levels but are representative of background conditions.

4.4.3 Sediment and Surface Water Samples

Seven each of collocated sediment samples (234SD, 236SD, 906SD, 303SD, 305SD, 306SD, and 307SD) and surface water samples (235SW, 905SW, 907SW, 299SW, 300SW, 302SW, and 304SW) were collected from the Colville River and surrounding lakes. These samples were analyzed for GRO, DRO, RRO (sediments only), TRPH (surface waters only), VOCs, BNA (sediments only), PAHs (surface waters only), Pest/PCBs, total metals, and dissolved metals (surface waters only). The analytical results are presented in Tables 4-15 and 4-16. Methylene chloride and bis(2-ethylhexyl)phthalate detected in sediments, and acetone detected in sediments and surface water, are attributed to laboratory blank contamination. Low concentrations of 2-butanone, carbon disulfide, and 4-methylphenol detected in sediments below the screening concentration are attributed to laboratory contamination. No other organic analytes were detected. Low levels of RRO and DDT are considered background conditions. Only naturally occurring arsenic, beryllium, and iron were detected at concentrations that exceeded the regulatory guidance or screening levels. In surface waters, total (unfiltered) aluminum, iron, and magnesium were detected at concentrations that exceeded the established regulatory guidance or screening levels. These results are attributed to the natural concentration contained in soil particles suspended in the surface water. Additionally, in one surface water sample, dissolved magnesium (83.7 μg/L) also exceeded the established regulatory guidance or screening level.

4.5 Unit A—Airstrip Operations Complex

4.5.1 Surface and Subsurface Soils

Phase I analytical results for surface soils showed petroleum constituents, including DRO, GRO, and TRPH at concentrations ranging up to 15,000 mg/kg, 193 mg/kg, and 32,000 mg/kg, respectively. Pesticides, including 4,4'-DDD; 4,4'-DDT; and 4-4'-DDE also were detected, but at concentrations below regulatory limits and EPA, Region 3, RBCs. All detected metals were below background levels.

Analytical results for Unit A soils are presented in Tables 4-17 through 4-18. Results for the engineering parameters-analyzed Unit A samples are presented in Table 4-19. Results of the Phase II surface soil sampling were similar to those described for the Phase I effort,

with the extent of surface soil contamination further defined. The extent of petroleum contamination above regulatory limits is shown in Figure 4-3. Concentrations for DRO, GRO, and RRO ranged up to 22,000 mg/kg, 390 mg/kg, and 24,000 mg/kg, respectively. The two zones of surface soil contamination shown are petroleum-stained and apparently originate from the former bulk fuel storage and previous drum storage areas. The former fuel tanks and drums appear to be the source of subsurface and groundwater petroleum contamination in Unit A.

In addition to petroleum contamination, 4-4'-DDT was found in concentrations exceeding the EPA, Region 3, RBCs in two discrete locations (see Figure 4-4). The maximum DDT concentration in surface soils was 4.67 mg/kg. Chlorinated pesticides were not detected below surface soils. The pesticides appear to have been contained within the surface soils and have not penetrated to the subsurface.

Benzene, toluene, ethylbenzene, and total xylene (BTEX) compounds were detected at MW-2 and 017SL (within the zones of contamination), but below regulatory and risk-based screening levels. BNA, VOCs, and metals also were detected in various surface soil samples, but below appropriate screening levels.

During the Phase I RI, subsurface soils were shown to contain the same petroleum constituents found in surface soils above ADEC North Slope Cleanup Matrix Levels. In addition, BH1-1 contained total BTEX above ADEC North Slope Cleanup Levels. Pesticides and metals also were found below grade, but below the same screening levels stated above for surface soils.

The Phase II subsurface soil exploration further defined the subsurface petroleum plume identified in Phase I and found two additional subsurface areas where petroleum contamination exists above the ADEC cleanup levels. Although VOCs, BNA, pesticides, and metals were detected in the subsurface, none of these constituents (except benzene) were found above the screening levels defined herein (see Table 4-17).

As shown in Figure 4-3, the two areas of surface soil contamination defined above are located above the plume identified during the Phase I investigation. A discrete area of subsurface soil with elevated levels of GRO is located at SB-25. A third subsurface petroleum plume appears to originate at the present bulk fuel storage area operated by Umiat Enterprises, Inc., on the east side of the Airstrip Operations Complex.

4.5.2 Groundwater

Analytical results for Unit A groundwater samples are presented in Table 4-20. During the Phase II investigation, two temporary monitoring wells were installed at the

Airstrip Operations Complex. Analytical results from groundwater samples collected at the wells showed concentrations of GRO, DRO, benzene, total BTEX, total PAHs and BTEX, soluble iron and lead, and total thallium above the defined screening levels. As shown in Figure 4-5 and cross sections A-A' and B-B' (see Figures 4-6 through 4-8), the contaminants originate at the two surface stained areas defined above and fan out on top of the groundwater table, mainly to the north and east. The groundwater plume is assumed to approximately match the subsurface soil contamination (see Figure 4-5). During the Phase II sampling, a petroleum sheen could be produced at the lake's edge by disturbing the shoreline gravels. Otherwise, no visible sheen was noticed on the lake's surface.

4.5.3 Surface Water and Sediment

Phase II sampling included analysis of surface water and sediment samples that were collocated from three locations in Runway Lake. Tables 4-21 and 4-22 present these results. No contaminants were detected above regulatory and/or background levels in either the surface water or sediment samples collected at Runway Lake.

No petroleum constituents were detected in the surface water samples. Acetone was the only VOC detected, at well below the screening value, and is considered to be a laboratory contaminant. The chlorinated pesticides 4-4'-DDD and 4-4'-DDT were detected below screening values in the surface water. All metals were below either background concentrations or the screening value.

All contaminant levels in Runway Lake sediments were below the defined screening levels. However, low levels of RRO, VOCs, BNA, and pesticides were detected in laboratory analyses. The data suggest a trend of higher levels of contaminants at the east end of the lake, where the westernmost subsurface soil petroleum plume described above meets the lake's edge.

4.5.4 Contaminant Fate and Transport

The physical-chemical characteristics affecting fate and transport of the contaminants detected at Unit A are provided in Appendix E. Two surface soil areas and three subsurface soil areas are defined above for petroleum contamination. Based on groundwater elevations documented at all three units, groundwater at the site appears to move slowly north. As evidenced by the subsurface exploration, the petroleum contamination, which originated from the former fuel and drum storage area near MW-1 and MW-2 locations, appears to have migrated toward Runway Lake. Surface waters do not appear to have been impacted;

however, sediments may be receiving contaminant loading from the subsurface soils. All contaminants in Runway Lake sediments are well below the screening levels.

The small zone of subsurface GRO contamination at SB-25 appears to be discrete. No discernable plume appears to be moving from that location.

The subsurface contamination near the bulk fuel storage area operated by Umiat Enterprises, Inc., was well-defined to the west, but questions remain of its extent in other directions. E & E did not further investigate this contamination because it was not of United States Department of Defense (DoD) origin. Contamination appears to originate from the aboveground bulk storage tanks operated by Umiat Enterprises, Inc. Contaminants may extend in the subsurface east to the edge of the Main Gravel Pad; however, no discernable sheen was noted on the adjacent wetlands.

4.6 Unit B—Main Gravel Pad

4.6.1 Surface and Subsurface Soils

During Phase I of the RI, 40 soil borings were drilled to determine the nature and extent of contamination throughout Unit B. Soil samples from 34 of the 40 soil borings contained contaminants that exceeded the regulatory guidance levels or risk-based screening concentrations. GRO was detected up to 2,200 mg/kg; DRO up to 46,000 mg/kg; TRPH up to 130,000 mg/kg; total BTEX up to 11 mg/kg; benzene up to 0.240 mg/kg; 4,4'-DDD up to 18 mg/kg; 4,4'-DDT up to 200 mg/kg; and PCBs up to 602 mg/kg. The areal extent of soil contamination was not delineated fully during Phase I, and groundwater was not sampled.

During Phase II of the RI, surface and subsurface soil samples were collected from 119 soil borings and 15 surface soil sample locations to characterize and delineate soil contamination within Unit B. Surface and subsurface soil samples were analyzed for some or all of the following analytes: field screening for petroleum hydrocarbons, PCBs, and DDT; off-site analyses for GRO, DRO, RRO, VOCs, BNA, metals, Pest/PCBs, and dioxin; and engineering/remediation parameters. Soil analytical results are organized by sample location and are presented in Tables 4-23 through 4-27. Soil samples from 61 of the 119 soil borings and from 12 of the 15 surface soil sampling locations exceeded the regulatory guidance levels or RBCs (see Figures 4-9 through 4-18). GRO was detected at concentrations ranging up to 1,600 mg/kg; DRO up to 140,000 mg/kg; RRO up to 75,000 mg/kg; benzene up to 0.6 mg/kg; total BTEX up to 100.5 mg/kg; 4,4'-DDD up to 8.33 mg/kg; 4,4'-DDT up to 26.1 mg/kg; PCBs (Aroclor 1254) up to 912 mg/kg; lead up to 26,400 mg/kg; and dioxin (2,3,7,8-

tetrachlorodibenzo-p-dioxin [2,3,7,8-TCDD] equivalency) up to 610 picograms per gram (pg/g).

4.6.2 Groundwater

One groundwater sample was collected from each of the nine Phase II monitoring wells installed within Unit B. Groundwater samples from the monitoring wells were analyzed for GRO, DRO, TRPH, VOCs, PAHs, Pest/PCBs, metals, and engineering/remediation parameters (see Table 3-2). Analytical results are presented in Table 4-28 and plotted on Figure 4-13.

Groundwater from eight of the nine wells contained a strong hydrocarbon odor and sheen, but no wells contained measurable, floating, free product. All nine monitoring wells had contaminant concentrations that exceed the regulatory guidance levels or RBCs for GRO, DRO, benzene, total BTEX, and total PAHs + BTEX. GRO was detected at concentrations ranging up to 20,000 μg/L, DRO up to 46,400 μg/L, benzene up to 91.4 μg/L, total BTEX up to 703.4 μg/L, and total PAHs + BTEX up to 790 μg/L. Additionally, MW-13 contained 4,4'-DDD at 1.47 μg/L and 4,4'-DDT at 0.617 μg/L. MW-14 contained PCBs (Aroclor 1254) at 240 μg/L. MW-20 contained several VOC compounds (in addition to BTEX) that exceeded the guidance levels, and MW-11 and MW-20 contained PAH compounds that exceeded the guidance levels. Only one groundwater sample from Area B was analyzed for filtered (dissolved) metals. In that sample, the concentration of thallium slightly exceeded the guidance level.

4.6.3 Surface Water and Sediment

Sediments and surface water were sampled from six locations within Unit B (Float-plane Lake). The sediment and surface water samples were collected as collocated pairs. The sediments were analyzed for RRO, VOCs, BNA, and Pest/PCBs (see Table 3-2). Surface waters were analyzed for VOCs, PAHs, Pest/PCBs, and metals. Analytical results are presented in Tables 4-29 and 4-30. None of the six surface water samples or six sediment samples contained analytes that exceeded a regulatory guidance level.

4.6.4 Contaminant Fate and Transport

The physical-chemical characteristics affecting fate and transport of the contaminants detected at Unit B are provided in Appendix E. Phase I (1994) and Phase II (1996) of the RI documented soil and groundwater contamination over significant portions of Unit B. The five

types of contaminants present are petroleum, pesticides, PCBs, metals, and dioxin (see Figures 4-9 through 4-18). Of these five types of contamination, petroleum is the most widespread. Petroleum staining of the gravel pad surface is evident at numerous locations within Unit B. Most of the surface soil contamination in Unit B is believed to be the result of leaking 55-gallon drums (removed in 1994), USTs, and ASTs. (The current potential contaminant sources within Area B are the in-place USTs near the west portion of the pad; the AST supplying the Alaska Department of Transportation (ADOT) Maintenance Building; and several small debris piles containing vehicle batteries, mostly empty 5-gallon fuel cans, and paint cans. Of these sources, only the in-place USTs appear to be of DoD origin.) Much of this surface petroleum contamination infiltrated downward through the soil column and spread laterally on the shallow (2 feet to 4 feet BGS) groundwater. The groundwater level fluctuates seasonally in response to recharge through precipitation and snowmelt. Contamination spreading laterally on the groundwater combined with seasonal fluctuation of the groundwater table resulted in smearing of petroleum contamination through subsurface soils. The estimated lateral extent of subsurface soil petroleum contamination is shown in Figure 4-9. At some locations (e.g., SB-59 at 10 feet BGS, SB-141 at 3 feet BGS, and SB-143 at 3 feet BGS), petroleum contamination has penetrated into permafrost either through small fractures or by seasonal freeze/thaw cycles. The depth of contamination penetration into permafrost is unknown but is at least 1.5 feet in SB-59 (permafrost at 8.5 feet BGS and the deepest sample at 10 feet BGS). Because each boring location encountered groundwater overlying permafrost, the permafrost did not appear to inhibit the flow of the overlying (suprapermafrost) groundwater during the warmer times of the year when the groundwater is not immobilized as ice. Petroleum contamination has leached from the subsurface soils into the groundwater, thereby contaminating the groundwater above the regulatory guidance level or RBC. Surface soil and subsurface soil petroleum contamination are well-delineated throughout Unit B. The areal extent of groundwater petroleum contamination likely mirrors the subsurface soil contamination and possibly extends beyond. The estimated areal extent of groundwater contamination is presented in Figure 4-13. Additional groundwater sampling would be necessary to more accurately estimate the areal extent and volume of contaminated groundwater. Additional groundwater samples are not deemed necessary by E & E.

Chlorinated pesticide (DDT and DDD) contamination of surface soil, subsurface soil, and groundwater across Unit B is the result of aerial and ground spraying of DDT for mosquito control in the late 1940s, and possibly later (E & E 1996b). DDT and DDD contamination in surface and subsurface soil across Unit B is presented in Figure 4-10. Contamination was detected across fairly broad areas, which is likely a result of aerial

spraying. Six of the nine groundwater samples collected from Unit B were analyzed for pesticides. Two wells (MW-12 and MW-13) contained detectable amounts of DDT and DDD, but only MW-13 exceeded the regulatory guidance level. E & E believes that the DDT and DDD detected in MW-13 groundwater is a result of the pesticides adhering to sediment particles that were suspended in the fairly turbid groundwater sample (a filtered groundwater sample was not collected). Therefore, E & E believes that the DDT and DDD contamination within Unit B is limited to the surface and subsurface soils represented in Figure 4-10.

PCB contamination of Unit B surface soil, subsurface soil, and groundwater is confined to former Area 7 of the Main Gravel Pad. The source of the PCB contamination was PCB-containing oil that leaked from 55-gallon drums. The drums were removed in 1994, but the oil-saturated soil under the drums remains. The areal and vertical extent of PCB soil contamination was established through Phase I and Phase II sampling (see Figure 4-11). Petroleum contamination of this area coincides with the PCB-contaminated area and extends beyond the PCB contamination (compare Figures 4-9 and 4-11). PCB contamination in subsurface soils extends to at least 3 feet BGS but may extend deeper. Exploration and sampling below 3 feet were precluded by shallow permafrost and buried metallic debris. Groundwater below the PCB-contaminated area also contains PCBs above the screening levels. All surface soil, subsurface soil, and groundwater contaminated with PCBs will be removed from Area 7 of the Main Gravel Pad and will be disposed of according to the remedial design for PCB material removal (E & E 1997b).

Metals concentrations that exceeded the background levels and the regulatory guidance levels were considered to be contamination. Metals contamination in surface and/or subsurface soils was detected in three general areas (at five soil boring locations) within Unit B (see Figure 4-12). Because metals contamination was detected in only three general areas, no attempt was made to delineate areal or vertical extents of contamination in the illustrations. The source of the documented metals contamination is unknown, and no obvious source exists in these areas. Metals contamination in the vicinity of former Area 3 includes surface soil lead concentrations up to 4,290 mg/kg. Subsurface soil metals contamination extends to approximately 3 feet BGS and includes lead, arsenic, beryllium, and iron. The remaining two locations with metals-contaminated soil are soil boring BH10-2 in former Area 10 and surface soil sample 407-SB north of former Areas 8 and 9. Metals contamination in both locations appears to be limited to surface soils. The Area 10 location contained only lead contamination at 745 mg/kg, while 407-SB contained lead, arsenic, antimony, copper, and iron contamination. Only one groundwater sample collected from Area B was analyzed for metals.

That sample was collected from MW-10 in former Area 3 and contained thallium at 6.3 µg/L, which slightly exceeds the screening value.

Dioxin contamination was detected at two surface soil locations in Unit B (sample 601SL near the ADOT house adjacent to SB-114 and triplicate sample 602SL, 603SL, and 604SL collected at SB7-1 in former Area 7). The results of the dioxin sampling are detailed in *Dioxin Evaluation Technical Memorandum for Soils at the Former Umiat Air Force Station* (E & E 1996b). Sample 601SL contained 160 pg/g of calculated 2,3,7,8-TCDD (TEQ), which exceeds the residential RBC of 4 pg/g and the industrial RBC of 40 pg/g (see Figure 4-12). The triplicate sample collected in former Area 7 contained up to 610 pg/g (TEQ) of 2,3,7,8-TCDD. Because only two surface soil samples at Umiat were analyzed for dioxin and both were contaminated, no attempt was made to delineate areal or vertical extents of contamination in the illustrations. Additional sampling would be required to accurately estimate the extent and volume of dioxin-contaminated soil and/or groundwater. Such delineation would be warranted only if dioxin contamination poses a risk to human or ecological health. However, the dioxin contamination documented in Area 7 will be removed during the PCB soil removal.

4.7 Area C—Landfill

4.7.1 Surface and Subsurface Soils

The results of the Phase I RI (E & E 1995a) at Unit C, the Landfill (described in the Phase I RIR as *Area 11*), indicate that petroleum products —BTEX, DRO, and TRPH— are present in surface soils at the Landfill, but not at concentrations exceeding the ADEC cleanup levels for North Slope petroleum-contaminated soils. In addition, low levels of DDT were detected, but at concentrations that did not exceed EPA, Region 3, RBCs for residential soil. Metals were detected in surface soil at the Landfill, but the levels did not appear to exceed background levels.

During the Phase II investigation, five surface soil samples were collected at select soil boring and monitoring well locations at the Landfill where there was either stained soil or a potential source of contamination (e.g., 55-gallon drums or batteries). The work plan (E & E 1996a) does not specify that any surface soil samples would be collected from the Landfill; however, E & E decided in the field that surface soil samples would be useful to determine whether subsurface contamination originated at the surface.

Analytical results for soil samples collected during the 1996 RI are summarized in Tables 4-31 and 4-32 and are presented in Figure 4-19. Arsenic, beryllium, and iron were

detected above screening levels at MW-3 and SB-50. However, there is no known source for these metals at the Landfill. These elevated levels are found at locations on opposite sides of the Landfill; therefore, it does not appear that this contamination is attributable to surface runoff. Lead was detected above screening levels at SB-47. Because this sample was collected adjacent to a lead-acid battery and lead was not detected at elevated levels at any other locations at the Landfill, this contamination is isolated and attributed to the battery.

The analytical results from the 1994 RI for subsurface soils at the Landfill are similar to the surface soil analytical results. Petroleum products —DRO, BTEX, and TRPH— are present in subsurface soils, but the concentrations of each are less than the ADEC cleanup levels for North Slope petroleum-contaminated soils. Low levels of DDT were detected, but at concentrations that did not exceed EPA, Region 3, RBCs for residential soil. Metals detected in subsurface soil did not appear to exceed background levels.

During the 1996 field investigation, soil borings and monitoring wells were installed at the Landfill. Six soil borings (SB-44, SB-45, SB-47, SB-49, SB-50, and SB-51) and six monitoring wells (MW-3 through MW-8) were drilled to the groundwater table. Subsurface soil results are summarized in Tables 4-31 and 4-32 and are presented in Figures 4-19 through 4-22. PCBs (Aroclor 1254) were detected above the screening level at SB-47 at 3 feet BGS. PCBs were detected in one other subsurface soil sample (MW-8), but below the screening level. PCBs were not detected in any other subsurface soil sample. PCB contamination appears to be limited to the north portion of the Landfill. The levels of PCBs in the subsurface soil at the Landfill are less than the required cleanup level of 10 ppm under Toxic Substances Control Act (TSCA) for PCB spills in unrestricted areas.

DRO, RRO, DDT, and DDD were detected above their respective screening levels at MW-6 at 3 feet BGS. Because these compounds were detected in only one location above screening levels, this indicates that the source of the contamination is probably isolated to the area around the monitoring well.

4.7.2 Groundwater

Groundwater at the Landfill was not sampled during previous investigations. During 1996, six monitoring wells (MW-3 through MW-8) were installed to characterize groundwater quality. The wells were installed to an average depth of 5 feet BGS.

Groundwater analytical results are in Table 4-33 and are presented in Figures 4-20 through 4-23. Petroleum products (DRO, GRO, and total PAHs) and chlorinated pesticides (DDT and DDD) exceed screening levels. DRO was detected above screening levels in

MW-4 and MW-6, with the highest concentration detected in MW-4. MW-4 also contained the only exceedance of total PAHs. GRO was detected above the screening level in MW-6 and MW-8. The distribution of DRO and GRO in Landfill monitoring wells suggests that there may be a petroleum groundwater plume originating from somewhere near MW-4.

Chlorinated pesticides (DDT and DDD) were detected above screening levels in MW-6. DDT was detected below the screening level in MW-5; however, the contamination appears to be discrete because no DDT was detected in wells between MW-5 and MW-6. DDT and DDD were detected in the associated subsurface soil sample at MW-6; therefore, it appears that the source of this contamination is near MW-6.

4.7.3 Surface Water/Sediment

Surface water and sediments were not sampled during previous investigations. In the 1996 investigation, surface water and sediment locations were collocated. Three surface water and three sediment samples were collected in the seasonal stream hydraulically downgradient of the Landfill.

Analytical results for surface water and sediment are in Tables 4-34 through 4-35 and are presented in Figures 4-19, 4-20, and 4-22. No analytes were detected above screening levels in surface water. PCBs (Aroclor 1254) were detected above EPA, Region 3, RBC screening levels in all three sediment samples. As shown on Figure 4-19, Analytical results for one sediment sample (232-SD) were above the TSCA cleanup level of 10 mg/kg for PCBs.

4.7.4 Contaminant Fate and Transport

The physical-chemical characteristics affecting fate and transport of the contaminants detected at the Landfill are provided in Appendix E.

Results of the 1996 Phase II investigation indicate that contamination is present in surface soils, but limited to isolated areas. Although surface runoff and windblown particulates are potential contaminant migration pathways, the presence of contaminants in discrete locations indicates that these are not significant contaminant migration pathways.

Contaminants were detected in subsurface soils in two discrete locations. Lateral and vertical migrations of contaminants through subsurface soils are the potential off-site contaminant migration pathways to be considered. Contaminants do not appear to have migrated vertically downward from the surface because the contaminants detected in subsurface soils are not the same as those detected in surface soils. Materials buried in the Landfill are the probable sources of contamination. Petroleum contamination has been detected in groundwa-

ter throughout the Landfill; however, petroleum contamination was detected only in subsurface soil and groundwater at MW-6. The petroleum contamination in the subsurface soil in MW-6 probably is leaching into the groundwater and appears to have migrated laterally via groundwater because MW-8, the well hydraulically downgradient from MW-6, contains petroleum products. Although petroleum products are present in groundwater, the absence of petroleum products in subsurface soils may be the result of the following possibilities:

- Landfill soils lack the organic and fine-grained material to which the petroleum products would adhere; and
- Contaminant source material in the Landfill was disposed of near the water table; therefore, contaminants could enter the groundwater directly in some locations.

Petroleum contamination at MW-4 probably originated from a nearby source, which is likely in the water table.

Chlorinated pesticide (DDT and DDD) contamination in subsurface soil and groundwater is limited to MW-6. Because these compounds are fairly insoluble, the DDT and DDD detected in the groundwater likely were the result of suspended particles in the groundwater, not a result of leaching. Groundwater samples from this area are turbid. There is no evidence that contamination is migrating from this location.

The principal off-site contamination migration pathway for subsurface soil and groundwater from the Landfill is lateral and vertical migration via groundwater. Because surface water in the slough located hydraulically downgradient from Landfill was not contaminated, surface water apparently is not an active migration pathway. However, the presence of PCBs in sediments suggests that it may have been at one time or it is periodically a contaminant migration pathway depending on the stage of the Colville River.

Contamination found in sediments in the seasonal stream likely originated from groundwater discharge from the Landfill because there are no nearby surface sources of PCBs for runoff and windblown deposition to be factors. The distribution of contamination, with the highest concentration found in sample 232-SD 500 feet from the Landfill, may be the result of the periodic flooding of the Landfill channel. The pool where sample 230-SD was collected is shallow and is flushed during flood events. Sample 232-SD was collected from a deeper pool located behind a topographic rise. Eddies form in this pool, and stream waters may slow sufficiently for suspended solids to deposit. In addition, the pool may be sufficiently deep that sediments are undisturbed during flood events.

Contaminants can migrate from the seasonal stream if sediments become suspended in flood events. Alternatively, contaminants may leach from the sediments or migrate vertically. However, surface water samples collocated with the sediment samples do not indicate that contaminants are actively migrating off site.

Table 4-1

PERMAFROST DISTRIBUTION
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Depth to Permafrost (feet BGS)
Phase I	
BH1-2	2.5
BH1-4	2.5
BH2-1	4
BH2-2	9
BH2-3	5
BH3-1	5
BH4-1	6
BH5-1	3
BH7-3	4
BH7-4	2
BH7-6	6
BH8-4	4
BH10-3	5
BH10-4	7
BH10-6	2.5
Phase II	
SB-3	3
SB-38	3
SB-39	3
SB-40	4
SB-45	3
SB-50	6.5
SB-59	8.5
SB-141	3
SB-143	3

Key at end of table.

Table 4-1

PERMAFROST DISTRIBUTION
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Depth to Permafrost (feet BGS)
SB-145	2
SB-146	3
SB-147	3
MW-1	5
MW-14	2.5

Key:

BGS = Below ground surface.
BH = Borehole.
SB = Soil boring.
MW = Monitoring well.

Table 4-2

NORTH SLOPE CLEANUP LEVELS FOR SOIL AND SEDIMENT
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Chemical	*Cleanup Level*
GRO	*100*
DRO	*200*
RRO	*2000*
Benzene	*0.5*
Total BTEX	*10*

Table 4-3

SCREENING CONCENTRATIONS FOR SOIL AND SEDIMENT
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Chemical	Cleanup Level
Risk-Based Concentrations	
1,1,1-Trichloroethane	2700
1,2,4-Trimethylbenzene	3900
1,2-Dichlorobenzene	7000
1,2-Dichloroethane	7
1,3,5-Trimethylbenzene	3900
2-Butanone	47000
2-Chlorophenol	390
2-Chlorotoluene	1600
2-Methylnaphthalene	3100
2,3,7,8 TCDD - TEQ	0.001
4,4'-DDD	2.7
4,4'-DDE	1.9
4,4'-DDT	1.9
4-Methylphenol	390
Acenaphthene	4700
Acetone	7800
Aldrin	0.038
Alpha-BHC	0.1
Aluminum	78000
Anthracene	23000
Antimony	31
Aroclor 1254	10
Aroclor 1260	10
Barium	5500
Benzene	0.5
Benzo(a)anthracene	0.87
Benzo(a)pyrene	0.088
Benzo(b)fluoranthene	0.87
Benzo(k)fluoranthene	8.8
Benzoic acid	310000
Benzyl alcohol	23000
bis(2-Ethylhexyl)phthalate	46
Butylbenzylphthalate	16000
Cadmium	39
Chlordane	0.49
Chlorobenzene	1600
Chloromethane	49
Chromium	390
Chrysene	87
Cobalt	14000
Copper	3100
di-n-Butylphthalate	7800
Dibenzofuran	150
Endosulfan I	470

Table 4-3

SCREENING CONCENTRATIONS FOR SOIL AND SEDIMENT
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Chemical	Cleanup Level
Endosulfan II	470
Endrin	23
Ethylbenzene	7800
Fluoranthene	3100
Fluorene	3100
Indeno(1,2,3-cd)pyrene	0.87
Iron (soil only)	23000
Isopropylbenzene	3100
Lead	400
Manganese	1800
Mercury	23
Methoxychlor	390
Methylene chloride	85
n-Butylbenzene	780
Naphthalene	3100
Nickel	1600
o-Xylene	160000
Pentachlorophenol	5.3
Pyrene	2300
sec-Butylbenzene	780
Selenium	390
Silver	390
Styrene	16000
tert-Butylbenzene	780
Toluene	16000
Total Xylenes	160000
Trichlorofluoromethane	23000
Vanadium	550
Xylene (m + p)	160000
Zinc	23000
Background Concentrations	
Arsenic (soil)	6.4
Beryllium (soil)	0.24
Arsenic (sediment)	7.1
Beryllium (sediment)	0.76
Iron (sediment)	27700

Table 4-4

SCREENING CONCENTRATIONS FOR WATER
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Chemical	Cleanup Level
Risk-Based Concentrations	
1,2,4-Trimethylbenzene	300
1,3,5-Trimethylbenzene	300
2-Butanone	1900
4,4'-DDD	0.28
4,4'-DDT	0.2
Acenaphthene	2200
Acetone	3700
Anthracene	11000
Aroclor 1254	0.0087
Arsenic	0.045
Benzene	0.36
Benzo(a)anthracene	0.092
Benzo(a)pyrene	0.0092
Benzo(b)fluoranthene	0.092
Benzo(k)fluoranthene	0.92
Beryllium	0.016
Chloroform	0.15
Chrysene	9.2
Cobalt	6600
Dibenzo(a,h)anthracene	0.0092
DRO	1500
Fluoranthene	1500
Fluorene	1500
GRO	350
Hexachlorobutadiene	0.14
Isopropylbenzene	1500
Methylene chloride	4.1
Naphthalene	1500
o-Xylene	1400
Pyrene	1100
sec-Butylbenzene	61
Toluene	750
Total Xylenes	520
Trichloroethene	1.6
Vanadium	260
Xylene (m + p)	520
Alaska Water Quality Criteria	
Total BTEX	10
Total PAHs + BTEX	15
MCLs	
Aluminum	200
Antimony	6
Barium	2000

Table 4-4

SCREENING CONCENTRATIONS FOR WATER
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Chemical	Cleanup Level
Cadmium	5
Chromium	100
Copper	1000
Ethylbenzene	700
Iron	300
Lead	15
Manganese	50
Mercury	2
Nickel	100
Selenium	50
Silver	100
Thallium	2
Zinc	5000

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Table 4-5

COMPARISON OF FIELD AND OFF-SITE PETROLEUM HYDROCARBON RESULTS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Off-Site Laboratory Sample	Corresponding Field Laboratory Sample	Field Results (PPM)		Off-Site Laboratory Results (mg/kg)		
		Estimated Field Concentration	Field Result	Combined DRO and GRO Results	DRO Results	GRO Results
96-UMT-001-SS	001-FL	112	~125	22000 JK	22000 JK	NA
96-UMT-003-SS	003-FL	1261	>625	17000 JK	17000 JK	NA
96-UMT-006-SB	006-FL	3850	>625	3060 JK	2600 JK	460 JK
96-UMT-027-SB	016-FL	17	<25	29.5 JK	4.5 JK	25 JK
96-UMT-028-SB	028-FL	17	<25	37.2 JK	29 JK	8.2 UJK
96-UMT-031-SB	031-FL	51	25-125	16.6 JK	9.0 JK	7.6 JK
96-UMT-032-SB	032-FL	17	<25	10.1 UJK	4.5 UJK	5.6 UJK
96-UMT-033-SB	033-FL	85	25-125	103 JK	41 JK	62 JK
96-UMT-175-SS	175-FL	17	<25	24.4 JK	19 JK	5.4 UJK
96-UMT-008-SB	5015-FL	154	~125	145 JK	100 JK	45 JK
96-UMT-007-SB	5016-FL	191	125-625	179 JK	140 JK	39 JK
96-UMT-009-SS	5031-FL	13	<25	61.5 JK	56 JK	5.5 UJK
96-UMT-010-SB	5036-FL	18	<25	15.5 JK	9.7 JK	5.8 UJK
96-UMT-011-SB	5040-FL	972	>625	80 JK	80 JK	NA
96-UMT-020-SB	5044-FL	11	<25	12.3 JK	6.3 JK	6 UJK
96-UMT-021-SS	5049-FL	3	<25	12.5 JK	7.1 JK	5.4 UJK
96-UMT-023-SB	5054-FL	3	<25	23 JK	12 JK	11 JK
96-UMT-022-SB	5055-FL	3	<25	34.4 JK	6.4 UJK	28 JK
96-UMT-026-SB	5060-FL	6	<25	12.4 JK	7.0 JK	5.4 UJK
96-UMT-030-SB	5065-FL	708	>625	570 JK	370 JK	200 JK
96-UMT-216-SB	5071-FL	567	125-625	2020 JK	1900 JK	120 JK
96-UMT-040-SS	5072-FL	26	<25	69.4 JK	64 JK	5.4 UJK
96-UMT-217/218-SB	5073-FL	801	>625	1800 JK	1450 JK	350 JK
96-UMT-220-SB	5074-FL	203	125-625	1075 JK	980 JK	95 JK
96-UMT-221-SB	5079-FL	23	<25	289 JK	260 JK	29 JK
96-UMT-222-SB	5084-FL	13	<25	11.7 JK	5.8 JK	5.9 UJK
96-UMT-223-SB	5090-FL	89	25-125	351 JK	320 JK	31 JK
96-UMT-241-SB	5095-FL	86	25-125	1060 JK	840 JK	220 JK
96-UMT-240-SB	5096-FL	70	25-125	1695 JK	1600 JK	95 JK
96-UMT-243-SB	5099-FL	32	25-125	42 JK	31 JK	11 JK
96-UMT-245-SB	5100-FL	48	25-125	44 JK	27 JK	17 JK
96-UMT-244-SB	5101-FL	70	25-125	46 JK	28 JK	18 JK
96-UMT-247-SB	5106-FL	17	<25	11.7 JK	6.3 JK	5.4 UJK
96-UMT-269-SS	5114-FL	12544	>625	28600 JK	27000 JK	1600 JK
96-UMT-270-SB	5115-FL	12544	>625	3720 JK	3000 JK	720 JK
96-UMT-271-SB	5116-FL	12544	>625	3060 JK	2700 JK	360 JK
96-UMT-276-SB	5126-FL	7900	>625	5800 JK	4700 JK	1100 JK
96-UMT-277-SB	5133-FL	446	125-625	890 JK	210 JK	680 JK
96-UMT-278-SB	5134-FL	18	<25	257.4 JK	250 JK	7.4 JK
96-UMT-279-SB	5137-FL	655	>625	4470 JK	4200 JK	270 JK
96-UMT-280-SB	5138-FL	655	>625	2580 JK	2300 JK	280 JK

Table 4-5

COMPARISON OF FIELD AND OFF-SITE PETROLEUM HYDROCARBON RESULTS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

		Field Results (PPM)		Off-Site Laboratory Results (mg/kg)		
Off-Site Laboratory Sample	Corresponding Field Laboratory Sample	Estimated Field Concentration	Field Result	Combined DRO and GRO Results	DRO Results	GRO Results
96-UMT-282-SB	5139-FL	6	<25	20.2 JK	14 JK	6.2 UJK
96-UMT-286-SS	5158-FL	392	125-625	33065 JK	33000 JK	65 JK
96-UMT-292-SB	5161-FL	601	>625	141000 JK	140000 JK	1000 JK
96-UMT-285-SB	5162-FL	6	<25	39.7 JK	34 JK	5.7 UJK
96-UMT-293-SB	5189-FL	11	<25	42.3 JK	36 JK	6.3 UJK
96-UMT-294-SB	5190-FL	180	125-625	638 JK	28 JK	610 JK
96-UMT-298-SB	5193-FL	400	125-625	1530 JK	1400 JK	130 JK
96-UMT-311-SB	5205-FL	81	25-125	271 JK	180 JK	91 JK
96-UMT-312-SB	5206-FL	166	~125	157 JK	95 JK	62 JK
96-UMT-314-SB	5207-FL	4	<25	18.5 JK	12 JK	6.5 JK
96-UMT-315-SB	5208-FL	601	>625	2660 JK	2100 JK	560 JK
96-UMT-316-SS	5216-FL	7	<25	16 JK	9.8 JK	6.2 UJK
96-UMT-317-SB	5217-FL	6	<25	25.2 JK	18 JK	7.2 JK
96-UMT-322-SB	5224-FL	831	>625	3430 JK	3000 JK	430 JK
96-UMT-323-SB	5225-FL	274	125-625	197 JK	170 JK	27 JK
96-UMT-324-SB	5227-FL	449	125-625	1670 JK	1500 JK	170 JK
96-UMT-325-SB	5228-FL	831	>625	680 JK	500 JK	180 JK
96-UMT-328-SB	5238-FL	7	<25	12.8 JK	7.2 JK	5.6 UJK

Note: 93% of the field results positively identified the presence of petroleum hydrocarbons.

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Table 4-6

COMPARISON OF FIELD AND OFF-SITE CHLORINATED PESTICIDES RESULTS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

		Result (PPM)	Off-Site Laboratory Results (mg/kg)				
Off-Site Laboratory Sample	Field Laboratory Sample	Field Result	Combined Pesticide Results	DDT Results	DDE Results	DDD Results	Chlordane Results
96-UMT-070-SS	040-FL	>10	1.13	0.0103 JK	0.0874 U	0.68 JK	0.35 U
96-UMT-316-SS	040D-FL	>10	0.02	0.00264 JL	0.0013 JH	0.00246 U	0.00985 U
96-UMT-175-SS	5071-FL	.2-1	0.80	0.516 JK	0.0277 JK	0.0833 JK	0.174 U
96-UMT-277-SB	5072-FL	>10	0.06	0.0197 JL	0.0015 JH	0.03 JH	0.00934 U
96-UMT-222-SB	5073-FL	.2-1	0.85	0.483 JL	0.0243 JH	0.157 JH	0.189 U
96-UMT-247-SB	5074-FL	>10	0.15	0.098	0.0029 J	0.0139	0.0348 U
96-UMT-216-SB	5079-FL	<.2	0.09	0.039 JL	0.022 U	0.0205 J	0.0115 J
96-UMT-223-SB	5084-FL	<.2	0.96	0.548 JL	0.014 JH	0.182 JH	0.216 U
96-UMT-220-SB	5085-FL	.2-1	21.87	8.28 JL	0.876 JH	8.03 JH	4.68 U
96-UMT-221-SB	5090-FL	1-10	0.03	0.0175	0.0045	0	0.00874 U
96-UMT-217-SB	5095-FL	<.2	0.37	0.124	0.0207 U	0.14	0.0828 U
96-UMT-218-SB	5096-FL	.2-1	0.36	0.114 JL	0.134	0.0226 U	0.0906 U
96-UMT-287-SB	5114-FL	>10	23.36	7.59 JH	1.49 U	8.33 JK	5.95 U
96-UMT-284-SB	5115-FL	>10	0.40	0.0265 JL	0.0189 JH	0.276 JH	0.0762 U
96-UMT-322-SB	5116-FL	1-10	0.05	0.0114 UJL	0.0045 U	0.019 JH	0.0182 U
96-UMT-324-SB	5126-FL	.2-1	0.06	0.0142 UJL	0.0057 U	0.0134 JH	0.0228 U
96-UMT-298-SB	5133-FL	<.2	0.11	0.0443 JL	0.0087 U	0.0256 JH	0.0348 U
96-UMT-040-SS	5153-FL	1-10	42.31	26.1 JK	2.18 U	5.32 JK	8.71 U
96-UMT-270-SB	5174-FL	1-10	0.32	0.0543 UJL	0.0217 U	0.161	0.0868 U
96-UMT-271-SB	5189-FL	.2-1	0.53	0.113 UJL	0.0451 U	0.196 JK	0.18 U
96-UMT-241-SB	5190-FL	.2-1	0.84	0.297 JK	0.0624 U	0.234 JK	0.249 U
96-UMT-325-SB	5191-FL	1-10	0.05	0.0131 UJL	0.0052 U	0.0117 JH	0.021 U
96-UMT-328-SB	5192-FL	.2-1	0.23	0.135 JL	0.0084 JH	0.0394 JH	0.0451 U
96-UMT-317-SB	5193-FL	<.2	0.02	0.00617 UJL	0.0025 U	0.00247 U	0.00986 U
96-UMT-293-SB	5216-FL	<.2	0.53	0.0969 JL	0.0503 U	0.177 JH	0.201 U
96-UMT-295-SB	5217-FL	<.2	0.30	0.155 JL	0.0195 JH	0.0292 JH	0.101 U
96-UMT-276-SB	5224-FL	>10	0.28	0.0621 UJL	0.0249 U	0.0974 JH	0.0994 U
96-UMT-329-SB	5227-FL	<.2	0.13	0.0279 JL	0.0009 JH	0.00782 JH	0.0947 U
96-UMT-294-SB	5228-FL	1-10	0.03	0.00642 JL	0.0024 U	0.00783 JH	0.00954 U
96-UMT-240-SB	5238-FL	<.2	1.67	0.594 JK	0.133 U	0.409 JK	0.531 U

Note: 83% of the field samples positively identified the presence of DDT, its metabolites, and other structurally similar compounds.

Table 4-7

COMPARISON OF FIELD AND OFF-SITE PCB RESULTS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

		Result (PPM)		Off-Site Lab Result (mg/kg)	
Off-Site Sample	Field Sample	Estimated Field Concentration	Field Result	PCB-1254	Combined PCB
96-UMT-277-SB	5133-FL	0.44	<1	0.0234	0.0234 U
96-UMT-316-SS	5216-FL	0.30	<1	0.0246	0.0246 U
96-UMT-317-SB	5217-FL	0.32	<1	0.0247	0.0247 U
96-UMT-322-SB	5224-FL	1.40	1-5	0.0454	0.0454 U
96-UMT-279-SB	5137-FL	3.21	1-5	0.613	0.613 U
96-UMT-280-SB	5138-FL	2.23	1-5	0.501	0.501 U
96-UMT-282-SB	5139-FL	0.36	<1	0.247	0.247 UJK
96-UMT-285-SB	5162-FL	0.38	<1	0.459	0.459 U
96-UMT-286-SS	5158-FL	372.82	>50	912	24 U
96-UMT-292-SB	5161-FL	21.09	10-50	346	33.7 U
96-UMT-324-SB	5228-FL	0.75	<1	0.057	0.057 U
96-UMT-325-SB	5227-FL	0.59	<1	0.0524	0.0524 U
96-UMT-328/329-SB	5238-FL	0.28	<1	0.113	0.113 U
96-UMT-287-SB	5174-FL	0.08	<1	14.9	14.9 U

Note: Correlation coefficient of 0.9027 was achieved .

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
Volatile Organic Compounds (Methods 8260/524)			
Trip Blank/ Rinsate Blank	Acetone, chloroform, toluene, and 1,2-dichloropropane were detected in the blanks	All results less than ten times the blank concentrations.	B
Holding Times	Samples were analyzed one to six days beyond established holding times.	014SS, 015SS, 017SS, 230SD, 270SB, 271SB, 407SB	JK UJK
	Low level VOC analyses were performed one to nine days beyond established holding times.	Low level VOC results from reports 9601.726, 9601.764, 9601.796, 9601.797	JK UJK
Blanks	Blanks did not meet established QC criteria for acetone.	027SB	B
	Blanks did not meet established QC criteria for methylene chloride.	254SDR1, 316SBR1, 273SB, 274SB, 303SD, 401SB, 403SB, 224SB, 305SD, 307SD	B
	Blanks did not meet established QC criteria for acetone and trichlorobenzene isomers.	VOC data flagged "B" in reports 9601.726, 9601.796, 9601.797 and samples 251SW, 291GW, 289GW	B

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
Surrogate	Surrogate recoveries exceeded established QC criteria.	014SS, 015SS, 017SS, 027SB-029SB, 031SB-033SB, 041SS, 070SS, 175SS, 195SB, 197SB, 201SS, 204SB, 205SB, 217SB, 060SS, 090SS, 110SS, 145SS, 165SS, 185SS, 196SS, 202SS, 213SS, 214SS, 216SBR1, 218SBR1, 224SD, 225SD, 232SD, 234SD, 236SD, 254SD, 906SD, 230SD, 255SD, 259SD, 263SD-265SD, 269SS, 269SSR1, 247SB, 276SB-278SB, 276SBR1, 282SB, 285SB, 295SB, 314SB-317SB, 315SBR1, 279SB, 280SB, 283SB, 284SB, 296SB, 327SB, 224SB, 225SD, 305SD-307SD, 270SB, 270SBR1, 271SB, 271SBR1, 273SB, 274SB, 303SD, 401SB, 403SB, 405SB, 407SBR1, 227SWR1, 228SWR1, 231SWR1, 233SWR1, 235SWR1, 251SWR1, 905SWR1, 907SWR1, 252SWR1, 253SWR1, 260SWR1-262SWR1, 903SWR1, 227SW, 309GW, 906GW, 299SWR1, 304SWR1, 309SWR1, 310SWR1, 905GWR1, 906GWR1, 288GW, 332GW, 333GW, 335GW, 336GW, 339GW, 341GW, 289GW, 291GW, 331GW, 334GW, 344GW, 351GW, 377GW, 340GW, 341GW, 335GWR1, 346GWR1, 347GWR1, 348GWR1, 338GW, 342GW, 343GW, 408SB, 272SB, 281SB	JH
	Surrogate recoveries were below established QC criteria.	018SS	JL UJL
	Surrogate recoveries did not meet established QC criteria.	013SS, 216SB, 218SB, 407SB	JK UJK

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
Matrix Spike	Matrix spike recoveries exceeded established QC criteria.	033SBR1	JH
	Matrix spike recoveries were below established QC criteria for 1,1-dichloroethene.	Results from reports 9601.696, 9601.701, 9601.766, 9601.799	JL UJL
Laboratory Control Recoveries (LCS)	LCS recoveries were below established QC limits for acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone, 1,2-dibromo-3-propane.	Results from reports 9601.693, 9601.696, 9601.699, 9601.701, 9601.735, 9601.766, 9601.799, 9601.729	JL UJL
	LCS recoveries did not meet established QC criteria for acetone and trichlorofluoromethane.	Results from reports 6901.764, 6901.796, 9601.797	JK UJK
Base Neutral and Acid Extractable Organic Compounds (Method 8270)			
Blanks	Blanks did not meet established QC criteria for bis(2-ethylhexyl)phthalate.	BNA results flagged "B" from reports 9601.699, 9601.684, 9601.701, 9601.729	B
	Blanks did not meet established QC criteria for di-n-butylphthalate.	226SD, 308SD, 402SB, 404SB, 272SB, 275SB, 281SB, 297SB	B
Surrogates	Surrogate recoveries exceeded established QC criteria.	013SSR1, 015SS, 015SSR1, 017SSD1, 205SB, 276SB, 013SS, 185SS, 218SB, 276SBR1, 327SB, 216SBR1, 017SS	JH
	Surrogate recoveries did not meet established QC criteria.	270SB, 269SS	JK UJK
	Surrogate recoveries were below the established QC criteria.	018SS, 407SB	JL UJL

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
Polynuclear Aromatic Hydrocarbons (Method 8310)			
Holding Time	Sample was analyzed two to seven days past established holding time.	250SW, 229SW, 301SW	JK UJK
Surrogates	Surrogate recoveries exceeded established QC criteria.	288GW, 289GW, 332GW, 337GW	JH
	Surrogate recoveries were below established QC criteria.	291GW, 290GW	JL UJL
	Surrogate recoveries were not calculable.	331GW, 342GW	JK UJK
Organochlorine Pesticides and Polychlorinated Biphenyls (Method 8080A)			
Holding Time	Sample analyzed one to 17 day past established holding time.	282SB, 907SW, 332GW, 227SW, 228SW, 304SW, 229SW, 301SW	JK UJK
Continuing Calibration	Calibration exceeded established QC criteria for 4,4'-DDT.	Results from report 9601.799, 9601.796	JH
	DDT breakdown exceeded established QC criteria for 4,4'-DDT.	212SB, 220SB, 222SB, 223SB, 254SD-265SD and results from report 9601.766	JL UJL
	DDT breakdown exceeded established QC criteria for 4,4'-DDD, 4,4'-DDE.	212SB, 220SB, 222SB, 223SB, 254SD-265SD and results from report 9601.766	JH

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
Surrogate	Surrogate recoveries were not calculated due to dilution.	13SS-19SS, 041SS, 070SS, 175SS, 204SB, 205SB, 232SD, 040SS, 265SD, 220SB, 222SB, 223SB, 276SB, 278SB-280SB, 282SB, 285SB, 286SB, 292SB, 293SB, 329SB, 240SB, 241SB, 271SB, 287SB, 305SD, 401SB, 403SB, 405SB, 407SB, 288GW, 289GW, 291GW, 341GW, 331GW, 334GW, 339GW, 340GW, 342GW, 332GW	JK
Matrix Spike	Matrix spike recoveries did not meet established QC criteria for DDT.	Results from reports 9601.699, 9601.701, 9601.799, 9601.766	JL UJL
Laboratory Control Sample	LCS recoveries were below established QC criteria for endrin aldehyde.	Results from reports 9601.696, 9601.699, 9601.701, 9601.729, 9601.766, 9601.799, 9601.726, 9601.764, 9601.796, 9601.797	JK UJK
	LCS recoveries did not meet established QC criteria for aldrin and heptachlor.	907SW	JK UJK
Aromatic Volatile Organics (AK 101)			
Holding Time	Samples were analyzed four days past established holding times.	214SB-900SB in report 9601.813	JK UJK
Surrogate	Surrogate recoveries exceeded established QC criteria.	276SB, 315SB	JH
	Surrogate recoveries were below the established QC criteria.	286SS, 269SS, 005SS, 219SB, 281SB, 005SS, 219SB, 281SB, 272SB, 024SS	JL UJL
Laboratory Control Sample	LCS recoveries were not reported	Sample results for reports 9601.729, 9601.810, 9601.812, 9601.813	JK UJK

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
Matrix Spike	Matrix Spike recovery did not meet established QC criteria.	325SB	JK UJK
Gasoline Range Organics (AK 101)			
Reporting Limits	Sample quantitation did not adhere to standard method criteria.	All project GRO Samples	JK UJK
Holding Time	Samples were analyzed two to four days past established holding time.	214SB-900SB in report 9601.813, 905GW, 906GW	JL UJL
Surrogate	Surrogate recoveries were not reported or diluted out.	029SB, 269SS, 273SB, 274SB, 283SB, 284SB, 327SB, 024SS	JK UJK
	Surrogate recoveries, exceeded established QC criteria.	004SB,012SB, 033SB, 270SB, 271SB, 276SB, 277SB, 292SB, 294SB, 298SB, 311SB, 312SB, 315SB, 322SB, 324SB, 325SB, 200SB, 216SB, 220SB, 240SB, 241SB, 339GW, 343GW	JH
	Surrogate recovery was below established QC criteria.	286SS	JL UJL
Diesel Range Organics (AK 102)			
Reporting Limits	Sample Quantitation did not adhere to standard method criteria.	All project DRO samples	JK UJK
Surrogate	Surrogate recoveries exceeded established QC criteria.	220SB, 222SB, 223SB, 278SB, 293SB, 311SB, 323SB, 070SS, 334GW, 344GW, 343GW, 338GW	JH
Laboratory Control Samples	LCS recoveries were below established QC criteria.	Sample results in reports 9601.796, 9601.797	JL UJL

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
Residual Range Organics (AK 103)			
Reporting Limits	Sample Quantitation did not adhere to standard method criteria.	All project RRO samples	JK UJK
Duplicate	Duplicate RPD exceeded established QC criteria.	246SB	JK UJK
Surrogate	Surrogate recovery was below established QC criteria.	313SB	JL UJL
Total Recoverable Petroleum Hydrocarbons (Method 418.1)			
Matrix Spike and Laboratory Control Sample	Matrix spike and LCS recoveries did not meet established QC criteria.	289SW	JK UJK
Metals (Methods 6010/6020/7000)			
Rinsate	Calcium was detected in the rinsate blank	All results less than ten times the blank concentration.	B
Matrix Spike	Matrix Spike RPD exceeded established QC criteria for copper.	Results for report 9601.684	JK UJK
	Matrix spike recoveries were below established QC criteria for antimony, cadmium, and silver.	Results for reports 9601.696, 9601.766, 9601.796, sample 236SD (for Na)	U
	Matrix spike recovery exceeded established QC criteria for copper.	Results for report 9601.696	JH
	Matrix spike recovery exceeded established QC criteria for mercury	Results for reports 9601.699, 9601.701, 9601.735	JH

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
	Matrix spike recovery exceeded established QC criteria for lead and vanadium.	Results for reports 9601.766	JH
	Matrix spike recoveries were below established QC criteria for cadmium, silver, mercury, and thallium.	Results for report 901.799	JL UJL
	Matrix spike recoveries were below established QC criteria for cobalt and sodium.	225SD, 303SD, 305SD, 306SD, 307SD, 224SB (Na only)	JL UJL
	Matrix spike recovery exceeded established QC criteria for vanadium.	224SB, 401SB, 403SB, 405SB, 407SB	JH
	Matrix spike recovery exceeded established QC criteria for arsenic, cadmium, chromium, zinc.	Results for report 9601.744	JH
	Matrix spike recoveries were below established QC criteria for silver and nickel.	Results for report 9601.744	JL UJL
	Matrix spike recoveries were below established QC criteria for arsenic.	Results for report 9601.764	JL UJL
	Matrix spike recovery exceeded established QC criteria for selenium.	345GW	JH
	Matrix spike recovery exceeded established QC criteria for arsenic and thallium.	Results for report 9601.797	JH
	Matrix spike recoveries were below established QC criteria for cadmium.	Results for report 9601.797	JL UJL

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
	Matrix spike recoveries exceeded established QC criteria for cadmium.	226SB, 308SB	JH
	Matrix spike recoveries were below established QC criteria for antimony	226SB, 308SB	JL UJL
	Matrix spike recoveries were below established QC criteria for copper and lead.	290GW	JL UJL
Duplicate	Duplicate RPD exceeded established QC criteria for copper.	Results for reports 9601.684, 9601.696, and samples 229SW, 301SW	JK UJK
	Duplicate RPD exceeded established QC criteria for arsenic and lead	Results for reports 9601.696	JK UJK
	Duplicate RPD exceeded established QC criteria for barium, copper, lead, magnesium, vanadium.	Results for reports 9601.699, 9601.701, 9601.735	JK UJK
	Duplicate RPD exceeded established QC criteria for chromium.	Results for reports 9601.766	JK UJK
	Duplicate RPD exceeded established QC criteria for sodium and zinc.	Results for report 9601.764	JK UJK
Laboratory Control Sample	LCS recoveries were below established QC criteria for silver	Results for reports 9601.696, 9601.766, 9601.744	JL UJL
	LCS recoveries were below established QC criteria for silver and arsenic.	Results for reports 9601.764	JL UJL
	LCS recoveries exceeded established QC criteria for silver	Results for report 9601.796	JH

Table 4-8

SUMMARY OF QUALIFIED DATA
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

QC Procedure	Problem Encountered	Affected Samples (96UMT-)	Data Qualifiers Applied/Action Taken
	LCS recoveries were below established QC criteria for sodium.	Results for report 9601.797	JL UJL
Dilution	Serial dilutions did not meet established QC criteria for copper and potassium.	Results for report 9601.766	JK UJK
	Serial dilutions did not meet established QC criteria for sodium.	Results for report 9601.764	JK UJK
	Serial dilutions did not meet established QC criteria for potassium and sodium.	Results for report 9601.796	JK UJK
	Serial dilutions did not meet established QC criteria for iron, sodium, and potassium.	Results for report 9601.797	JK UJK
Blank	Blanks did not meet established QC criteria for zinc.	239SW	B
Total Organic Carbon (Method 415.1 mod)			
Duplicate	Duplicate RPD exceeded established QC criteria.	002SB, 196SB, 202SB, 270SB, 247SB	JK UJK
Alkalinity (Method 310.1)			
Duplicate	Duplicate RPD exceeded established QC criteria.	278SB, 286SB, 322SB	JK UJK

* Data qualifiers were determined based on CQAR recommendations and "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", EPA 540/R-94/012, February 1994, and "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", EPA 540/R-94/013, February 1994.

Table 4-9

QUALITY CONTROL SAMPLE RESULTS - WATER TRIP BLANKS AND RINSATES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Type:	Rinsate	Rinsate	Trip Blank	Trip Blank	Trip Blank	Trip Blank
Sample Number (96-UMT-:)	309-SW	310-SW	903-GW	905-GW	906-GW	916-GW
Sample Date:	8/15/96	8/15/96	8/8/96	8/8/96	8/8/96	8/19/96
GRO	100 UJK	100 UJK	NA	100 UJK	100 UJK	100 UJK
DRO	100 UJK	100 UJK	NA	NA	NA	NA
TRPH	1000 U	1000 U	NA	NA	NA	NA
VOCs						
Acetone	10 UJK	10 UJK	2.72 B	10 UJK	10 UJK	10 UJK
Chloroform	1.01 B	5 U	2.31 B	5 U	5 U	1.45 B
Toluene	1.17 B	1.1 B	1.44 B	1.08 B	1.15 B	0.851 B
Metals						
Aluminum	23.9 U	23.9 U	NA	NA	NA	NA
Antimony	4.9 U	4.9 U	NA	NA	NA	NA
Arsenic	4.3 UJL	4.3 UJL	NA	NA	NA	NA
Barium	1.8 U	1.8 U	NA	NA	NA	NA
Beryllium	0.2 U	0.2 U	NA	NA	NA	NA
Cadmium	2.6 U	2.6 U	NA	NA	NA	NA
Calcium	24.4 J	50.7 J	NA	NA	NA	NA
Chromium	4.2 U	4.2 U	NA	NA	NA	NA
Cobalt	3.4 U	3.4 U	NA	NA	NA	NA
Copper	2.5 U	2.5 U	NA	NA	NA	NA
Iron	5.3 U	5.3 U	NA	NA	NA	NA
Lead	2.8 U	2.8 U	NA	NA	NA	NA
Magnesium	59.1 U	59.1 U	NA	NA	NA	NA
Manganese	0.8 U	0.8 U	NA	NA	NA	NA
Mercury	0.1 U	0.1 U	NA	NA	NA	NA
Nickel	8.6 U	8.6 U	NA	NA	NA	NA
Potassium	33.7 U	33.7 U	NA	NA	NA	NA
Selenium	4.2 U	4.2 U	NA	NA	NA	NA
Silver	2.1 UJL	2.1 UJL	NA	NA	NA	NA
Sodium	37.8 UJK	37.8 UJK	NA	NA	NA	NA
Thallium	3 U	3 U	NA	NA	NA	NA
Vanadium	3.6 U	3.6 U	NA	NA	NA	NA
Zinc	1.7 UJK	1.7 UJK	NA	NA	NA	NA

Table 4-9

QUALITY CONTROL SAMPLE RESULTS - SOIL TRIP BLANKS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Type:	**Trip Blank**	**Trip Blank**	**Trip Blank**	**Trip Blank**	**Trip Blank**
Sample Number (96-UMT-:)	**237-SB**	**239-SB**	**240-SB-TB**	**900-SB**	**901-SB**
Sample Date:	**8/8/96**	**8/8/96**	**8/8/96**	**8/8/96**	**8/8/96**
GRO	5 UJK	5 UJK	6.6 UJK	5 UJK	5 UJK
Benzene	NA	0.08 U	0.11 U	0.08 UJK	0.08 UJK
Ethylbenzene	NA	0.09 U	0.12 U	0.09 UJK	0.09 UJK
Toluene	NA	0.12 U	0.16 U	0.12 UJK	0.12 UJK
Total Xylenes	NA	0.25 U	0.33 U	0.25 UJK	0.25 UJK

Table 4-10

BACKGROUND SOIL SAMPLE LABORATORY ANALYTICAL RESULTS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-17	MW-17	MW-18	MW-18	MW-19	MW-19	605-SL	
Sample Number (96-UMT-:)	316-SS	317-SB	318-SS	319-SB	320-SS	321-SB	605-SL	
Depth (feet BGS:)	0	2	0	3	0	3	0	Screening
Sample Date:	8/16/96	8/16/96	8/16/96	8/16/96	8/16/96	8/16/96	12/3/96	Value
GRO	6.2 UJK	7.2 JK	NA	NA	NA	NA	NA	100
DRO	9.8 JK	18 JK	NA	NA	NA	NA	NA	200
RRO	37 JK	51 JK	NA	NA	NA	NA	NA	NL
BTEX	ND	ND	NA	NA	NA	NA	NA	NL
VOCs								
1,3,5-Trimethylbenzene	0.00999 JH	0.0062 U	NA	NA	NA	NA	NA	3900
Benzene	0.00607 U	0.00265 JH	NA	NA	NA	NA	NA	0.5
p-Cymene	0.0083 JH	0.0062 U	NA	NA	NA	NA	NA	NL
Total BTEX	0 U	0.00265	NA	NA	NA	NA	NA	10
BNAs								
4-Methylphenol	0.299 J	0.407 U	NA	NA	NA	NA	NA	390
Pest/PCBs								
4,4'-DDE	0.00127 JH	0.00247 U	NA	NA	NA	NA	0.00240 U	1.9
4,4'-DDT	0.00264 JL	0.00617 UJL	NA	NA	NA	NA	0.00523 J	1.9
Metals								
Aluminum	6160	7920	5560	3940	7220	6890	NA	78000
Antimony	7.1 UJL	7 UJL	6.7 UJL	6.3 UJL	7.2 UJL	6.7 UJL	NA	31
Arsenic	6.4	5.2	5.8	4	5.3	4.7	NA	6.4
Barium	351	391	283	209	363	333	NA	5500
Beryllium	0.19 J	0.22 J	0.18 J	0.09 J	0.24 J	0.22 J	NA	0.24
Cadmium	0.31 UJL	0.31 UJL	0.3 UJL	0.28 UJL	0.32 UJL	0.3 UJL	NA	39
Calcium	2050	2780	1950	1520	2750	2440	NA	
Chromium	12.2 JK	15.9 JK	10.4 JK	7 JK	14.3 JK	12.9 JK	NA	390
Cobalt	9.3	10.2	7.6	6.3	9.6	8.6	NA	14000
Copper	24.5 JK	18.9 JK	19.4 JK	16.3 JK	19.7 JK	18.8 JK	NA	3100
Iron	19800	21200	16900	12500	19300	17500	NA	23000

Table 4-10

BACKGROUND SOIL SAMPLE LABORATORY ANALYTICAL RESULTS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-17	MW-17	MW-18	MW-18	MW-19	MW-19	605-SL	
Sample Number (96-UMT-:)	316-SS	317-SB	318-SS	319-SB	320-SS	321-SB	605-SL	
Depth (feet BGS:)	0	2	0	3	0	3	0	Screening
Sample Date:	8/16/96	8/16/96	8/16/96	8/16/96	8/16/96	8/16/96	12/3/96	Value
Lead	6.2 JH	6.2 JH	6.3 JH	4.2 JH	6.6 JH	5.7 JH	NA	400
Magnesium	3160	3870	2880	1940	3750	3310	NA	NL
Manganese	547	623	511	511	581	538	NA	1800
Mercury	0.05	0.02 U	0.05	0.02 U	0.06	0.05	NA	23
Nickel	26.2	28.6	23	18.2	26.3	24.9	NA	1600
Potassium	558 JK	763 JK	495 JK	312 JK	871 JK	876 JK	NA	NL
Selenium	0.53 J	0.83	0.47 U	0.44 U	0.5 U	0.47 U	NA	390
Silver	0.25 UJL	0.25 UJL	0.24 UJL	0.23 UJL	0.26 UJL	0.24 UJL	NA	390
Sodium	61.9	66.1	68.5	53.8	63.6	76	NA	NL
Thallium	0.36 U	0.36 U	0.34 U	0.32 U	0.37 U	0.34 U	NA	NL
Vanadium	23.9 JH	26 JH	20.6 JH	14.7 JH	23.7 JH	22.4 JH	NA	550
Zinc	53.6	59.6	47.9	34.9	55.7	47.9	NA	23000

Table 4-11

BACKGROUND FIELD LABORATORY PCB RESULTS (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
MW-17	5216-FL	0	0.76	0.3	<1
MW-17	5217-FL	2	0.75	0.32	<1
MW-18	5218-FL	0	0.74	0.35	<1
MW-18	5219-FL	3	0.77	0.27	<1
MW-19	5220-FL	0	0.9	0.7	<1
MW-19	5221-FL	3	0.83	0.84	<1

Table 4-12

BACKGROUND FIELD LABORATORY CHLORINATED PESTICIDES (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
MW-17	5216-FL	0	0.48	0.01	<.2
MW-17	5217-FL	2	0.48	0.01	<.2
MW-18	5218-FL	0	0.43	0.03	<.2
MW-18	5219-FL	3	0.33	0.34	.2-1
MW-19	5220-FL	0	0.42	0.11	<.2
MW-19	5221-FL	3	0.5	0.06	<.2

Table 4-13

BACKGROUND FIELD LABORATORY PETROLEUM HYDROCARBON (DRO in PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
MW-17	5216-FL	0	0.5	6.52	<25
MW-17	5217-FL	2	0.37	6.00	<25
MW-18	5218-FL	0	0.38	5.31	<25
MW-18	5219-FL	3	0.36	6.79	<25
MW-19	5220-FL	0	0.48	15.48	<25
MW-19	5221-FL	3	0.47	16.67	<25

Table 4-14

BACKGROUND GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-17	MW-17	MW-18	MW-18	MW-19	MW-19	
Sample Number (96-UMT-:)	345-GW	345-GW-F	346-GW	346-GW-F	347-GW	347-GW-F	
Depth (feet BGS:)	1.25	1.25	2.56	2.56	2.60	2.60	
Sample Date:	8/19/96	8/19/96	8/20/96	8/20/96	8/20/96	8/20/96	Value
GRO	128 JK	NA	100 UJK	NA	100 UJK	NA	NL
DRO	151 JK	NA	100 UJK	NA	262 JK	NA	NL
TRPH	1000 U	NA	1000 U	NA	1000 U	NA	NL
VOCs							
Acetone	3.32 BJK	NA	4.2 BJK	NA	4.79 BJK	NA	NL
Metals							
Aluminum	231000	73.3 J	42000	84.8 J	146000	66.8 J	200 (s)
Antimony	58.7 UJL	4.9 U	58.7 UJL	4.9 U	58.7 UJL	4.9 U	6
Arsenic	123	4.3 U	29.9	4.3 U	95.1	4.3 U	50
Barium	16300	549	2650	267	9260	1110	2000
Beryllium	11.6	0.2 U	1.7 J	0.2 U	6.6	0.2 U	4
Cadmium	2.6 UJL	2.6 UJL	2.6 UJL	2.6 UJL	2.6 UJL	2.6 UJL	5
Calcium	170000	45400	37900	38900	99800	31300	NL
Chromium	456	4.2 U	84.1	4.2 U	298	4.2 U	100
Cobalt	404	4.3 J	61.3	3.4 U	253	7.9 J	NL
Copper	848	5.7 J	130	13.8 J	505	13.2 J	1000 (s)
Iron	697000	267 JK	114000	51.7 JK	400000	415 JK	300 (s)
Lead	274	2.8 U	53.5	2.8 U	190	2.8 U	15
Magnesium	146000	20800	32000	20300	100000	13000	NL
Manganese	37400	6790	5120	1340	21900	9840	50 (s)
Mercury	1	0.1 U	0.38	0.1 U	0.69	0.1 U	2
Nickel	1060	6.4 J	152	4.7 U	633	4.7 U	100
Potassium	19400 JK	2030 JK	5940 JK	1280 JK	12000 JK	1310 JK	NL
Selenium	25 JH	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	50
Silver	2.1 UJL	2.1 U	2.1 UJL	2.1 U	2.1 UJL	2.1 U	100 (s)
Sodium	6160 JK	2700 JL	2700 JK	1810 JL	3560 JK	1800 JL	250000 (s)

Table 4-14

BACKGROUND GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-17	MW-17	MW-18	MW-18	MW-19	MW-19	
Sample Number (96-UMT-:)	345-GW	345-GW-F	346-GW	346-GW-F	347-GW	347-GW-F	
Depth (feet BGS:)	1.25	1.25	2.56	2.56	2.60	2.60	
Sample Date:	8/19/96	8/19/96	8/20/96	8/20/96	8/20/96	8/20/96	Value
Thallium	6.6	4.9 JH	3 U	3 U	3.9 J	3 U	2
Vanadium	657	3.6 U	121	3.6 U	425	3.6 U	NL
Zinc	2300	9.4 J	346	12.5	1370	18.8	5000 (s)

Table 4-15

BACKGROUND SEDIMENT SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	BKA	BKB	BKC	BKC	BKL1	BKL1	BKL2	BKL3	
Sample Number (96-UMT-:)	234-SD	236-SD	238-SD	906-SD	306-SD	307-SD	303-SD	305-SD	Screening
Sample Date:	8/11/96	8/11/96	8/11/96	8/11/96	8/15/96	8/15/96	8/15/96	8/15/96	Value
RRO	47 UJK	51 UJK	NA	49 UJK	360 JK	140 JK	33 JK	250 JK	NL
VOCs									
2-Butanone	0.0122 UJL	0.0128 UJL	NA	0.0123 UJL	0.0524 JL	0.0366 JL	0.0109 JL	0.0129 JL	47000
Acetone	0.00193 B	0.00447 B	NA	0.0123 UJL	0.247 B	0.142 B	0.0382 B	0.0426 B	7800
Carbon disulfide	0.00608 U	0.00639 U	NA	0.00616 U	0.0125 U	0.00568 JH	0.00579 U	0.00801 U	NL
Methylene chloride	0.00608 U	0.00129 JH	NA	0.00712	0.0125 U	0.00449 B	0.00139 BJ	0.0032 BJ	85
BNAs									
4-Methylphenol	0.388 U	0.421 U	NA	0.403 U	0.278 J	1.1 U	0.393 U	1.1 U	390
bis(2-Ethylhexyl)phthalate	0.043 JB	0.0619 JB	NA	0.403 U	0.856 U	1.1 U	0.0554 J	1.1 U	46
Pest/PCBs									
4,4'-DDD	0.00942 U	0.0102 U	NA	0.00976 U	0.026 U	0.0166 U	0.00238 U	0.0672 JK	2.7
Metals									
Aluminum	4010	7870	3990	NA	14400	9810	9330	11100	78000
Antimony	5.8 U	7.1 U	7 U	NA	1.5 J	0.78 U	0.72 J	0.89 J	31
Arsenic	4.1	6.9	4.1	NA	7.1	4.5	3.7	6.1	7.1
Barium	177 JK	406 JK	217 JK	NA	486	304	288	334	5500
Beryllium	0.15 J	0.35 J	0.13 J	NA	0.76 J	0.48 J	0.41 J	0.56 J	0.76
Cadmium	0.26 U	0.31 U	0.31 U	NA	0.68 UJL	0.41 UJL	0.27 UJL	0.38 UJL	39
Calcium	1720	3040	1580	NA	5220	2530	2090	2190	NL
Chromium	7.9	16.5	6.9	NA	29.2	19.3	17.5	20.4	390
Cobalt	6.6	11.9	5.2	NA	22.8 JL	13.7 JL	14.8 JL	8.9 JL	14000
Copper	13.7 JK	17.8 JK	13.2 JK	NA	175	58.4	21.8	31	3100
Iron	13900	24500	12000	NA	27700	18700	23600	20900	27700
Lead	5.3 JK	7.8 JK	4.7 JK	NA	16.6	9.9	9.2	11.8	400
Magnesium	2140 JK	4350 JK	1980 JK	NA	6130	4250	4150	4460	NL
Manganese	396	584	328	NA	832	397	1520	532	1800
Mercury	0.03 JH	0.04 JH	0.02 U	NA	0.28 JL	0.13 JL	0.05 JL	0.05 JL	23

Table 4-15

BACKGROUND SEDIMENT SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	BKA	BKB	BKC	BKC	BKL1	BKL1	BKL2	BKL3	
Sample Number (96-UMT-:)	234-SD	236-SD	238-SD	906-SD	306-SD	307-SD	303-SD	305-SD	Screening
Sample Date:	8/11/96	8/11/96	8/11/96	8/11/96	8/15/96	8/15/96	8/15/96	8/15/96	Value
Nickel	18.7	30.5	17.7	NA	82.6	45.4	35.5	32.1	1600
Potassium	331	816	502	NA	1070 J	702 J	791	574 J	NL
Selenium	0.4 U	0.49 U	0.49 U	NA	1.1 U	0.66 U	0.43 U	0.62 U	390
Silver	0.21 U	0.25 U	0.25 U	NA	0.55 UJL	0.33 UJL	0.22 UJL	0.31 UJL	390
Sodium	69.2 U	119	83.6 U	NA	165 JL	95.9 JL	94.1 JL	89.8 JL	NL
Thallium	0.29 U	0.36 U	0.36 U	NA	0.78 UJL	0.47 UJL	0.31 UJL	0.44 UJL	NL
Vanadium	14.1 JK	26.1 JK	14.4 JK	NA	35.2	24.2	24.9	29.1	550
Zinc	40.2	73.3	48.9	NA	148	91.8	83.5	91.2	23000

Table 4-16

BACKGROUND SURFACE WATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	BKA	BKA	BKB	BKB	BKC	BKC	BKL-1	BKL-1	
Sample Number (96-UMT-:)	235-SW	235-SW-F	237-SW	237-SW-F	239-SW	239-SW-F	299-SW	299-SW-F	Screening
Sample Date:	8/11/96	8/11/96	8/11/96	8/11/96	8/11/96	8/11/96	8/15/96	8/15/96	Value
VOCs									
Acetone	10 U	NA	10 U	NA	10 U	NA	10 UJK	NA	NL
Metals									
Aluminum	377	23.9 U	385	23.9 U	167	23.9 U	30.4 J	23.9 U	200 (s)
Antimony	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	6
Arsenic	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 UJL	4.3 UJL	50
Barium	84.4	73.1	81.1	75.9	78.4	68.2	62.6	60.2	2000
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	4
Cadmium	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	5
Calcium	15600	14900	15000	15500	15300	13900	9230	8830	NL
Chromium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	100
Cobalt	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	NL
Copper	5.6 J	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	10.8 J	2.5 U	1000 (s)
Iron	848	47.7 J	857	68	415	45 J	250	19.8 J	300 (s)
Lead	2.8 U	2.8 U	2.8 U	3.7 J	3.1 J	2.8 U	2.8 U	2.8 U	15
Magnesium	6200	5830	5960	6070	6010	5420	3970	3800	NL
Manganese	20	5.2 J	18.6	5.5 J	10.8	3.6 J	108	83.7	50 (s)
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2
Nickel	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	12.9 JL	8.6 UJL	8.6 U	8.6 U	100
Potassium	505	420 J	513	442 J	455 J	404 J	340 J	336 J	NL
Selenium	4.2 U	4.2 U	4.2 U	4.2 U	5.3	4.2 U	4.2 U	4.2 U	50
Silver	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	100 (s)
Sodium	1970	1950	1940	2240	1930	1770	5320 JK	5250 JK	250000 (s)
Thallium	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	2
Vanadium	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	NL
Zinc	6.9 JH	5.4 JH	7.7 JH	9.1 JH	6.9 BJH	28.6 JH	1.7 UJK	9 JK	5000 (s)

Table 4-16

BACKGROUND SURFACE WATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	BKL-1	BKL-1	BKL-2	BKL-2	BKL-3	BKL-3	
Sample Number (96-UMT-:)	300-SW	300-SW-F	302-SW	302-SW-F	304-SW	304-SW-F	Screening
Sample Date:	8/15/96	8/15/96	8/15/96	8/15/96	8/15/96	8/15/96	Value
VOCs							
Acetone	10 UJK	NA	10 UJK	NA	3.82 BJK	NA	NL
Metals							
Aluminum	NA	23.9 U	40.6 J	23.9 U	35.1 J	23.9 U	200 (s)
Antimony	NA	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	6
Arsenic	NA	4.3 UJL	4.3 UJL	4.3 UJL	4.3 UJL	4.3 UJL	50
Barium	NA	58.4	59.9	58.7	59.3	58.1	2000
Beryllium	NA	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	4
Cadmium	NA	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	5
Calcium	NA	8630	8910	8620	8750	8560	NL
Chromium	NA	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	100
Cobalt	NA	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	NL
Copper	NA	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1000 (s)
Iron	NA	15.8 J	220	6.8 J	216	5.3 U	300 (s)
Lead	NA	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	15
Magnesium	NA	3700	3850	3720	3790	3690	NL
Manganese	NA	95.8	28.8	23.9	31.3	31.4	50 (s)
Mercury	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2
Nickel	NA	8.6 U	8.6 U	8.6 U	8.6 U	8.6 U	100
Potassium	NA	335 J	363 J	362 J	384 J	375 J	NL
Selenium	NA	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	50
Silver	NA	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	100 (s)
Sodium	NA	4990 JK	5260 JK	5190 JK	5070 JK	5210 JK	250000 (s)
Thallium	NA	3 U	3 U	3 U	3 U	3 U	2
Vanadium	NA	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	NL
Zinc	NA	1.7 UJK	1.7 UJK	1.7 UJK	1.7 UJK	1.7 UJK	5000 (s)

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-1	MW-1	MW-2	MW-2	MW-2	SB-1	SB-1	SB-2	
Sample Number (96-UMT-:)	001-SS	002-SB	003-SS	004-SS	006-SB	013-SS	029-SB	014-SS	
Duplicate Sample (96-UMT-:)			004-SS	003-SS					
Depth (feet BGS:)	0	5	0	0	4	0	5	0	Screening
Sample Date:	8/8/96	8/8/96	8/8/96	8/8/96	8/8/96	8/8/96	8/9/96	8/8/96	Value
GRO	5.4 UJK	16 JK	NA	390 JK	460 JK	5.4 UJK	1800 JK	5.8 UJK	100
DRO	22000 JK	25 JK	17000 JK	14000 JK	2600 JK	89	190 JK	120	200
RRO	24000 JK	43 UJK	4000 JK	4300 JK	260 JK	620 JK	32 JK	450 JK	2000
BTEX									
Benzene	0.087 U	0.087 U	NA	0.41 J	0.94	0.086 U	NA	0.093 U	0.5
Ethylbenzene	0.098 U	0.098 U	NA	0.68	1.3	0.097 U	NA	0.1 U	7800
Toluene	0.13 U	0.13 U	NA	0.81	0.67	0.13 U	NA	0.14 U	16000
Total Xylenes	0.27 U	0.27 U	NA	5	13	0.27 U	NA	0.29 U	160000
Total BTEX	0 U	0 U	NA	6.9	15.91	0 U	NA	0 U	10
VOCs									
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	0.00537 UJK	0.99 JH	0.00579 UJK	3900
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	0.00537 UJK	0.328 JH	0.00579 UJK	3900
2-Butanone	NA	NA	NA	NA	NA	0.0107 UJL	0.014 UJL	0.0116 UJL	47000
Acetone	NA	NA	NA	NA	NA	0.0107 UJL	0.014 UJL	0.0116 UJL	7800
Benzene	NA	NA	NA	NA	NA	0.00537 UJK	1.07 JH	0.00579 UJK	0.5
Ethylbenzene	NA	NA	NA	NA	NA	0.00537 UJK	0.508 JH	0.00579 UJK	7800
Isopropylbenzene	NA	NA	NA	NA	NA	0.00537 UJK	0.0824 JH	0.00579 UJK	3100
Methylene chloride	NA	NA	NA	NA	NA	0.00305 JK	0.00699 U	0.00279 JK	85
n-Butylbenzene	NA	NA	NA	NA	NA	0.00537 UJK	0.00699 U	0.00579 UJK	780
n-Propylbenzene	NA	NA	NA	NA	NA	0.00537 UJK	0.176 JH	0.00579 UJK	NL
Naphthalene	NA	NA	NA	NA	NA	0.00117 JK	0.487 JH	0.00579 UJK	3100
o-Xylene	NA	NA	NA	NA	NA	0.00537 UJK	0.322 JH	0.00579 UJK	160000
p-Cymene	NA	NA	NA	NA	NA	0.00537 UJK	0.336 JH	0.00579 UJK	NL
sec-Butylbenzene	NA	NA	NA	NA	NA	0.00537 UJK	0.2 JH	0.00579 UJK	780
Styrene	NA	NA	NA	NA	NA	0.00537 UJK	0.00699 U	0.00579 UJK	16000

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-1	MW-1	MW-2	MW-2	MW-2	SB-1	SB-1	SB-2	
Sample Number (96-UMT-:)	001-SS	002-SB	003-SS	004-SS	006-SB	013-SS	029-SB	014-SS	
Duplicate Sample (96-UMT-:)			004-SS	003-SS					
Depth (feet BGS:)	0	5	0	0	4	0	5	0	Screening
Sample Date:	8/8/96	8/8/96	8/8/96	8/8/96	8/8/96	8/8/96	8/9/96	8/8/96	Value
Toluene	NA	NA	NA	NA	NA	0.00537 UJK	0.738 JH	0.00579 UJK	16000
Total BTEX	NA	NA	NA	NA	NA	0 U	3.39	0 U	10
Total Xylenes	NA	NA	NA	NA	NA	0.00537 UJK	1.08 JH	0.00579 UJK	160000
Xylene (m + p)	NA	NA	NA	NA	NA	0.00537 UJK	0.752 JH	0.00579 UJK	160000
BNAs									
2-Methylnaphthalene	NA	NA	NA	NA	NA	0.102 J	1.63	0.389 U	3100
Benzoic acid	NA	NA	NA	NA	NA	1.77 U	2.27 U	1.89 U	310000
Benzyl alcohol	NA	NA	NA	NA	NA	0.365 U	0.468 U	0.389 U	23000
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	0.168 JB	0.468 U	0.0536 JB	46
Butylbenzylphthalate	NA	NA	NA	NA	NA	0.0391 J	0.468 U	0.389 U	16000
di-n-Octylphthalate	NA	NA	NA	NA	NA	0.365 U	0.468 U	0.389 U	NL
Fluoranthene	NA	NA	NA	NA	NA	0.365 U	0.0501 J	0.389 U	3100
Naphthalene	NA	NA	NA	NA	NA	0.0417 J	0.919	0.389 U	3100
Phenanthrene	NA	NA	NA	NA	NA	0.365 U	0.0606 J	0.389 U	NL
Pyrene	NA	NA	NA	NA	NA	0.365 U	0.468 U	0.389 U	2300
Pest/PCBs									
4,4'-DDD	NA	NA	NA	NA	NA	0.397	0.0348	0.13	2.7
4,4'-DDE	NA	NA	NA	NA	NA	0.0553 U	0.00567 U	0.0471 U	1.9
4,4'-DDT	NA	NA	NA	NA	NA	0.477	0.0142 U	0.167	1.9
Metals									
Copper	NA	NA	NA	NA	NA	57.2	27.2 JH	16.5	3100
Lead	NA	NA	NA	NA	NA	274	9.3 JK	16.9	400
Total Organic Carbon	NA	85400 JK	NA	NA	NA	NA	NA	NA	NL

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-2	SB-3	SB-3	SB-4	SB-4	SB-12	SB-12	
Sample Number (96-UMT-:)	028-SB	015-SS	033-SB	016-SS	027-SB	018-SS	031-SB	
Duplicate Sample (96-UMT-:)								
Depth (feet BGS:)	3	0	3	0	1.5	0	4	Screening
Sample Date:	8/9/96	8/896	8/10/96	8/8/96	8/9/96	8/9/96	8/9/96	Value
GRO	8.2 UJK	7.5 UJK	62 JK	5.3 UJK	25 JK	40	7.6 JK	100
DRO	29 JK	31	41 JK	25	4.5 JK	NA	9 JK	200
RRO	200 JK	300 JK	65 JK	83 JK	44 UJK	NA	51 UJK	2000
BTEX								
Benzene	NA	0.12 U	NA	0.084 U	NA	NA	NA	0.5
Ethylbenzene	NA	0.14 U	NA	0.095 U	NA	NA	NA	7800
Toluene	NA	0.18 U	NA	0.13 U	NA	NA	NA	16000
Total Xylenes	NA	0.38 U	NA	0.26 U	NA	NA	NA	160000
Total BTEX	NA	0 U	NA	0 U	NA	NA	NA	10
VOCs								
1,2,4-Trimethylbenzene	0.00364 JH	0.00754 UJK	0.971 JH	0.00527 U	0.0231 JH	0.00542 UJL	0.0028 JH	3900
1,3,5-Trimethylbenzene	0.00175 JH	0.00754 UJK	0.532 JH	0.00527 U	0.0029 JH	0.00542 UJL	0.00806 JH	3900
2-Butanone	0.0128 JL	0.0164 JL	0.051 UJL	0.0105 UJL	0.0107 UJL	0.0108 UJL	0.0124 UJL	47000
Acetone	0.0979 B	0.263 BJK	0.0339 B	0.0105 UJL	0.00475 B	0.0108 UJL	0.0124 UJL	7800
Benzene	0.0215 JH	0.00754 UJK	0.0255 U	0.00527 U	0.00229 JH	0.00542 UJL	0.0158 JH	0.5
Ethylbenzene	0.00906 JH	0.00754 UJK	1.44 JH	0.00527 U	0.00616 JH	0.00542 UJL	0.00226 JH	7800
Isopropylbenzene	0.00785 U	0.00754 UJK	0.604 JH	0.00527 U	0.00264 JH	0.00542 UJL	0.00618 U	3100
Methylene chloride	0.00785 U	0.00836 JK	0.0255 U	0.0018 J	0.00534 U	0.00209 JL	0.00618 U	85
n-Butylbenzene	0.00785 U	0.00754 UJK	0.0255 U	0.00527 U	0.00426 JH	0.00542 UJL	0.00618 U	780
n-Propylbenzene	0.00785 U	0.00754 UJK	0.476 JH	0.00527 U	0.00455 JH	0.00542 UJL	0.00618 U	NL
Naphthalene	0.00285 JH	0.00754 UJK	0.0154 JH	0.00527 U	0.0112 JH	0.00542 UJL	0.00618 U	3100
o-Xylene	0.0349 JH	0.00754 UJK	1.91 JH	0.00527 U	0.00525 JH	0.00542 UJL	0.00538 JH	160000
p-Cymene	0.00785 U	0.00754 UJK	0.156 JH	0.00527 U	0.00732 JH	0.00542 UJL	0.00215 JH	NL
sec-Butylbenzene	0.00785 U	0.00754 UJK	0.115 JH	0.00527 U	0.00355 JH	0.00542 UJL	0.00618 U	780
Styrene	0.00785 U	0.0016 JK	0.0255 U	0.00527 U	0.00534 U	0.00542 UJL	0.00618 U	16000

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-2	SB-3	SB-3	SB-4	SB-4	SB-12	SB-12	
Sample Number (96-UMT-:)	028-SB	015-SS	033-SB	016-SS	027-SB	018-SS	031-SB	
Duplicate Sample (96-UMT-:)								
Depth (feet BGS:)	3	0	3	0	1.5	0	4	Screening
Sample Date:	8/9/96	8/896	8/10/96	8/8/96	8/9/96	8/9/96	8/9/96	Value
Toluene	0.00462 B	0.00754 UJK	0.324 JH	0.00527 U	0.00534 U	0.00542 UJL	0.00249 B	16000
Total BTEX	0.08628	0 U	6.864	0 U	0.0229	0 U	0.02926	10
Total Xylenes	0.0506 JH	0.00754 UJK	5.09 JH	0.00527 U	0.0145 JH	0.00542 UJL	0.00865 JH	160000
Xylene (m + p)	0.0162 JH	0.00754 UJK	3.19 JH	0.00527 U	0.0092 JH	0.00542 UJL	0.00333 JH	160000
BNAs								
2-Methylnaphthalene	0.541 U	0.0872 J	0.354 U	0.0507 J	0.0821 J	0.364 U	0.424 U	3100
Benzoic acid	2.62 U	0.526 J	1.71 U	1.71 U	1.74 U	1.77 U	2.06 U	310000
Benzyl alcohol	0.541 U	0.113 J	0.354 U	0.352 U	0.36 U	0.364 U	0.424 U	23000
bis(2-Ethylhexyl)phthalate	0.541 U	0.193 JB	0.0541 J	0.048 JB	0.0392 J	0.156 JB	0.0536 J	46
Butylbenzylphthalate	0.541 U	0.446 U	0.354 U	0.352 U	0.36 U	0.364 U	0.424 U	16000
di-n-Octylphthalate	0.541 U	0.446 U	0.354 U	0.352 U	0.36 U	0.364 U	0.424 U	NL
Fluoranthene	0.541 U	0.446 U	0.354 U	0.352 U	0.36 U	0.364 U	0.424 U	3100
Naphthalene	0.541 U	0.446 U	0.354 U	0.352 U	0.0532 J	0.364 U	0.424 U	3100
Phenanthrene	0.541 U	0.446 U	0.354 U	0.352 U	0.36 U	0.364 U	0.424 U	NL
Pyrene	0.541 U	0.446 U	0.354 U	0.352 U	0.36 U	0.364 U	0.424 U	2300
Pest/PCBs								
4,4'-DDD	0.00885 J	0.0707 J	NA	0.762	0.326	NA	0.0163	2.7
4,4'-DDE	0.0131 U	0.27 U	NA	0.533 U	0.0283	NA	0.00257 U	1.9
4,4'-DDT	0.0328 U	2.73	NA	4.67	0.246	NA	0.0201	1.9
Metals								
Copper	25.5 JH	13.9	NA	45	8 JH	NA	19 JH	3100
Lead	8.6 JK	15.5	NA	36.8	2.7 JK	NA	6.2 JK	400
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NL

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-13	SB-13	SB-21	SB-23	SB-25	SB-25	
Sample Number (96-UMT-:)	019-SS	032-SB	009-SS	010-SB	011-SB	012-SB	
Duplicate Sample (96-UMT-:)					012-SB	011-SB	
Depth (feet BGS:)	0	3	0	3.5	3.5	3.5	Screening
Sample Date:	8/9/96	8/10/96	8/9/96	8/9/96	8/9/96	8/9/96	Value
GRO	5.4 U	5.6 UJK	5.5 UJK	5.8 UJK	NA	640 JK	100
DRO	14	4.5 UJK	56 JK	9.7 JK	80 JK	56 JK	200
RRO	170 JK	45 UJK	110 JK	28 JK	36 JK	27 JK	2000
BTEX							
Benzene	NA	NA	0.088 U	0.29	NA	12	0.5
Ethylbenzene	NA	NA	0.099 U	0.11	NA	6.1	7800
Toluene	NA	NA	0.13 U	0.14 U	NA	5.7	16000
Total Xylenes	NA	NA	0.28 U	0.29 U	NA	31	160000
Total BTEX	NA	NA	0 U	0.4	NA	54.8	10
VOCs							
1,2,4-Trimethylbenzene	0.00533 U	0.0031 JH	NA	NA	NA	NA	3900
1,3,5-Trimethylbenzene	0.00533 U	0.00115 JH	NA	NA	NA	NA	3900
2-Butanone	0.0107 UJL	0.0112 UJL	NA	NA	NA	NA	47000
Acetone	0.0107 UJL	0.0112 UJL	NA	NA	NA	NA	7800
Benzene	0.00533 U	0.00117 JH	NA	NA	NA	NA	0.5
Ethylbenzene	0.00533 U	0.00562 U	NA	NA	NA	NA	7800
Isopropylbenzene	0.00533 U	0.00562 U	NA	NA	NA	NA	3100
Methylene chloride	0.00177 J	0.00562 U	NA	NA	NA	NA	85
n-Butylbenzene	0.00533 U	0.00562 U	NA	NA	NA	NA	780
n-Propylbenzene	0.00533 U	0.00562 U	NA	NA	NA	NA	NL
Naphthalene	0.00533 U	0.00247 JH	NA	NA	NA	NA	3100
o-Xylene	0.00533 U	0.00562 U	NA	NA	NA	NA	160000
p-Cymene	0.00533 U	0.00181 JH	NA	NA	NA	NA	NL
sec-Butylbenzene	0.00533 U	0.00562 U	NA	NA	NA	NA	780
Styrene	0.00533 U	0.00562 U	NA	NA	NA	NA	16000

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-13	SB-13	SB-21	SB-23	SB-25	SB-25	
Sample Number (96-UMT-:)	019-SS	032-SB	009-SS	010-SB	011-SB	012-SB	
Duplicate Sample (96-UMT-:)					012-SB	011-SB	
Depth (feet BGS:)	0	3	0	3.5	3.5	3.5	Screening
Sample Date:	8/9/96	8/10/96	8/9/96	8/9/96	8/9/96	8/9/96	Value
Toluene	0.00533 U	0.00562 U	NA	NA	NA	NA	16000
Total BTEX	0 U	0.00117	NA	NA	NA	NA	10
Total Xylenes	0.00533 U	0.00562 U	NA	NA	NA	NA	160000
Xylene (m + p)	0.00533 U	0.00562 U	NA	NA	NA	NA	160000
BNAs							
2-Methylnaphthalene	0.357 U	0.741 U	NA	NA	NA	NA	3100
Benzoic acid	1.73 U	3.71 U	NA	NA	NA	NA	310000
Benzyl alcohol	0.357 U	0.741 U	NA	NA	NA	NA	23000
bis(2-Ethylhexyl)phthalate	0.0501 JB	0.741 U	NA	NA	NA	NA	46
Butylbenzylphthalate	0.357 U	0.741 U	NA	NA	NA	NA	16000
di-n-Octylphthalate	0.357 U	0.741 U	NA	NA	NA	NA	NL
Fluoranthene	0.357 U	0.741 U	NA	NA	NA	NA	3100
Naphthalene	0.357 U	0.741 U	NA	NA	NA	NA	3100
Phenanthrene	0.357 U	0.741 U	NA	NA	NA	NA	NL
Pyrene	0.357 U	0.741 U	NA	NA	NA	NA	2300
Pest/PCBs							
4,4'-DDD	0.0243 J	0.0494	NA	NA	NA	NA	2.7
4,4'-DDE	0.0126 J	0.00898 U	NA	NA	NA	NA	1.9
4,4'-DDT	1.2	0.0498	NA	NA	NA	NA	1.9
Metals							
Copper	NA	17.7 JH	NA	NA	NA	NA	3100
Lead	NA	7.3 JK	NA	NA	NA	NA	400
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NL

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-27	SB-30	SB-32	SB-32	SB-37	SB-41	
Sample Number (96-UMT-:)	020-SB	021-SS	022-SB	023-SB	026-SB	030-SB	
Duplicate Sample (96-UMT-:)			023-SB	022-SB			
Depth (feet BGS:)	4.5	0	1.5	1.5	4.6	4	Screening
Sample Date:	8/9/96	8/9/96	8/9/96	8/9/96	8/9/96	8/9/96	Value
GRO	6 UJK	5.4 UJK	28 JK	11 JK	5.4 UJK	200 JK	100
DRO	6.3 JK	7.1 JK	6.4 UJK	12 JK	7 JK	370 JK	200
RRO	48 UJK	23 JK	64 UJK	50 JK	30 JK	61 JK	2000
BTEX							
Benzene	0.096 U	0.086 U	0.13 U	0.12 U	0.086 U	0.37 JK	0.5
Ethylbenzene	0.11 U	0.097 U	0.14 U	0.14 U	0.097 U	0.79 JK	7800
Toluene	0.14 U	0.13 U	0.19 U	0.19 U	0.13 U	0.24 JK	16000
Total Xylenes	0.3 U	0.27 U	0.4 U	0.39 U	0.27 U	2.3 JK	160000
Total BTEX	0 U	0 U	0 U	0 U	0 U	3.7	10
VOCs							
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	3900
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	3900
2-Butanone	NA	NA	NA	NA	NA	NA	47000
Acetone	NA	NA	NA	NA	NA	NA	7800
Benzene	NA	NA	NA	NA	NA	NA	0.5
Ethylbenzene	NA	NA	NA	NA	NA	NA	7800
Isopropylbenzene	NA	NA	NA	NA	NA	NA	3100
Methylene chloride	NA	NA	NA	NA	NA	NA	85
n-Butylbenzene	NA	NA	NA	NA	NA	NA	780
n-Propylbenzene	NA	NA	NA	NA	NA	NA	NL
Naphthalene	NA	NA	NA	NA	NA	NA	3100
o-Xylene	NA	NA	NA	NA	NA	NA	160000
p-Cymene	NA	NA	NA	NA	NA	NA	NL
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	780
Styrene	NA	NA	NA	NA	NA	NA	16000

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-27**	**SB-30**	**SB-32**	**SB-32**	**SB-37**	**SB-41**	
Sample Number (96-UMT-:)	**020-SB**	**021-SS**	**022-SB**	**023-SB**	**026-SB**	**030-SB**	
Duplicate Sample (96-UMT-:)			**023-SB**	**022-SB**			
Depth (feet BGS:)	**4.5**	**0**	**1.5**	**1.5**	**4.6**	**4**	**Screening**
Sample Date:	**8/9/96**	**8/9/96**	**8/9/96**	**8/9/96**	**8/9/96**	**8/9/96**	**Value**
Toluene	NA	NA	NA	NA	NA	NA	16000
Total BTEX	NA	NA	NA	NA	NA	NA	10
Total Xylenes	NA	NA	NA	NA	NA	NA	160000
Xylene (m + p)	NA	NA	NA	NA	NA	NA	160000
BNAs							
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	3100
Benzoic acid	NA	NA	NA	NA	NA	NA	310000
Benzyl alcohol	NA	NA	NA	NA	NA	NA	23000
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	46
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	16000
di-n-Octylphthalate	NA	NA	NA	NA	NA	NA	NL
Fluoranthene	NA	NA	NA	NA	NA	NA	3100
Naphthalene	NA	NA	NA	NA	NA	NA	3100
Phenanthrene	NA	NA	NA	NA	NA	NA	NL
Pyrene	NA	NA	NA	NA	NA	NA	2300
Pest/PCBs							
4,4'-DDD	NA	NA	NA	NA	NA	NA	2.7
4,4'-DDE	NA	NA	NA	NA	NA	NA	1.9
4,4'-DDT	NA	NA	NA	NA	NA	NA	1.9
Metals							
Copper	NA	NA	NA	NA	NA	NA	3100
Lead	NA	NA	NA	NA	NA	NA	400
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NL

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-48**	**SB-48**	**017-SL**	
Sample Number (96-UMT-:)	**007-SB**	**008-SB**	**017-SS**	
Duplicate Sample (96-UMT-:)	**008-SB**	**007-SB**		
Depth (feet BGS:)	**1.5**	**1.5**	**0**	**Screening**
Sample Date:	**8/9/96**	**8/9/96**	**8/8/96**	**Value**
GRO	39 JK	45 JK	79 JK	100
DRO	140 JK	100 JK	**3500**	200
RRO	56 JK	43 JK	610 JK	2000
BTEX				
Benzene	0.098 U	0.096 U	0.087 U	0.5
Ethylbenzene	0.19	0.21	0.13	7800
Toluene	0.15 U	0.14 U	0.11 J	16000
Total Xylenes	1.1	1.3	0.42	160000
Total BTEX	1.29	1.51	0.66	10
VOCs				
1,2,4-Trimethylbenzene	NA	NA	0.00544 UJK	3900
1,3,5-Trimethylbenzene	NA	NA	0.00544 UJK	3900
2-Butanone	NA	NA	0.0109 UJL	47000
Acetone	NA	NA	0.0109 UJL	7800
Benzene	NA	NA	0.00544 UJK	0.5
Ethylbenzene	NA	NA	0.00544 UJK	7800
Isopropylbenzene	NA	NA	0.00544 UJK	3100
Methylene chloride	NA	NA	0.00544 UJK	85
n-Butylbenzene	NA	NA	0.00544 UJK	780
n-Propylbenzene	NA	NA	0.00544 UJK	NL
Naphthalene	NA	NA	0.00544 UJK	3100
o-Xylene	NA	NA	0.00544 UJK	160000
p-Cymene	NA	NA	0.00544 UJK	NL
sec-Butylbenzene	NA	NA	0.00544 UJK	780
Styrene	NA	NA	0.00544 UJK	16000

Table 4-17

UNIT A SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-48**	**SB-48**	**017-SL**	
Sample Number (96-UMT-:)	**007-SB**	**008-SB**	**017-SS**	
Duplicate Sample (96-UMT-:)	**008-SB**	**007-SB**		
Depth (feet BGS:)	**1.5**	**1.5**	**0**	**Screening**
Sample Date:	**8/9/96**	**8/9/96**	**8/8/96**	**Value**
Toluene	NA	NA	0.00544 UJK	16000
Total BTEX	NA	NA	0 U	10
Total Xylenes	NA	NA	0.00544 UJK	160000
Xylene (m + p)	NA	NA	0.00544 UJK	160000
BNAs				
2-Methylnaphthalene	NA	NA	0.36 U	3100
Benzoic acid	NA	NA	1.74 U	310000
Benzyl alcohol	NA	NA	0.36 U	23000
bis(2-Ethylhexyl)phthalate	NA	NA	0.406 B	46
Butylbenzylphthalate	NA	NA	0.36 U	16000
di-n-Octylphthalate	NA	NA	0.0334 J	NL
Fluoranthene	NA	NA	0.36 U	3100
Naphthalene	NA	NA	0.36 U	3100
Phenanthrene	NA	NA	0.36 U	NL
Pyrene	NA	NA	0.0345 J	2300
Pest/PCBs				
4,4'-DDD	NA	NA	0.122	2.7
4,4'-DDE	NA	NA	0.109 U	1.9
4,4'-DDT	NA	NA	0.272 U	1.9
Metals				
Copper	NA	NA	15.2	3100
Lead	NA	NA	24.2	400
Total Organic Carbon	NA	NA	NA	NL

Table 4-18

UNIT A FIELD PETROLEUM HYDROCARBON (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
MW-1	001-FL	0	0.09	112.00	~125
MW-1	002-FL	2.3	0.01	3849.80	>625
MW-2	003-FL	0	0.02	1261.27	>625
MW-2	004-FL	0	0.01	3849.80	>625
MW-2	006-FL	4	0.01	3849.80	>625
SB-1	013-FL	0	0.24	23.09	<25
SB-2	014-FL	0	0.33	13.83	<25
SB-2	028-FL	~3	0.44	17.02	<25
SB-2	028D-FL	~3	0.44	17.02	<25
SB-3	015-FL	0	0.3	16.12	<25
SB-3	033-FL	3.5	0.17	84.94	25-125
SB-3	033D-FL	3.5	0.17	84.94	25-125
SB-4	016-FL	0	0.29	17.03	<25
SB-5	5001-FL	0	0.19	33.63	25-125
SB-5	5002-FL	1.5	0.03	656.63	~625
SB-5	5003-FL	5	0.23	24.73	<25
SB-6	5004-FL	0	0.2	30.97	25-125
SB-6	5005-FL	4	0.02	2021.00	>625
SB-7	5006-FL	0	0.27	29.94	25-125
SB-7	5007-FL	2	0.03	1048.53	>625
SB-8	5008-FL	0	0.37	17.98	<25
SB-8	5009-FL	1.5	0.03	1048.53	>625
SB-9	5010-FL	0	0.28	28.23	25-125
SB-9	5011-FL	1.5	0.12	111.23	~125
SB-10	5012-FL	0	0.48	11.80	<25
SB-10	5013-FL	2	0.44	13.58	<25
SB-12	018-FL	0	0.15	77.51	25-125
SB-12	031-FL	~3.5	0.23	50.95	25-125
SB-12	031D-FL	~3.5	0.23	50.95	25-125
SB-13	019-FL	0	0.47	12.21	<25
SB-13	032-FL	3	0.44	17.02	<25
SB-13	032D-FL	3	0.39	20.87	<25
SB-14	5017-FL	0	0.47	12.21	<25
SB-14	5018-FL	1.5	0.21	9.85	<25
SB-15	5019-FL	0	0.43	12.46	<25
SB-15	5020-FL	2	0.39	15.18	<25
SB-16	5021-FL	0	0.47	10.40	<25
SB-16	5022-FL	0.5	0.41	13.72	<25
SB-17	5023-FL	0	0.43	14.10	<25
SB-17	5024-FL	2	0.44	13.58	<25

Table 4-18

UNIT A FIELD PETROLEUM HYDROCARBON (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
SB-18	5025-FL	0	0.4	14.42	<25
SB-18	5026-FL	2.7	0.04	1527.77	>625
SB-19	5027-FL	0	0.21	9.85	<25
SB-19	5028-FL	3.2	0.06	235.95	125-625
SB-20	5029-FL	0	0.36	17.85	<25
SB-20	5030-FL	2.3	0.02	6218.32	>625
SB-21	5031-FL	0	0.42	13.06	<25
SB-21	5032-FL	3	0.03	2735.71	>625
SB-22	5033-FL	0	0.21	9.85	<25
SB-22	5034-FL	4	0.15	35.08	25-125
SB-23	5035-FL	0	0.43	12.46	<25
SB-23	5036-FL	3.5	0.36	17.85	<25
SB-24	5037-FL	0	0.23	6.45	<25
SB-24	5038-FL	3.5	0.1	101.14	25-125
SB-25	5039-FL	0	0.42	13.06	<25
SB-25	5040-FL	3.5	0.05	972.31	>625
SB-26	5041-FL	0	0.45	13.10	<25
SB-26	5042-FL	3	0.19	52.87	25-125
SB-27	5043-FL	0	0.46	10.87	<25
SB-27	5044-FL	4.5	0.45	11.36	<25
SB-28	5045-FL	0	0.27	2.76	<25
SB-28	5046-FL	4	0.27	2.76	<25
SB-29	5047-FL	0	0.31	2.61	<25
SB-29	5048-FL	4.2	0.26	7.10	<25
SB-30	5049-FL	0	0.31	2.61	<25
SB-30	5050-FL	3.9	0.26	7.10	<25
SB-30	5051-FL	3.9	0.27	5.81	<25
SB-31	5052-FL	3.8	0.26	7.10	<25
SB-32	5053-FL	0	0.27	2.76	<25
SB-32	5054-FL	1.5	0.27	2.76	<25
SB-32	5055-FL	1.5	0.26	3.42	<25
SB-33	5056-FL	4	0.07	318.07	125-625
SB-34	5057-FL	4	0.14	78.36	25-125
SB-35	5058-FL	4	0.03	708.27	>625
SB-36	5059-FL	4	0.29	3.89	<25
SB-37	5060-FL	4.6	0.27	5.81	<25
SB-37	5061-FL	4.6	0.3	3.19	<25
SB-38	5062-FL	3	0.29	3.89	<25
SB-39	5063-FL	3	0.29	3.89	<25
SB-40	5064-FL	4	0.28	4.76	<25

Table 4-18

UNIT A FIELD PETROLEUM HYDROCARBON (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
SB-41	5065-FL	4	0.03	708.27	>625
SB-42	5066-FL	0	0.46	15.79	<25
SB-42	5067-FL	3.5	0.41	19.18	<25
SB-43	5068-FL	0	0.46	15.79	<25
SB-43	5069-FL	3.5	0.46	15.79	<25
SB-153	5215-FL	3.2	0.001	622.01	>625
017-SL	017-FL	0	0.09	112.00	~125

Table 4-19

UNIT A ENGINEERING PROPERTIES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Sample Location:	**MW1**
Sample Number (96-UMT-:)	**002-SB**
Depth (feet BGS:)	**5**
Sample Date:	**8/8/96**
Liquid Limit	33
Plastic Limit	30
Plasticity Index	3
Specific Gravity [g/cm^3]	1.09
Unified Soil Classification	GP-GW
Total Kjeldahl Nitrogen [mg/kg]	409
Total Organic Carbon [mg/kg]	85,400
Total Phosphorus [mg/kg]	270
pH [S.U.]	5.91
Total Alkalinity [mg $CaCO_3$/kg]	24.8
Heteratrophic Bacteria [#/dry g]	2.6E+06
Percent Moisture	8.0

Key:

BGS = Below Ground Surface.
NA = Not Analyzed.
NP = Non Plastic.
GP = Poorly Graded Gravel with Sand.
GP-GM = Poorly Graded Gravel with Silt and Sand
GW = Well Graded Gravel.
SM = Silty Sand.
S.U. = Standard pH units.
g/cm^3 = grams per cubic centimeter.
mg $CaCO_3$/kg = milligrams CaCO3/ per kilogram.
#/dry g = Count per dry gram.

Table 4-20

UNIT A GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-1	MW-1	MW-1	MW-1	MW-2		
Sample Number (96-UMT-:)	288-GW	288-GW-F	289-GW	289-GW-F	291-GW		
Duplicate Sample (96-UMT-:)	289-GW	289-GW-F	288-GW	288-GW-F			
Depth (feet BGS:)	2.30	2.30	2.30	2.30	1.68	Screening	Background
Sample Date:	8/18/96	8/18/96	8/18/96	8/18/96	8/19/96	Value	Concentration
GRO	4110	NA	5860	NA	14500	350	NL
DRO	42500	NA	14100	NA	13300	1500	NL
TRPH	12100	NA	12500 JK	NA	33800	NL	NL
VOCs							
1,2,4-Trimethylbenzene	140 JH	NA	20.3 JH	NA	80 JH	300	NL
1,3,5-Trimethylbenzene	60.7 JH	NA	7.32 JH	NA	26.8 JH	300	NL
2-Butanone	10 U	NA	50 U	NA	2.97 JH	1900	NL
Acetone	10 UJK	NA	5.08 BJK	NA	2.43 BJK	3700	NL
Benzene	110 JH	NA	97.3 JH	NA	16.8 JH	0.36	NL
Ethylbenzene	98.5 JH	NA	13.9 JH	NA	18.8 JH	700	NL
Isopropylbenzene	26.1 JH	NA	7.14 JH	NA	4.23 JH	1500	NL
n-Propylbenzene	27.8 JH	NA	3.69 JH	NA	5.5 JH	NL	NL
Naphthalene	157 JH	NA	15.9 JH	NA	145 JH	1500	NL
o-Xylene	77.1 JH	NA	9.66 JH	NA	93.7 JH	1400	NL
p-Cymene	33.9 JH	NA	7.51 JH	NA	6.25 JH	NL	NL
sec-Butylbenzene	13.1 JH	NA	1.49 JH	NA	3.05 JH	61	NL
Toluene	39.3 JH	NA	30.2 JH	NA	26.7 JH	750	NL
Total BTEX	493.9	NA	173.56	NA	286	10	NL
Total Xylenes	246 JH	NA	32.2 JH	NA	223 JH	520	NL
Xylene (m + p)	169 JH	NA	22.5 JH	NA	130 JH	520	NL
PAHs							
Acenaphthene	5.7 U	NA	5.3 U	NA	50 JL	2200	NL
Anthracene	1.6 JH	NA	1.06 U	NA	1.02 U	11000	NL
Benzo(a)anthracene	4.6 JH	NA	1.06 U	NA	1.02 U	0.092	NL
Chrysene	2.4 JH	NA	1.06 U	NA	1.02 U	9.2	NL
Dibenzo(a,h)anthracene	2.6 JH	NA	2.65 U	NA	2.55 U	0.0092	NL

Table 4-20

UNIT A GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-1	MW-1	MW-1	MW-1	MW-2		
Sample Number (96-UMT-:)	288-GW	288-GW-F	289-GW	289-GW-F	291-GW		
Duplicate Sample (96-UMT-:)	289-GW	289-GW-F	288-GW	288-GW-F			
Depth (feet BGS:)	2.30	2.30	2.30	2.30	1.68	Screening	Background
Sample Date:	8/18/96	8/18/96	8/18/96	8/18/96	8/19/96	Value	Concentration
Fluoranthene	5.2 N	NA	2.65 U	NA	2.55 U	1500	NL
Fluorene	4.8 JH	NA	1.5 JH	NA	0.94 JL	1500	NL
Naphthalene	88 JH	NA	77 JH	NA	43 JL	1500	NL
Phenanthrene	5.8 JH	NA	1.4 JH	NA	0.86 JL	NL	NL
Pyrene	1.2 N	NA	4.6 JH	NA	2.55 U	1100	NL
Total PAHs + BTEX	610.1	NA	258.06	NA	380.8	15	NL
Metals							
Aluminum	36700	112	69000	109	NA	200	231000/84.8
Arsenic	22.1	4.3 U	38.9	4.3 U	NA	0.045	123/ND
Barium	5160	1190	6390	1260	NA	2000	16300/1110
Beryllium	3 J	0.2 U	2.9 J	0.2 U	NA	0.016	11.6/ND
Calcium	77200	45800	70500	47800	NA	NL	170000/45400
Chromium	67.5	4.2 U	168	4.2 U	NA	100	456/ND
Cobalt	129	21.9	137	26.5	NA	6600	404/7.9
Copper	301	41.8	332	23.6	NA	1000	848/13.8
Iron	185000	2360 JK	237000	2310 JK	NA	300	697000/415
Lead	144	24.2	202	4.5 J	NA	15	274/ND
Magnesium	44500	25600	60900	28400	NA	NL	146000/20800
Manganese	16900	6600	14500	6770	NA	50	37400/9840
Nickel	239	38.4	315	41.5	NA	100	1060/6.4
Potassium	8410 JK	5270 JK	9740 JK	5330 JK	NA	NL	19400/2030
Silver	2.1 UJL	2.1 J	2.1 UJL	2.1 U	NA	100	ND/ND
Sodium	11800 JK	10900 JL	12800 JK	11500 JL	NA	NL	6160/2700
Thallium	6.9	4.7 JH	3 U	3 U	NA	2	6.6/4.9
Vanadium	123	3.6 U	204	3.6 U	NA	260	657/ND
Zinc	647	263	812	27.7	NA	5000	2300/18.8

Table 4-21

RUNWAY LAKE SURFACE WATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	RWL-1	RWL-1	RWL-2	RWL-2	RWL-3	RWL-3		
Sample Number (96-UMT-:)	260-SW	260-SW-F	261-SW	261-SW-F	262-SW	262-SW-F	Screening	Background
Sample Date:	8/13/96	8/13/96	8/13/96	8/13/96	8/13/96	8/13/96	Value	Concentration
VOCs								
Acetone	2.07 B	NA	1.76 B	NA	1.37 B	NA	3700	NL
Pest/PCBs								
4,4'-DDD	0.051 U	NA	0.0145 JH	NA	0.0191 JH	NA	0.28	NL
4,4'-DDT	0.102 UJL	NA	0.1 UJL	NA	0.0284 JL	NA	0.2	NL
Metals								
Aluminum	29.8 J	23.9 U	28.7 J	23.9 U	35.2 J	30.1 J	200	385/ND
Antimony	4.9 U	5.1 J	4.9 U	4.9 U	4.9 U	4.9 U	6	ND/ND
Arsenic	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	0.045	ND/ND
Barium	224	215	218	212	215	210	2000	84.4/75.9
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.016	ND/ND
Cadmium	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	5	ND/ND
Calcium	14100	15100	14100	14600	13800	14600	NL	15600/15500
Chromium	4.2 U	4.2 U	4.4 JH	4.2 U	4.2 U	4.2 U	100	ND/ND
Cobalt	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	6600	ND/ND
Copper	2.5 U	2.5 U	3.7 J	2.5 U	2.5 U	2.5 U	1000	10.8/ND
Iron	169	54.6	189	58.7	200	56.2	300	857/68
Lead	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	15	3.1/3.7
Magnesium	6160	6690	6160	6470	6030	6410	NL	6200/6070
Manganese	58.5	14.4	66.4	20.8	48	10.1	50	108/95.8
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2	ND/ND
Nickel	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	100	12.9/ND
Potassium	1090	1140	1110	1120	1110	1140	NL	513/442
Selenium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	50	5.3/ND
Silver	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	100	ND/ND
Sodium	1560	1640	1740	1590	1570	1720	NL	5320/5250
Thallium	3 U	3 U	3 U	3 U	3 U	3 U	2	ND/ND
Vanadium	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	260	ND/ND
Zinc	3.8 U	4.1 JH	12.1 JH	15.7 JH	8.8 JH	25.6 JH	5000	7.7/28.6

Table 4-22

RUNWAY LAKE SEDIMENT SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	RWL-1	RWL-2	RWL-3	
Sample Number (96-UMT-:)	263-SD	264-SD	265-SD	Screening
Sample Date:	8/13/96	8/13/96	8/13/96	Value
RRO	29 JK	36 JK	51 UJK	2000
VOCs				
1,2,4-Trimethylbenzene	0.00554 U	0.00578 U	0.0205 JH	3900
1,3,5-Trimethylbenzene	0.00554 U	0.00578 U	0.011 JH	3900
Naphthalene	0.00554 U	0.00578 U	0.02 JH	3100
p-Cymene	0.00554 U	0.00578 U	0.0214 JH	NL
sec-Butylbenzene	0.00554 U	0.00578 U	0.0619 JH	780
tert-Butylbenzene	0.00554 U	0.00578 U	0.0232 JH	780
BNAs				
2-Methylnaphthalene	0.381 U	0.395 U	0.484	3100
bis(2-Ethylhexyl)phthalate	0.0913 JB	0.0691 JB	0.123 JB	46
Fluorene	0.381 U	0.395 U	0.0689 J	3100
Naphthalene	0.381 U	0.395 U	0.104 J	3100
Pest/PCBs				
4,4'-DDD	0.0136 JH	0.0394 JH	0.297 JH	2.7
4,4'-DDE	0.00906 JH	0.00936 JH	0.0365 JK	1.9
4,4'-DDT	0.0116 UJL	0.0103 JL	0.0335 JL	1.9

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**MW-9**	**MW-10**	**MW-10**	**MW-11**	**MW-11**	**MW-11**	**MW-13**	**MW-15**	
Sample Number (96-UMT-:)	**216-SB**	**244-SB**	**245-SB**	**269-SB**	**270-SB**	**271-SB**	**277-SB**	**311-SB**	
Duplicate Sample (96-UMT-:)					**271-SB**	**270-SB**		**312-SB**	
Depth (feet BGS:)	**4.6**	**2.5**	**2.5**	**0**	**2**	**2**	**1.4**	**3**	**Screening**
Sample Date:	**8/11/96**	**8/12/96**	**8/12/96**	**8/13/96**	**8/13/96**	**8/13/96**	**8/14/96**	**8/15/96**	**Value**
GRO	**120 JK**	18 JK	17 JK	**1600 JK**	**720 JK**	**360 JK**	**680 JK**	91 JK	100
DRO	**1900 JK**	28 JK	27 JK	**27000 JK**	**3000 JK**	**2700 JK**	**210 JK**	180 JK	200
RRO	420 JK	80 JK	93 JK	23000 UJK	110 JK	140 JK	37 JK	190 JK	2000
BTEX									
Benzene	0.088 UJK	0.087 UJK	0.12 JK	1.9 UJK	0.87 UJK	0.9 UJK	1.9 UJK	0.11 UJK	0.5
Ethylbenzene	1.1 JK	0.13 JK	0.13 JK	2.1 UJK	0.98 UJK	1 UJK	2.3 JK	0.49 JK	7800
Toluene	0.59 JK	0.13 UJK	0.13 UJK	2.8 UJK	1.3 UJK	1.4 UJK	2.8 UJK	0.16 UJK	16000
Total Xylenes	4.3 JK	0.46 JK	0.55 JK	5.8 UJK	3.8 JK	2.8 UJK	12 JK	3.2 JK	160000
Total BTEX	5.99	0.59	0.8	0 U	3.8	0 U	**14.3**	3.69	10
VOCs									
1,2,4-Trimethylbenzene	0.0415 JK	NA	NA	0.173 JH	1.4 JK	0.634 JK	2.98 JH	NA	3900
1,2-Dichlorobenzene	0.0257 UJK	NA	NA	0.056 U	0.0254 UJK	0.00543 UJK	0.00577 U	NA	7000
1,3,5-Trimethylbenzene	1.75 JK	NA	NA	14.7 JH	1.9 JK	2.31 JK	1.68 JH	NA	3900
2-Butanone	0.0514 UJL	NA	NA	0.112 UJL	0.0507 UJL	0.00335 JL	0.0115 UJL	NA	47000
2-Chlorotoluene	0.0257 UJK	NA	NA	0.056 U	0.0254 UJK	0.00543 UJK	0.00577 U	NA	1600
Acetone	0.0514 UJL	NA	NA	0.112 UJL	0.0507 UJL	0.0177 BJK	0.0115 UJL	NA	7800
Benzene	0.0257 UJK	NA	NA	0.056 U	0.0254 UJK	0.00543 UJK	0.00577 U	NA	0.5
Ethylbenzene	0.0257 UJK	NA	NA	0.056 U	0.129 JK	0.0401 JK	NA	NA	7800
Isopropylbenzene	0.0257 UJK	NA	NA	0.0994 JH	0.0254 UJK	0.00543 UJK	0.0778 JH	NA	3100
Methylene chloride	0.00951 JK	NA	NA	0.056 U	0.0254 UJK	0.00543 UJK	0.00577 U	NA	85
n-Propylbenzene	0.0257 UJK	NA	NA	0.056 U	0.0254 UJK	0.134 JK	0.111 JH	NA	NL
Naphthalene	0.11 JK	NA	NA	0.056 U	0.498 JK	0.665 UJK	0.153 JH	NA	3100
o-Xylene	0.264 JK	NA	NA	0.0752 JH	0.431 JK	0.112 JK	1.42 JH	NA	160000
p-Cymene	0.414 JK	NA	NA	17.9 JH	2.13 JK	0.00543 UJK	0.00577 U	NA	NL
sec-Butylbenzene	0.0257 UJK	NA	NA	0.696 JH	0.535 JK	0.00543 UJK	0.0489 JH	NA	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-9	MW-10	MW-10	MW-11	MW-11	MW-11	MW-13	MW-15	
Sample Number (96-UMT-:)	216-SB	244-SB	245-SB	269-SB	270-SB	271-SB	277-SB	311-SB	
Duplicate Sample (96-UMT-:)					271-SB	270-SB		312-SB	
Depth (feet BGS:)	4.6	2.5	2.5	0	2	2	1.4	3	Screening
Sample Date:	8/11/96	8/12/96	8/12/96	8/13/96	8/13/96	8/13/96	8/14/96	8/15/96	Value
tert-Butylbenzene	0.0257 UJK	NA	NA	0.159 JH	0.0254 UJK	0.00543 UJK	0.00577 U	NA	780
Toluene	0.0257 UJK	NA	NA	0.056 U	0.0254 UJK	0.00543 UJK	0.065 B	NA	16000
Total BTEX	0.2984	NA	NA	0.0752	0.883	0.4711	4.185	NA	10
Total Xylenes	0.291 JK	NA	NA	0.0732 JH	0.752 JK	0.215 JK	4.12 JH	NA	160000
Xylene (m + p)	0.0344 JK	NA	NA	0.056 U	0.323 JK	0.104 JK	2.7 JH	NA	160000
BNAs									
1,2-Dichlorobenzene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	7000
2-Chlorophenol	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	390
2-Methylnaphthalene	0.427	NA	NA	7.68 UJK	7.21 JK	4.64	0.595	NA	3100
4-Methylphenol	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	390
Acenaphthene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	4700
Anthracene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	23000
Benzo(a)anthracene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	0.87
Benzo(a)pyrene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	0.088
Benzo(b)fluoranthene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	0.87
Benzo(k)fluoranthene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	8.8
Benzoic acid	1.81 U	NA	NA	38.4 UJK	8.95 UJK	9.3 U	1.87 U	NA	310000
bis(2-Ethylhexyl)phthalate	0.0376 JB	NA	NA	1.14 BJK	0.244 JK	0.194 J	0.385 U	NA	46
Chrysene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	87
di-n-Butylphthalate	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	7800
Dibenzofuran	0.169 J	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	150
Fluoranthene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	3100
Fluorene	0.374	NA	NA	5.16 JK	0.985 JK	0.821 J	0.385 U	NA	3100
Indeno(1,2,3-cd)pyrene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	0.87
Naphthalene	0.125 J	NA	NA	7.68 UJK	3.52 JK	1.96	0.385 U	NA	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-9	MW-10	MW-10	MW-11	MW-11	MW-11	MW-13	MW-15	
Sample Number (96-UMT-:)	216-SB	244-SB	245-SB	269-SB	270-SB	271-SB	277-SB	311-SB	
Duplicate Sample (96-UMT-:)					271-SB	270-SB		312-SB	
Depth (feet BGS:)	4.6	2.5	2.5	0	2	2	1.4	3	Screening
Sample Date:	8/11/96	8/12/96	8/12/96	8/13/96	8/13/96	8/13/96	8/14/96	8/15/96	Value
Pentachlorophenol	1.81 U	NA	NA	38.4 UJK	8.95 UJK	9.3 U	1.87 U	NA	5.3
Phenanthrene	0.187 J	NA	NA	2.92 JK	0.477 JK	0.436 J	0.385 U	NA	NL
Pyrene	0.363 U	NA	NA	7.68 UJK	1.79 UJK	1.86 U	0.385 U	NA	2300
Pest/PCBs									
4,4'-DDD	0.0205 J	NA	NA	NA	0.161	0.196 JK	0.03 JH	NA	2.7
4,4'-DDE	0.022 U	NA	NA	NA	0.0217 U	0.0451 U	0.00145 JH	NA	1.9
4,4'-DDT	0.039 JL	NA	NA	NA	0.0543 UJL	0.113 UJL	0.0197 JL	NA	1.9
Aldrin	0.011 U	NA	NA	NA	0.0109 U	0.0225 U	0.00117 U	NA	0.038
alpha-BHC	0.011 U	NA	NA	NA	0.0109 U	0.0225 U	0.00117 U	NA	0.1
Aroclor 1254	0.22 U	NA	NA	NA	0.217 U	0.451 U	0.0234 U	NA	10
beta-BHC	0.011 U	NA	NA	NA	0.0109 U	0.0225 U	0.00117 U	NA	NL
Chlordane	0.0115 J	NA	NA	NA	0.0868 U	0.18 U	0.00934 U	NA	0.49
Metals									
Aluminum	3400	NA	NA	NA	NA	NA	NA	NA	78000
Antimony	6.2 U	NA	NA	NA	NA	NA	NA	NA	31
Arsenic	3.5	NA	NA	NA	NA	NA	NA	NA	6.4
Barium	257 JK	NA	NA	NA	NA	NA	NA	NA	5500
Beryllium	0.11 J	NA	NA	NA	NA	NA	NA	NA	0.24
Cadmium	0.28 U	NA	NA	NA	NA	NA	NA	NA	39
Calcium	1060	NA	NA	NA	NA	NA	NA	NA	NL
Chromium	6.2	NA	NA	NA	NA	NA	NA	NA	390
Cobalt	4.9	NA	NA	NA	NA	NA	NA	NA	14000
Copper	14.4 JK	NA	NA	NA	NA	NA	8.9 JK	NA	3100
Iron	10700	NA	NA	NA	NA	NA	NA	NA	23000

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**MW-9**	**MW-10**	**MW-10**	**MW-11**	**MW-11**	**MW-11**	**MW-13**	**MW-15**	
Sample Number (96-UMT-:)	**216-SB**	**244-SB**	**245-SB**	**269-SB**	**270-SB**	**271-SB**	**277-SB**	**311-SB**	
Duplicate Sample (96-UMT-:)					**271-SB**	**270-SB**		**312-SB**	
Depth (feet BGS:)	**4.6**	**2.5**	**2.5**	**0**	**2**	**2**	**1.4**	**3**	**Screening**
Sample Date:	**8/11/96**	**8/12/96**	**8/12/96**	**8/13/96**	**8/13/96**	**8/13/96**	**8/14/96**	**8/15/96**	**Value**
Lead	4.3 JK	10.3	2.9	NA	NA	NA	4.1 JH	NA	400
Magnesium	1620 JK	NA	NA	NA	NA	NA	NA	NA	NL
Manganese	297	NA	NA	NA	NA	NA	NA	NA	1800
Mercury	0.02 U	NA	NA	NA	NA	NA	NA	NA	23
Nickel	16.4	NA	NA	NA	NA	NA	NA	NA	1600
Potassium	400	NA	NA	NA	NA	NA	NA	NA	NL
Selenium	0.64	NA	NA	NA	NA	NA	NA	NA	390
Silver	0.22 U	NA	NA	NA	NA	NA	NA	NA	390
Sodium	74.6 U	NA	NA	NA	NA	NA	NA	NA	NL
Vanadium	13.6 JK	NA	NA	NA	NA	NA	NA	NA	550
Zinc	33.7	NA	NA	NA	NA	NA	NA	NA	23000
TCLP Lead	NA	NA	NA	NA	NA	NA	NA	NA	NL
Total Organic Carbon	NA	NA	NA	NA	21000 JK	NA	NA	NA	NL

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**MW-15**	**MW-20**	**SB-53**	**SB-53**	**SB-53**	**SB-54**	**SB-58**	**SB-62**	
Sample Number (96-UMT-:)	**312-SB**	**322-SB**	**040-SS**	**217-SB**	**218-SB**	**220-SB**	**221-SB**	**222-SB**	
Duplicate Sample (96-UMT-:)	**311-SB**			**218-SB**	**217-SB**				
Depth (feet BGS:)	**3**	**2**	**0**	**4**	**4**	**5**	**5**	**4**	**Screening**
Sample Date:	**8/15/96**	**8/16/96**	**8/9/96**	**8/11/96**	**8/11/96**	**8/11/96**	**8/11/96**	**8/11/96**	**Value**
GRO	62 JK	**430 JK**	5.4 UJK	**350 JK**	**400 JK**	95 JK	29 JK	5.9 UJK	100
DRO	95 JK	**3000 JK**	64 JK	**1400 JK**	**1500 JK**	**980 JK**	**260 JK**	5.8 JK	200
RRO	100 JK	**3700 JK**	250 JK	610 JK	240 JK	1300 JK	44 UJK	47 UJK	2000
BTEX									
Benzene	0.096 UJK	0.91 UJK	0.087 U	0.41 UJK	0.45 UJK	0.34 JK	0.087 UJK	0.095 UJK	0.5
Ethylbenzene	0.32 JK	0.99 JK	0.098 U	1.3 JK	1.3 JK	0.35 JK	0.19 JK	0.11 UJK	7800
Toluene	0.14 UJK	0.19 JK	0.13 U	3.6 JK	4.1 JK	0.14 UJK	0.13 UJK	0.14 UJK	16000
Total Xylenes	2 JK	3.7 JK	0.27 U	8.8 JK	9.7 JK	2.2 JK	0.76 JK	0.3 UJK	160000
Total BTEX	2.32	4.88	0 U	**13.7**	**15.1**	2.89	0.95	0 U	10
VOCs									
1,2,4-Trimethylbenzene	NA	NA	NA	1.66 JH	0.519 JK	NA	NA	NA	3900
1,2-Dichlorobenzene	NA	NA	NA	0.00501 U	0.0275 UJK	NA	NA	NA	7000
1,3,5-Trimethylbenzene	NA	NA	NA	1.97 JH	1.74 JK	NA	NA	NA	3900
2-Butanone	NA	NA	NA	0.01 UJL	0.055 UJL	NA	NA	NA	47000
2-Chlorotoluene	NA	NA	NA	0.00501 U	0.0275 UJK	NA	NA	NA	1600
Acetone	NA	NA	NA	0.005 B	0.055 UJL	NA	NA	NA	7800
Benzene	NA	NA	NA	0.00501 U	0.0275 UJK	NA	NA	NA	0.5
Ethylbenzene	NA	NA	NA	0.0389 JH	0.0404 JK	NA	NA	NA	7800
Isopropylbenzene	NA	NA	NA	0.0573 JH	0.0275 UJK	NA	NA	NA	3100
Methylene chloride	NA	NA	NA	0.00501 U	0.0275 UJK	NA	NA	NA	85
n-Propylbenzene	NA	NA	NA	0.0844 JH	0.0275 UJK	NA	NA	NA	NL
Naphthalene	NA	NA	NA	0.261 JH	0.0275 UJK	NA	NA	NA	3100
o-Xylene	NA	NA	NA	0.0692 JH	0.0841 JK	NA	NA	NA	160000
p-Cymene	NA	NA	NA	0.00501 U	0.524 JK	NA	NA	NA	NL
sec-Butylbenzene	NA	NA	NA	0.0672 JH	0.0275 UJK	NA	NA	NA	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-15	MW-20	SB-53	SB-53	SB-53	SB-54	SB-58	SB-62	
Sample Number (96-UMT-:)	312-SB	322-SB	040-SS	217-SB	218-SB	220-SB	221-SB	222-SB	
Duplicate Sample (96-UMT-:)	311-SB			218-SB	217-SB				
Depth (feet BGS:)	3	2	0	4	4	5	5	4	Screening
Sample Date:	8/15/96	8/16/96	8/9/96	8/11/96	8/11/96	8/11/96	8/11/96	8/11/96	Value
tert-Butylbenzene	NA	NA	NA	0.00501 U	0.0275 UJK	NA	NA	NA	780
Toluene	NA	NA	NA	0.00383 B	0.0275 UJK	NA	NA	NA	16000
Total BTEX	NA	NA	NA	0.37793	0.3875	NA	NA	NA	10
Total Xylenes	NA	NA	NA	0.336 JH	0.348 JK	NA	NA	NA	160000
Xylene (m + p)	NA	NA	NA	0.266 JH	0.263 JK	NA	NA	NA	160000
BNAs									
1,2-Dichlorobenzene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	7000
2-Chlorophenol	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	390
2-Methylnaphthalene	NA	NA	NA	1.24	0.932 JH	NA	NA	NA	3100
4-Methylphenol	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	390
Acenaphthene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	4700
Anthracene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	23000
Benzo(a)anthracene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	0.87
Benzo(a)pyrene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	0.088
Benzo(b)fluoranthene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	0.87
Benzo(k)fluoranthene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	8.8
Benzoic acid	NA	NA	NA	1.71 U	1.87 U	NA	NA	NA	310000
bis(2-Ethylhexyl)phthalate	NA	NA	NA	0.341 U	0.0534 JH	NA	NA	NA	46
Chrysene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	87
di-n-Butylphthalate	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	7800
Dibenzofuran	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	150
Fluoranthene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	3100
Fluorene	NA	NA	NA	0.722	0.801 JH	NA	NA	NA	3100
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	0.87
Naphthalene	NA	NA	NA	0.669	0.532 JH	NA	NA	NA	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**MW-15**	**MW-20**	**SB-53**	**SB-53**	**SB-53**	**SB-54**	**SB-58**	**SB-62**	
Sample Number (96-UMT-:)	**312-SB**	**322-SB**	**040-SS**	**217-SB**	**218-SB**	**220-SB**	**221-SB**	**222-SB**	
Duplicate Sample (96-UMT-:)	**311-SB**			**218-SB**	**217-SB**				
Depth (feet BGS:)	**3**	**2**	**0**	**4**	**4**	**5**	**5**	**4**	**Screening**
Sample Date:	**8/15/96**	**8/16/96**	**8/9/96**	**8/11/96**	**8/11/96**	**8/11/96**	**8/11/96**	**8/11/96**	**Value**
Pentachlorophenol	NA	NA	NA	1.71 U	1.87 U	NA	NA	NA	5.3
Phenanthrene	NA	NA	NA	0.39	0.309	NA	NA	NA	NL
Pyrene	NA	NA	NA	0.341 U	0.374 U	NA	NA	NA	2300
Pest/PCBs									
4,4'-DDD	NA	0.019 JH	**5.32 JK**	0.14	0.0226 U	**8.03 JH**	0.00449	0.157 JH	2.7
4,4'-DDE	NA	0.00454 U	2.18 U	0.0207 U	0.134	0.876 JH	0.00218 U	0.0243 JH	1.9
4,4'-DDT	NA	0.0114 UJL	**26.1 JK**	0.124	0.114 JL	**8.28 JL**	0.0175	0.483 JL	1.9
Aldrin	NA	0.00227 U	1.09 U	0.0103 U	0.0113 U	0.585 U	0.00118 J	0.0236 U	0.038
alpha-BHC	NA	0.00227 U	1.09 U	0.0103 U	0.0113 U	0.585 U	0.00244	0.0236 U	0.1
Aroclor 1254	NA	0.0454 U	21.8 U	0.207 U	0.226 U	11.7 U	0.0218 U	0.473 U	10
beta-BHC	NA	0.00227 U	1.09 U	0.0103 U	0.0113 U	0.585 U	0.00116 J	0.0236 U	NL
Chlordane	NA	0.0182 U	8.71 U	0.0828 U	0.0906 U	4.68 U	0.00874 U	0.189 U	0.49
Metals									
Aluminum	NA	NA	NA	2150	2900	4910	2210	NA	78000
Antimony	NA	NA	NA	5.6 UJL	6.6 U	6.7 U	5.5 U	NA	31
Arsenic	NA	NA	NA	2.5 JK	3.4	4.7	2.8	NA	6.4
Barium	NA	NA	NA	176	184 JK	499 JK	165 JK	NA	5500
Beryllium	NA	NA	NA	0.08 J	0.09 J	0.16 J	0.07 J	NA	0.24
Cadmium	NA	NA	NA	0.25 UJL	0.29 U	0.3 U	0.24 U	NA	39
Calcium	NA	NA	NA	814	970	1870	715	NA	NL
Chromium	NA	NA	NA	4.8	4.8	10.2	4.5	NA	390
Cobalt	NA	NA	NA	3.5	3.9	6.5	3.3	NA	14000
Copper	NA	NA	NA	10.3 JH	11.3 JK	22.1 JK	11.1 JK	NA	3100
Iron	NA	NA	NA	6990	8720	12800	8270	NA	23000

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**MW-15**	**MW-20**	**SB-53**	**SB-53**	**SB-53**	**SB-54**	**SB-58**	**SB-62**	
Sample Number (96-UMT-:)	**312-SB**	**322-SB**	**040-SS**	**217-SB**	**218-SB**	**220-SB**	**221-SB**	**222-SB**	
Duplicate Sample (96-UMT-:)	**311-SB**			**218-SB**	**217-SB**				
Depth (feet BGS:)	**3**	**2**	**0**	**4**	**4**	**5**	**5**	**4**	**Screening**
Sample Date:	**8/15/96**	**8/16/96**	**8/9/96**	**8/11/96**	**8/11/96**	**8/11/96**	**8/11/96**	**8/11/96**	**Value**
Lead	NA	NA	NA	3.4 JK	4.1 JK	64.1 JK	3.1 JK	NA	400
Magnesium	NA	NA	NA	1030	1320 JK	2190 JK	1030 JK	NA	NL
Manganese	NA	NA	NA	240	249	402	280	NA	1800
Mercury	NA	NA	NA	0.02 U	0.02 U	0.03 JH	0.03 JH	NA	23
Nickel	NA	NA	NA	12.3	13.5	19.3	11.9	NA	1600
Potassium	NA	NA	NA	237	350	685	294	NA	NL
Selenium	NA	NA	NA	0.48	0.79	0.48 U	0.39 U	NA	390
Silver	NA	NA	NA	0.2 UJL	0.24 U	0.24 U	0.2 U	NA	390
Sodium	NA	NA	NA	67 U	79.1 U	80.1 U	65.9 U	NA	NL
Vanadium	NA	NA	NA	8.5	9.5 JK	15.3 JK	12.3 JK	NA	550
Zinc	NA	NA	NA	26	29.5	94.4	25.9	NA	23000
TCLP Lead	NA	NA	NA	NA	NA	NA	NA	NA	NL
Total Organic Carbon	NA	15500	NA	NA	NA	NA	NA	NA	NL

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-67	SB-70	SB-72	SB-72	SB-77	SB-77	SB-78	SB-78	
Sample Number (96-UMT-:)	223-SB	041-SS	240-SB	241-SB	060-SS	283-SB	070-SS	284-SB	
Duplicate Sample (96-UMT-:)			241-SB	240-SB					
Depth (feet BGS:)	4	0	3.5	3.5	0	2	0	2	Screening
Sample Date:	8/11/96	8/9/96	8/12/96	8/12/96	8/9/96	8/14/96	8/9/96	8/14/96	Value
GRO	31 JK	5.5 UJK	95 JK	**220 JK**	37 JK	76 JK	11 UJK	9.5 UJK	100
DRO	**320 JK**	**8700 JK**	**1600 JK**	**840 JK**	NA	NA	40 JK	NA	200
RRO	43 UJK	**38000 JK**	990 JK	580 JK	NA	NA	NA	NA	2000
BTEX									
Benzene	0.087 UJK	NA	0.11 UJK	0.12 JK	NA	NA	NA	NA	0.5
Ethylbenzene	0.097 UJK	NA	0.21 JK	0.52 JK	NA	NA	NA	NA	7800
Toluene	0.13 UJK	NA	0.49 JK	1.2 JK	NA	NA	NA	NA	16000
Total Xylenes	0.27 UJK	NA	1.2 JK	4.4 JK	NA	NA	NA	NA	160000
Total BTEX	0 U	NA	1.9	6.24	NA	NA	NA	NA	10
VOCs									
1,2,4-Trimethylbenzene	NA	0.00521 U	NA	NA	0.261 JH	0.384 JH	0.0108 U	0.00309 JH	3900
1,2-Dichlorobenzene	NA	0.00521 U	NA	NA	0.00621 U	0.0104 U	0.0108 U	0.0094 U	7000
1,3,5-Trimethylbenzene	NA	0.00521 U	NA	NA	0.304 JH	0.35 JH	0.0108 U	0.0094 U	3900
2-Butanone	NA	0.00327 JL	NA	NA	0.00753 JL	0.0153 JL	0.00861 JL	0.0173 JL	47000
2-Chlorotoluene	NA	0.00521 U	NA	NA	0.00206 JH	0.0104 U	0.0108 U	0.0094 U	1600
Acetone	NA	0.0137 B	NA	NA	0.0172 B	0.0354 B	0.024 B	0.0785 B	7800
Benzene	NA	0.00521 U	NA	NA	0.0156 JH	0.0114 JH	0.0108 U	0.0094 U	0.5
Ethylbenzene	NA	0.00521 U	NA	NA	0.0113 JH	0.0157 JH	0.0108 U	0.0094 U	7800
Isopropylbenzene	NA	0.00521 U	NA	NA	0.00308 JH	0.0104 U	0.0108 U	0.0094 U	3100
Methylene chloride	NA	0.00521 U	NA	NA	0.00621 U	0.0104 U	0.0108 U	0.00198 JH	85
n-Propylbenzene	NA	0.00521 U	NA	NA	0.00621 U	0.0104 U	0.0108 U	0.0094 U	NL
Naphthalene	NA	0.00521 U	NA	NA	0.0634 JH	0.77 E	0.0108 U	0.0156 JH	3100
o-Xylene	NA	0.00521 U	NA	NA	0.0572 JH	0.0522 JH	0.0108 U	0.0094 U	160000
p-Cymene	NA	0.00521 U	NA	NA	0.0445 JH	0.0104 U	0.0108 U	0.0094 U	NL
sec-Butylbenzene	NA	0.00521 U	NA	NA	0.00621 U	0.0732 JH	0.0108 U	0.0094 U	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-67**	**SB-70**	**SB-72**	**SB-72**	**SB-77**	**SB-77**	**SB-78**	**SB-78**	
Sample Number (96-UMT-:)	**223-SB**	**041-SS**	**240-SB**	**241-SB**	**060-SS**	**283-SB**	**070-SS**	**284-SB**	
Duplicate Sample (96-UMT-:)			**241-SB**	**240-SB**					
Depth (feet BGS:)	**4**	**0**	**3.5**	**3.5**	**0**	**2**	**0**	**2**	**Screening**
Sample Date:	**8/11/96**	**8/9/96**	**8/12/96**	**8/12/96**	**8/9/96**	**8/14/96**	**8/9/96**	**8/14/96**	**Value**
tert-Butylbenzene	NA	0.00521 U	NA	NA	0.00621 U	0.0384 JH	0.0108 U	0.0094 U	780
Toluene	NA	0.00521 U	NA	NA	0.0103 B	0.00572 B	0.0108 U	0.00288 B	16000
Total BTEX	NA	0 U	NA	NA	0.1486	0.14662	0 U	0.00288	10
Total Xylenes	NA	0.00521 U	NA	NA	0.111 JH	0.113 JH	0.0108 U	0.0094 U	160000
Xylene (m + p)	NA	0.00521 U	NA	NA	0.0542 JH	0.0616 JH	0.0108 U	0.0094 U	160000
BNAs									
1,2-Dichlorobenzene	NA	1.8 U	NA	NA	0.433 U	1.32 U	1.44 U	0.629 U	7000
2-Chlorophenol	NA	1.8 U	NA	NA	0.433 U	1.32 U	1.44 U	0.629 U	390
2-Methylnaphthalene	NA	1.8 U	NA	NA	0.352 J	3.84	1.44 U	0.629 U	3100
4-Methylphenol	NA	1.8 U	NA	NA	0.433 U	0.986 J	1.44 U	0.486 J	390
Acenaphthene	NA	1.8 U	NA	NA	0.433 U	5.52	1.44 U	0.629 U	4700
Anthracene	NA	1.8 U	NA	NA	0.433 U	2.24	1.44 U	0.629 U	23000
Benzo(a)anthracene	NA	1.8 U	NA	NA	0.433 U	**2.46**	1.44 U	0.629 U	0.87
Benzo(a)pyrene	NA	1.8 U	NA	NA	0.433 U	**1.41**	1.44 U	0.629 U	0.088
Benzo(b)fluoranthene	NA	1.8 U	NA	NA	0.433 U	**2.94**	1.44 U	0.629 U	0.87
Benzo(k)fluoranthene	NA	1.8 U	NA	NA	0.433 U	1.32 U	1.44 U	0.629 U	8.8
Benzoic acid	NA	9 U	NA	NA	2.16 U	6.4 U	7.21 U	0.184 J	310000
bis(2-Ethylhexyl)phthalate	NA	1.8 U	NA	NA	0.378 JB	1.32 U	1.44 U	0.0663 J	46
Chrysene	NA	1.8 U	NA	NA	0.0813 J	1.95	1.44 U	0.629 U	87
di-n-Butylphthalate	NA	1.8 U	NA	NA	0.433 U	1.32 U	1.44 U	1.03	7800
Dibenzofuran	NA	1.8 U	NA	NA	0.433 U	3.08	1.44 U	0.629 U	150
Fluoranthene	NA	1.8 U	NA	NA	0.0868 J	8.46	1.44 U	0.629 U	3100
Fluorene	NA	1.8 U	NA	NA	0.0732 J	3.38	1.44 U	0.629 U	3100
Indeno(1,2,3-cd)pyrene	NA	1.8 U	NA	NA	0.433 U	0.686 J	1.44 U	0.629 U	0.87
Naphthalene	NA	1.8 U	NA	NA	0.328 J	4.2	1.44 U	0.629 U	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-67**	**SB-70**	**SB-72**	**SB-72**	**SB-77**	**SB-77**	**SB-78**	**SB-78**	
Sample Number (96-UMT-:)	**223-SB**	**041-SS**	**240-SB**	**241-SB**	**060-SS**	**283-SB**	**070-SS**	**284-SB**	
Duplicate Sample (96-UMT-:)			**241-SB**	**240-SB**					
Depth (feet BGS:)	**4**	**0**	**3.5**	**3.5**	**0**	**2**	**0**	**2**	**Screening**
Sample Date:	**8/11/96**	**8/9/96**	**8/12/96**	**8/12/96**	**8/9/96**	**8/14/96**	**8/9/96**	**8/14/96**	**Value**
Pentachlorophenol	NA	9 U	NA	NA	2.16 U	6.4 U	7.21 U	3.05 U	5.3
Phenanthrene	NA	1.8 U	NA	NA	0.15 J	24.4	1.44 U	0.069 J	NL
Pyrene	NA	1.8 U	NA	NA	0.247 J	NA	1.44 U	0.629 U	2300
Pest/PCBs									
4,4'-DDD	0.182 JH	2.45 JK	0.409 JK	0.234 JK	NA	NA	0.68 JK	0.276 JH	2.7
4,4'-DDE	0.014 JH	0.46 JK	0.133 U	0.0624 U	NA	NA	0.0874 U	0.0189 JH	1.9
4,4'-DDT	0.548 JL	**10.9 JK**	0.594 JK	0.297 JK	NA	NA	0.0103 JK	0.0265 JL	1.9
Aldrin	0.027 U	0.545 U	0.0663 U	0.0312 U	NA	NA	0.0437 U	0.00953 U	0.038
alpha-BHC	0.027 U	0.545 U	0.0663 U	0.0312 U	NA	NA	0.0437 U	0.00953 U	0.1
Aroclor 1254	0.188 JK	10.9 U	1.33 U	0.624 U	NA	NA	0.874 U	0.191 U	10
beta-BHC	0.027 U	0.545 U	0.0663 U	0.0312 U	NA	NA	0.0437 U	0.00953 U	NL
Chlordane	0.216 U	4.36 U	0.531 U	0.249 U	NA	NA	0.35 U	0.0762 U	0.49
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	78000
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	31
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	6.4
Barium	NA	NA	NA	NA	NA	NA	NA	NA	5500
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	0.24
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	39
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	390
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	14000
Copper	NA	17.2 JH	NA	NA	NA	NA	99.4 JH	NA	3100
Iron	NA	NA	NA	NA	NA	NA	NA	NA	23000

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-67	SB-70	SB-72	SB-72	SB-77	SB-77	SB-78	SB-78	
Sample Number (96-UMT-:)	223-SB	041-SS	240-SB	241-SB	060-SS	283-SB	070-SS	284-SB	
Duplicate Sample (96-UMT-:)			241-SB	240-SB					
Depth (feet BGS:)	4	0	3.5	3.5	0	2	0	2	Screening
Sample Date:	8/11/96	8/9/96	8/12/96	8/12/96	8/9/96	8/14/96	8/9/96	8/14/96	Value
Lead	NA	137 JK	NA	NA	NA	NA	14.3 JK	NA	400
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	1800
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	23
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	1600
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	390
Silver	NA	NA	NA	NA	NA	NA	NA	NA	390
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	550
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	23000
TCLP Lead	NA	NA	NA	NA	NA	NA	NA	NA	NL
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NL

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-79	SB-79	SB-80	SB-80	SB-80	SB-81	SB-81	SB-82	
Sample Number (96-UMT-:)	090-SS	247-SB	110-SS	273-SB	274-SB	145-SS	278-SB	165-SS	
Duplicate Sample (96-UMT-:)				274-SB	273-SB				
Depth (feet BGS:)	0	5	0	3	3	0	2	0	Screening
Sample Date:	8/9/96	8/12/96	8/9/96	8/13/96	8/13/96	8/10/96	8/14/96	8/10/96	Value
GRO	5.8 UJK	5.4 UJK	5.6 UJK	19 JK	6.3 JK	5.3 UJK	7.4 JK	5.5 UJK	100
DRO	NA	6.3 JK	NA	46 JK	34 JK	NA	**250 JK**	NA	200
RRO	NA	16 JK	NA	14 JK	23 JK	NA	650 JK	NA	2000
BTEX									
Benzene	NA	0.087 UJK	NA	NA	NA	NA	0.1 UJK	NA	0.5
Ethylbenzene	NA	0.098 UJK	NA	NA	NA	NA	0.11 UJK	NA	7800
Toluene	NA	0.13 UJK	NA	NA	NA	NA	0.15 UJK	NA	16000
Total Xylenes	NA	0.27 UJK	NA	NA	NA	NA	0.32 UJK	NA	160000
Total BTEX	NA	0 U	NA	NA	NA	NA	0 U	NA	10
VOCs									
1,2,4-Trimethylbenzene	0.00579 U	0.00154 JH	0.00561 U	0.00554 U	0.00273 J	0.00515 U	0.00532 JH	0.00539 U	3900
1,2-Dichlorobenzene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	7000
1,3,5-Trimethylbenzene	0.00579 U	0.0015 JH	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00253 JH	0.00539 U	3900
2-Butanone	0.0116 UJL	0.0109 UJL	0.0112 UJL	0.00906 JL	0.011 UJL	0.0103 UJL	0.00424 JL	0.0108 UJL	47000
2-Chlorotoluene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	1600
Acetone	0.00262 B	0.0109 UJL	0.00853 B	0.0268 B	0.00264 B	0.0103 UJL	0.0125 B	0.0108 UJL	7800
Benzene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	0.5
Ethylbenzene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	7800
Isopropylbenzene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	3100
Methylene chloride	0.00147 JH	0.00266 JH	0.00561 U	0.0027 BJ	0.00201 BJ	0.00515 U	0.00603 U	0.00112 JH	85
n-Propylbenzene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	NL
Naphthalene	0.00579 U	0.00132 JH	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00583 JH	0.00539 U	3100
o-Xylene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00243 JH	0.00539 U	160000
p-Cymene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	NL
sec-Butylbenzene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-79	SB-79	SB-80	SB-80	SB-80	SB-81	SB-81	SB-82	
Sample Number (96-UMT-:)	090-SS	247-SB	110-SS	273-SB	274-SB	145-SS	278-SB	165-SS	
Duplicate Sample (96-UMT-:)				274-SB	273-SB				
Depth (feet BGS:)	0	5	0	3	3	0	2	0	Screening
Sample Date:	8/9/96	8/12/96	8/9/96	8/13/96	8/13/96	8/10/96	8/14/96	8/10/96	Value
tert-Butylbenzene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	780
Toluene	0.00579 U	0.00544 U	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00603 U	0.00539 U	16000
Total BTEX	0 U	0.000684	0 U	0 U	0 U	0 U	0.00739	0 U	10
Total Xylenes	0.00579 U	0.000693 JH	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00742 JH	0.00539 U	160000
Xylene (m + p)	0.00579 U	0.000684 JH	0.00561 U	0.00554 U	0.00549 U	0.00515 U	0.00496 JH	0.00539 U	160000
BNAs									
1,2-Dichlorobenzene	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	7000
2-Chlorophenol	0.384 U	0.0373 J	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	390
2-Methylnaphthalene	0.384 U	0.359 U	0.372 U	0.373 U	0.0396 J	35.2 U	0.42 U	0.362 U	3100
4-Methylphenol	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	390
Acenaphthene	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	4700
Anthracene	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	23000
Benzo(a)anthracene	0.0807 J	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	0.87
Benzo(a)pyrene	0.0666 J	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	0.088
Benzo(b)fluoranthene	0.151 J	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	0.87
Benzo(k)fluoranthene	0.0935 J	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	8.8
Benzoic acid	0.0492 J	1.8 U	1.86 U	1.86 U	1.82 U	176 U	2.04 U	1.81 U	310000
bis(2-Ethylhexyl)phthalate	0.0943 JB	0.0384 BJ	0.109 JB	0.0418 J	0.0661 J	35.2 U	0.42 U	0.0762 JB	46
Chrysene	0.155 J	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	87
di-n-Butylphthalate	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	7800
Dibenzofuran	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	150
Fluoranthene	0.156 J	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	3100
Fluorene	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	3100
Indeno(1,2,3-cd)pyrene	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	0.87
Naphthalene	0.384 U	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-79	SB-79	SB-80	SB-80	SB-80	SB-81	SB-81	SB-82	
Sample Number (96-UMT-:)	090-SS	247-SB	110-SS	273-SB	274-SB	145-SS	278-SB	165-SS	
Duplicate Sample (96-UMT-:)				274-SB	273-SB				
Depth (feet BGS:)	0	5	0	3	3	0	2	0	Screening
Sample Date:	8/9/96	8/12/96	8/9/96	8/13/96	8/13/96	8/10/96	8/14/96	8/10/96	Value
Pentachlorophenol	1.92 U	1.8 U	1.86 U	1.86 U	1.82 U	176 U	2.04 U	1.81 U	5.3
Phenanthrene	0.0396 J	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	NL
Pyrene	0.236 J	0.359 U	0.372 U	0.373 U	0.363 U	35.2 U	0.42 U	0.362 U	2300
Pest/PCBs									
4,4'-DDD	NA	0.0139	NA	0.157	0.152	NA	0.0778 JH	NA	2.7
4,4'-DDE	NA	0.00294 J	NA	0.0226 U	0.022 U	NA	0.0509 U	NA	1.9
4,4'-DDT	NA	0.098	NA	0.0824 JH	0.0715 JH	NA	0.042 JL	NA	1.9
Aldrin	NA	0.00436 U	NA	0.0113 U	0.011 U	NA	0.0255 U	NA	0.038
alpha-BHC	NA	0.00436 U	NA	0.0113 U	0.011 U	NA	0.0255 U	NA	0.1
Aroclor 1254	NA	0.0871 U	NA	0.226 U	0.22 U	NA	0.509 U	NA	10
beta-BHC	NA	0.00436 U	NA	0.0113 U	0.011 U	NA	0.0255 U	NA	NL
Chlordane	NA	0.0348 U	NA	0.0904 U	0.0881 U	NA	0.204 U	NA	0.49
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	78000
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	31
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	6.4
Barium	NA	NA	NA	NA	NA	NA	NA	NA	5500
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	0.24
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	39
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	390
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	14000
Copper	NA	NA	NA	NA	NA	NA	NA	NA	3100
Iron	NA	NA	NA	NA	NA	NA	NA	NA	23000

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-79	SB-79	SB-80	SB-80	SB-80	SB-81	SB-81	SB-82	
Sample Number (96-UMT-:)	090-SS	247-SB	110-SS	273-SB	274-SB	145-SS	278-SB	165-SS	
Duplicate Sample (96-UMT-:)				274-SB	273-SB				
Depth (feet BGS:)	0	5	0	3	3	0	2	0	Screening
Sample Date:	8/9/96	8/12/96	8/9/96	8/13/96	8/13/96	8/10/96	8/14/96	8/10/96	Value
Lead	NA	NA	NA	NA	NA	NA	NA	NA	400
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	1800
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	23
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	1600
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	390
Silver	NA	NA	NA	NA	NA	NA	NA	NA	390
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	550
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	23000
TCLP Lead	NA	NA	NA	NA	NA	NA	NA	NA	NL
Total Organic Carbon	NA	16400 JK	NA	NA	NA	NA	19500	NA	NL

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-82**	**SB-82**	**SB-83**	**SB-83**	**SB-84**	**SB-84**	**SB-89**	**SB-109**	
Sample Number (96-UMT-:)	**295-SB**	**296-SB**	**175-SS**	**315-SB**	**185-SS**	**327-SB**	**243-SB**	**276-SB**	
Duplicate Sample (96-UMT-:)	**296-SB**	**295-SB**							
Depth (feet BGS:)	**3**	**3**	**0**	**3**	**0**	**3**	**2**	**2.8**	**Screening**
Sample Date:	**8/15/96**	**8/15/96**	**8/10/96**	**8/15/96**	**8/10/96**	**8/16/96**	**8/12/96**	**8/13/96**	**Value**
GRO	6.3 UJK	6.9 UJK	5.4 UJK	**560 JK**	12 JK	20 JK	11 JK	**1100 JK**	100
DRO	NA	NA	19 JK	**2100 JK**	NA	NA	31 JK	**4700 JK**	200
RRO	NA	NA	58 JK	39 JK	NA	NA	59 JK	110 JK	2000
BTEX									
Benzene	NA	NA	NA	0.44 UJK	0.089 UJK	NA	0.45 JK	0.99 UJK	0.5
Ethylbenzene	NA	NA	NA	2.3 JK	0.1 UJK	NA	0.15 JK	5.6 JK	7800
Toluene	NA	NA	NA	0.62 JK	0.13 UJK	NA	0.12 UJK	2.2 JK	16000
Total Xylenes	NA	NA	NA	17 JK	0.39 JK	NA	0.25 UJK	13 JK	160000
Total BTEX	NA	NA	NA	**19.92**	0.39	NA	0.6	**20.8**	10
VOCs									
1,2,4-Trimethylbenzene	0.00629 U	0.00676 U	0.00507 U	0.0612 JH	0.00545 U	0.0351 JH	NA	31.4 E	3900
1,2-Dichlorobenzene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.00177 JH	NA	0.0555 U	7000
1,3,5-Trimethylbenzene	0.00629 U	0.00676 U	0.00507 U	1.67 JH	0.00545 U	0.0106 JH	NA	12.9 JH	3900
2-Butanone	0.0496 JL	0.0135 UJL	0.0101 UJL	0.00749 JL	0.0109 UJL	0.0122 UJL	NA	0.111 UJL	47000
2-Chlorotoluene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.00611 U	NA	0.0555 U	1600
Acetone	0.252 B	0.0138 B	0.0101 UJL	0.00523 B	0.0109 B	0.0254 B	NA	0.089 B	7800
Benzene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.0246 JH	NA	0.12 JH	0.5
Ethylbenzene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.00945 JH	NA	0.965 JH	7800
Isopropylbenzene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.00601 JH	NA	0.845 JH	3100
Methylene chloride	0.00619 JH	0.00171 JH	0.00507 U	0.00544 U	0.00114 JH	0.00611 U	NA	0.0555 U	85
n-Propylbenzene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.00708 JH	NA	1.58 JH	NL
Naphthalene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.0319 JH	NA	41 E	3100
o-Xylene	0.00629 U	0.00676 U	0.00507 U	0.0061 JH	0.00545 U	0.0062 JH	NA	0.941 JH	160000
p-Cymene	0.00629 U	0.00676 U	0.00507 U	1.7 JH	0.00545 U	0.0155 JH	NA	12.7 JH	NL
sec-Butylbenzene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.00539 JH	NA	1.14 JH	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-82	SB-82	SB-83	SB-83	SB-84	SB-84	SB-89	SB-109	
Sample Number (96-UMT-:)	295-SB	296-SB	175-SS	315-SB	185-SS	327-SB	243-SB	276-SB	
Duplicate Sample (96-UMT-:)	296-SB	295-SB							
Depth (feet BGS:)	3	3	0	3	0	3	2	2.8	Screening
Sample Date:	8/15/96	8/15/96	8/10/96	8/15/96	8/10/96	8/16/96	8/12/96	8/13/96	Value
tert-Butylbenzene	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.00611 U	NA	0.0555 U	780
Toluene	0.00629 U	0.00676 U	0.00507 U	0.00185 B	0.00545 U	0.00216 B	NA	0.021 B	16000
Total BTEX	0 U	0 U	0 U	0.00795	0 U	0.05411	NA	3.627	10
Total Xylenes	0.00629 U	0.00676 U	0.00507 U	0.00605 JH	0.00545 U	0.0179 JH	NA	2.51 JH	160000
Xylene (m + p)	0.00629 U	0.00676 U	0.00507 U	0.00544 U	0.00545 U	0.0117 JH	NA	1.58 JH	160000
BNAs									
1,2-Dichlorobenzene	0.415 U	0.454 U	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	7000
2-Chlorophenol	0.415 U	0.454 U	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	390
2-Methylnaphthalene	0.415 U	0.454 U	0.358 U	0.359 U	0.179 JH	1.55 JH	NA	0.41 U	3100
4-Methylphenol	0.306 J	0.335 J	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	390
Acenaphthene	0.415 U	0.454 U	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	4700
Anthracene	0.415 U	0.454 U	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	23000
Benzo(a)anthracene	0.415 U	0.454 U	0.0774	0.359 U	0.369 U	0.417 U	NA	0.41 U	0.87
Benzo(a)pyrene	0.415 U	0.454 U	0.0427	0.359 U	0.369 U	0.417 U	NA	0.41 U	0.088
Benzo(b)fluoranthene	0.415 U	0.454 U	0.0597	0.359 U	0.369 U	0.417 U	NA	0.41 U	0.87
Benzo(k)fluoranthene	0.415 U	0.454 U	0.044	0.359 U	0.369 U	0.417 U	NA	0.41 U	8.8
Benzoic acid	2.01 U	2.2 U	1.79 U	1.74 U	1.84 U	2.02 U	NA	1.99 U	310000
bis(2-Ethylhexyl)phthalate	0.415 U	0.454 U	0.358 U	0.0617 J	0.121 BJH	0.0543 JH	NA	0.0416 JH	46
Chrysene	0.415 U	0.454 U	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	87
di-n-Butylphthalate	0.683	0.748	0.358 U	0.359 U	0.369 U	0.686 JH	NA	0.41 U	7800
Dibenzofuran	0.415 U	0.454 U	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	150
Fluoranthene	0.415 U	0.454 U	0.192	0.359 U	0.369 U	0.417 U	NA	0.41 U	3100
Fluorene	0.415 U	0.454 U	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	3100
Indeno(1,2,3-cd)pyrene	0.415 U	0.454 U	0.358 U	0.359 U	0.369 U	0.417 U	NA	0.41 U	0.87
Naphthalene	0.415 U	0.454 U	0.358 U	0.359 U	0.088 JH	0.802 JH	NA	0.41 U	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-82**	**SB-82**	**SB-83**	**SB-83**	**SB-84**	**SB-84**	**SB-89**	**SB-109**	
Sample Number (96-UMT-:)	**295-SB**	**296-SB**	**175-SS**	**315-SB**	**185-SS**	**327-SB**	**243-SB**	**276-SB**	
Duplicate Sample (96-UMT-:)	**296-SB**	**295-SB**							
Depth (feet BGS:)	**3**	**3**	**0**	**3**	**0**	**3**	**2**	**2.8**	**Screening**
Sample Date:	**8/15/96**	**8/15/96**	**8/10/96**	**8/15/96**	**8/10/96**	**8/16/96**	**8/12/96**	**8/13/96**	**Value**
Pentachlorophenol	2.01 U	2.2 U	0.0655	1.74 U	1.84 U	2.02 U	NA	1.99 U	5.3
Phenanthrene	0.415 U	0.454 U	0.214	0.359 U	0.0717 JH	0.052 JH	NA	0.41 U	NL
Pyrene	0.415 U	0.454 U	0.198	0.359 U	0.0408 JH	0.417 U	NA	0.41 U	2300
Pest/PCBs									
4,4'-DDD	0.0292 JH	NA	0.0833 JK	0.00795 JH	NA	NA	NA	0.0974 JH	2.7
4,4'-DDE	0.0195 JH	NA	0.0277 JK	0.00436 U	NA	NA	NA	0.0249 U	1.9
4,4'-DDT	0.155 JL	NA	0.516 JK	0.0101 JL	NA	NA	NA	0.0621 UJL	1.9
Aldrin	0.0126 U	NA	0.0217 U	0.00218 U	NA	NA	NA	0.0124 U	0.038
alpha-BHC	0.0126 U	NA	0.0217 U	0.00218 U	NA	NA	NA	0.0124 U	0.1
Aroclor 1254	0.252 U	NA	0.434 U	0.0436 U	NA	NA	NA	0.249 U	10
beta-BHC	0.0126 U	NA	0.0217 U	0.00218 U	NA	NA	NA	0.0124 U	NL
Chlordane	0.101 U	NA	0.174 U	0.0174 U	NA	NA	NA	0.0994 U	0.49
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	10800	NA	78000
Antimony	NA	NA	NA	NA	NA	NA	7.9 U	NA	31
Arsenic	NA	NA	NA	NA	NA	NA	**8.3**	NA	6.4
Barium	NA	NA	NA	NA	NA	NA	584 JK	NA	5500
Beryllium	NA	NA	NA	NA	NA	NA	**0.37 J**	NA	0.24
Cadmium	NA	NA	NA	NA	NA	NA	0.35 U	NA	39
Calcium	NA	NA	NA	NA	NA	NA	3490	NA	NL
Chromium	NA	NA	NA	NA	NA	NA	22.8	NA	390
Cobalt	NA	NA	NA	NA	NA	NA	14.7	NA	14000
Copper	NA	NA	17 JH	10 JK	NA	NA	30 JK	26.2 JK	3100
Iron	NA	NA	NA	NA	NA	NA	**28800**	NA	23000

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-82**	**SB-82**	**SB-83**	**SB-83**	**SB-84**	**SB-84**	**SB-89**	**SB-109**	
Sample Number (96-UMT-:)	**295-SB**	**296-SB**	**175-SS**	**315-SB**	**185-SS**	**327-SB**	**243-SB**	**276-SB**	
Duplicate Sample (96-UMT-:)	**296-SB**	**295-SB**							
Depth (feet BGS:)	**3**	**3**	**0**	**3**	**0**	**3**	**2**	**2.8**	**Screening**
Sample Date:	**8/15/96**	**8/15/96**	**8/10/96**	**8/15/96**	**8/10/96**	**8/16/96**	**8/12/96**	**8/13/96**	**Value**
Lead	NA	NA	53.7 JK	3.7 JH	NA	NA	13.9 JK	9.3 JH	400
Magnesium	NA	NA	NA	NA	NA	NA	5270 JK	NA	NL
Manganese	NA	NA	NA	NA	NA	NA	859	NA	1800
Mercury	NA	NA	NA	NA	NA	NA	0.02 JH	NA	23
Nickel	NA	NA	NA	NA	NA	NA	41.8	NA	1600
Potassium	NA	NA	NA	NA	NA	NA	1250	NA	NL
Selenium	NA	NA	NA	NA	NA	NA	0.56 U	NA	390
Silver	NA	NA	NA	NA	NA	NA	0.28 U	NA	390
Sodium	NA	NA	NA	NA	NA	NA	94.3 U	NA	NL
Vanadium	NA	NA	NA	NA	NA	NA	35 JK	NA	550
Zinc	NA	NA	NA	NA	NA	NA	85.2	NA	23000
TCLP Lead	NA	NA	NA	NA	NA	NA	173 UJK	NA	NL
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NL

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-118	SB-118	SB-119	SB-121	SB-124	SB-125	SB-126	SB-138	
Sample Number (96-UMT-:)	279-SB	280-SB	282-SB	285-SB	293-SB	294-SB	298-SB	314-SB	
Duplicate Sample (96-UMT-:)	280-SB	279-SB							
Depth (feet BGS:)	3	3	3	3	2	3	2	3	Screening
Sample Date:	8/14/96	8/14/96	8/14/96	8/14/96	8/15/96	8/15/96	8/15/96	8/15/96	Value
GRO	**270 JK**	**280 JK**	6.2 UJK	5.7 UJK	6.3 UJK	**610 JK**	**130 JK**	6.5 JK	100
DRO	**4200 JK**	**2300 JK**	14 JK	34 JK	36 JK	28 JK	**1400 JK**	12 JK	200
RRO	160 JK	64 JK	38 JK	77 JK	170 JK	23 JK	42 JK	39 JK	2000
BTEX									
Benzene	0.49 UJK	0.5 UJK	0.15 JK	0.092 UJK	0.1 UJK	0.17 JK	0.087 UJK	NA	0.5
Ethylbenzene	0.55 UJK	0.56 UJK	0.11 UJK	0.1 UJK	0.11 UJK	3.2 JK	0.35 JK	NA	7800
Toluene	0.74 UJK	0.75 UJK	0.15 UJK	0.14 UJK	0.15 UJK	0.86 JK	0.13 UJK	NA	16000
Total Xylenes	1.8 JK	1.7 JK	0.31 UJK	0.29 UJK	0.31 UJK	12 JK	1.8 JK	NA	160000
Total BTEX	1.8	1.7	0.15	0 U	0 U	**16.23**	2.15	NA	10
VOCs									
1,2,4-Trimethylbenzene	0.113 JH	0.145 JH	0.00595 U	0.00289 JH	NA	NA	NA	0.00642 U	3900
1,2-Dichlorobenzene	0.00605 U	0.00611 U	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	7000
1,3,5-Trimethylbenzene	0.0242 JH	0.0596 JH	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	3900
2-Butanone	0.0121 UJL	0.00126 JL	0.0119 UJL	0.0148 JL	NA	NA	NA	0.0142 JL	47000
2-Chlorotoluene	0.00605 U	0.00611 U	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	1600
Acetone	0.0121 UJL	0.0223 B	0.0049 B	0.0529 B	NA	NA	NA	0.0539 B	7800
Benzene	0.0145 JH	0.0219 JH	0.00194 JH	0.00565 U	NA	NA	NA	0.00642 U	0.5
Ethylbenzene	0.0164 JH	0.0141 JH	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	7800
Isopropylbenzene	0.0411 JH	0.0288 JH	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	3100
Methylene chloride	0.00605 U	0.00171 JH	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	85
n-Propylbenzene	0.0644 JH	0.00611 U	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	NL
Naphthalene	0.00605 U	0.19 JH	0.00347 JH	0.00565 U	NA	NA	NA	0.00642 U	3100
o-Xylene	0.00605 U	0.00582 JH	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	160000
p-Cymene	0.199 JH	0.262 E	0.00203 JH	0.00565 U	NA	NA	NA	0.00642 U	NL
sec-Butylbenzene	0.0963 JH	0.0951 JH	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-118	SB-118	SB-119	SB-121	SB-124	SB-125	SB-126	SB-138	
Sample Number (96-UMT-:)	279-SB	280-SB	282-SB	285-SB	293-SB	294-SB	298-SB	314-SB	
Duplicate Sample (96-UMT-:)	280-SB	279-SB							
Depth (feet BGS:)	3	3	3	3	2	3	2	3	Screening
Sample Date:	8/14/96	8/14/96	8/14/96	8/14/96	8/15/96	8/15/96	8/15/96	8/15/96	Value
tert-Butylbenzene	0.00605 U	0.00611 U	0.00595 U	0.00565 U	NA	NA	NA	0.00642 U	780
Toluene	0.00605 U	0.00218 B	0.00595 U	0.00142 B	NA	NA	NA	0.00642 U	16000
Total BTEX	0.0416	0.0789	0.00194	0.002396	NA	NA	NA	0 U	10
Total Xylenes	0.0108 JH	0.0204 JH	0.00595 U	0.00098 JH	NA	NA	NA	0.00642 U	160000
Xylene (m + p)	0.0107 JH	0.0145 JH	0.00595 U	0.000976 JH	NA	NA	NA	0.00642 U	160000
BNAs									
1,2-Dichlorobenzene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	7000
2-Chlorophenol	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	390
2-Methylnaphthalene	1.9 J	2.25	0.408 U	0.0539 J	NA	NA	NA	0.424 U	3100
4-Methylphenol	2.02 U	0.413 U	0.408 U	0.279 J	NA	NA	NA	0.311 J	390
Acenaphthene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	4700
Anthracene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	23000
Benzo(a)anthracene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	0.87
Benzo(a)pyrene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	0.088
Benzo(b)fluoranthene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	0.87
Benzo(k)fluoranthene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	8.8
Benzoic acid	9.82 U	2 U	1.98 U	1.84 U	NA	NA	NA	2.05 U	310000
bis(2-Ethylhexyl)phthalate	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	46
Chrysene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	87
di-n-Butylphthalate	2.02 U	0.413 U	0.67	0.622	NA	NA	NA	0.697	7800
Dibenzofuran	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	150
Fluoranthene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	3100
Fluorene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	3100
Indeno(1,2,3-cd)pyrene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	0.87
Naphthalene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-118**	**SB-118**	**SB-119**	**SB-121**	**SB-124**	**SB-125**	**SB-126**	**SB-138**	
Sample Number (96-UMT-:)	**279-SB**	**280-SB**	**282-SB**	**285-SB**	**293-SB**	**294-SB**	**298-SB**	**314-SB**	
Duplicate Sample (96-UMT-:)	**280-SB**	**279-SB**							
Depth (feet BGS:)	**3**	**3**	**3**	**3**	**2**	**3**	**2**	**3**	**Screening**
Sample Date:	**8/14/96**	**8/14/96**	**8/14/96**	**8/14/96**	**8/15/96**	**8/15/96**	**8/15/96**	**8/15/96**	**Value**
Pentachlorophenol	9.82 U	2 U	1.98 U	1.84 U	NA	NA	NA	2.05 U	5.3
Phenanthrene	2.02 U	0.348 J	0.408 U	0.379 U	NA	NA	NA	0.424 U	NL
Pyrene	2.02 U	0.413 U	0.408 U	0.379 U	NA	NA	NA	0.424 U	2300
Pest/PCBs									
4,4'-DDD	0.486 JH	0.3 JH	0.033 JK	0.234 JH	0.177 JH	0.00783 JH	0.0256 JH	0.00257 U	2.7
4,4'-DDE	0.0613 U	0.0501 U	0.0247 UJK	0.0459 U	0.0503 U	0.00238 U	0.00871 U	0.00178 JH	1.9
4,4'-DDT	0.0701 JL	0.125 UJL	0.125 JK	0.0471 JL	0.0969 JL	0.00642 JL	0.0443 JL	0.00552 JL	1.9
Aldrin	0.0307 U	0.025 U	0.0124 UJK	0.023 U	0.0252 U	0.00119 U	0.00435 U	0.00128 U	0.038
alpha-BHC	0.0307 U	0.025 U	0.0124 UJK	0.023 U	0.0252 U	0.00119 U	0.00435 U	0.00128 U	0.1
Aroclor 1254	0.613 U	0.501 U	0.247 UJK	0.459 U	0.503 U	0.0238 U	0.0871 U	0.0257 U	10
beta-BHC	0.0307 U	0.025 U	0.0124 UJK	0.023 U	0.0252 U	0.00119 U	0.00435 U	0.00128 U	NL
Chlordane	0.245 U	0.2 U	0.0988 UJK	0.184 U	0.201 U	0.00954 U	0.0348 U	0.0103 U	0.49
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	78000
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	31
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	6.4
Barium	NA	NA	NA	NA	NA	NA	NA	NA	5500
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	0.24
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	39
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	390
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	14000
Copper	NA	NA	NA	NA	NA	NA	NA	29.6 JK	3100
Iron	NA	NA	NA	NA	NA	NA	NA	NA	23000

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-118	SB-118	SB-119	SB-121	SB-124	SB-125	SB-126	SB-138	
Sample Number (96-UMT-:)	279-SB	280-SB	282-SB	285-SB	293-SB	294-SB	298-SB	314-SB	
Duplicate Sample (96-UMT-:)	280-SB	279-SB							
Depth (feet BGS:)	3	3	3	3	2	3	2	3	Screening
Sample Date:	8/14/96	8/14/96	8/14/96	8/14/96	8/15/96	8/15/96	8/15/96	8/15/96	Value
Lead	NA	NA	NA	NA	NA	NA	NA	9.5 JH	400
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	1800
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	23
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	1600
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	390
Silver	NA	NA	NA	NA	NA	NA	NA	NA	390
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	550
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	23000
TCLP Lead	NA	NA	NA	NA	NA	NA	NA	NA	NL
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NA	NL

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-141**	**SB-142**	**SB-156**	**SB-158**	**SB-158**	**SB-165**	**SB-165**	**SB-171**	
Sample Number (96-UMT-:)	**286-SS**	**292-SB**	**323-SB**	**324-SB**	**325-SB**	**328-SB**	**329-SB**	**287-SB**	
Duplicate Sample (96-UMT-:)				**325-SB**	**324-SB**	**329-SB**	**328-SB**		
Depth (feet BGS:)	**0**	**2**	**3**	**3**	**3**	**3**	**3**	**1.5**	**Screening**
Sample Date:	**8/15/96**	**8/15/96**	**8/16/96**	**8/16/96**	**8/16/96**	**8/16/96**	**8/16/96**	**8/18/96**	**Value**
GRO	65 JK	**1000 JK**	27 JK	**170 JK**	**180 JK**	5.6 UJK	5.9 UJK	NA	100
DRO	**33000 JK**	**140000 JK**	170 JK	**1500 JK**	**500 JK**	7.2 JK	470 UJK	NA	200
RRO	**27000 JK**	**75000 JK**	23 JK	420 JK	180 JK	27 JK	47 UJK	NA	2000
BTEX									
Benzene	0.16 UJK	1.3 UJK	0.087 UJK	**0.6 JK**	0.37 JK	0.09 UJK	0.095 UJK	NA	0.5
Ethylbenzene	0.18 UJK	4.5 JK	0.097 UJK	3.6 JK	1.1 JK	0.1 UJK	0.11 UJK	NA	7800
Toluene	0.24 UJK	2 UJK	0.13 UJK	0.3 JK	0.16 UJK	0.14 UJK	0.14 UJK	NA	16000
Total Xylenes	0.5 UJK	96 JK	0.27 UJK	14 JK	5.9 JK	0.28 UJK	0.3 UJK	NA	160000
Total BTEX	0 U	**100.5**	0 U	**18.5**	7.37	0 U	0 U	NA	10
VOCs									
1,2,4-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	3900
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	7000
1,3,5-Trimethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	3900
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	47000
2-Chlorotoluene	NA	NA	NA	NA	NA	NA	NA	NA	1600
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	7800
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	0.5
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	7800
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	3100
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	85
n-Propylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NL
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	3100
o-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	160000
p-Cymene	NA	NA	NA	NA	NA	NA	NA	NA	NL
sec-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-141	SB-142	SB-156	SB-158	SB-158	SB-165	SB-165	SB-171	
Sample Number (96-UMT-:)	286-SS	292-SB	323-SB	324-SB	325-SB	328-SB	329-SB	287-SB	
Duplicate Sample (96-UMT-:)				325-SB	324-SB	329-SB	328-SB		
Depth (feet BGS:)	0	2	3	3	3	3	3	1.5	Screening
Sample Date:	8/15/96	8/15/96	8/16/96	8/16/96	8/16/96	8/16/96	8/16/96	8/18/96	Value
tert-Butylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	780
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	16000
Total BTEX	NA	NA	NA	NA	NA	NA	NA	NA	10
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	160000
Xylene (m + p)	NA	NA	NA	NA	NA	NA	NA	NA	160000
BNAs									
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	7000
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	390
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	3100
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	390
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	4700
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	23000
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.87
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	0.088
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.87
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	8.8
Benzoic acid	NA	NA	NA	NA	NA	NA	NA	NA	310000
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	46
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	87
di-n-Butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	7800
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	150
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	3100
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	3100
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	0.87
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-141**	**SB-142**	**SB-156**	**SB-158**	**SB-158**	**SB-165**	**SB-165**	**SB-171**	
Sample Number (96-UMT-:)	**286-SS**	**292-SB**	**323-SB**	**324-SB**	**325-SB**	**328-SB**	**329-SB**	**287-SB**	
Duplicate Sample (96-UMT-:)				**325-SB**	**324-SB**	**329-SB**	**328-SB**		
Depth (feet BGS:)	**0**	**2**	**3**	**3**	**3**	**3**	**3**	**1.5**	**Screening**
Sample Date:	**8/15/96**	**8/15/96**	**8/16/96**	**8/16/96**	**8/16/96**	**8/16/96**	**8/16/96**	**8/18/96**	**Value**
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	5.3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NL
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	2300
Pest/PCBs									
4,4'-DDD	2.4 U	3.37 U	NA	0.0134 JH	0.0117 JH	0.0394 JH	0.00782 JH	**8.33 JK**	2.7
4,4'-DDE	2.4 U	3.37 U	NA	0.0057 U	0.00524 U	0.00835 JH	0.000947 JH	1.49 U	1.9
4,4'-DDT	**5.61 JL**	8.43 UJL	NA	0.0142 UJL	0.0131 UJL	0.135 JL	0.0279 JL	**7.59 JH**	1.9
Aldrin	1.2 U	1.69 U	NA	0.00285 U	0.00262 U	0.00564 U	0.0118 U	0.744 U	0.038
alpha-BHC	1.2 U	1.69 U	NA	0.00285 U	0.00262 U	0.00564 U	0.0118 U	0.744 U	0.1
Aroclor 1254	**912 JK**	**346 JK**	NA	0.057 U	0.0524 U	0.113 U	0.237 U	14.9 U	10
beta-BHC	1.2 U	1.69 U	NA	0.00285 U	0.00262 U	0.00564 U	0.0118 U	0.744 U	NL
Chlordane	9.62 U	13.5 U	NA	0.0228 U	0.021 U	0.0451 U	0.0947 U	5.95 U	0.49
Metals									
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	78000
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	31
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	6.4
Barium	NA	NA	NA	NA	NA	NA	NA	NA	5500
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	0.24
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	39
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	390
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	14000
Copper	NA	NA	NA	NA	NA	NA	NA	NA	3100
Iron	NA	NA	NA	NA	NA	NA	NA	NA	23000

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-141	SB-142	SB-156	SB-158	SB-158	SB-165	SB-165	SB-171	
Sample Number (96-UMT-:)	286-SS	292-SB	323-SB	324-SB	325-SB	328-SB	329-SB	287-SB	
Duplicate Sample (96-UMT-:)				325-SB	324-SB	329-SB	328-SB		
Depth (feet BGS:)	0	2	3	3	3	3	3	1.5	Screening
Sample Date:	8/15/96	8/15/96	8/16/96	8/16/96	8/16/96	8/16/96	8/16/96	8/18/96	Value
Lead	NA	NA	3.3 JH	NA	NA	5.2 JH	6.9 JH	NA	400
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	1800
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	23
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	1600
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	390
Silver	NA	NA	NA	NA	NA	NA	NA	NA	390
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NL
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	550
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	23000
TCLP Lead	NA	NA	8.8 JH	NA	NA	6.8 JH	6 JH	NA	NL
Total Organic Carbon	25000	NA	NA	NA	NA	NA	NA	NA	NL

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-403**	**SB-405**	**SB-407**	
Sample Number (96-UMT-:)	**403-SB**	**405-SB**	**407-SB**	
Duplicate Sample (96-UMT-:)				
Depth (feet BGS:)	**0**	**0**	**0**	**Screening**
Sample Date:	**8/19/96**	**8/19/96**	**8/19/96**	**Value**
GRO	NA	NA	NA	100
DRO	48 JK	**3300 JK**	**23000 JK**	200
RRO	350 JK	**12000 JK**	**42000 JK**	2000
BTEX				
Benzene	NA	NA	NA	0.5
Ethylbenzene	NA	NA	NA	7800
Toluene	NA	NA	NA	16000
Total Xylenes	NA	NA	NA	160000
Total BTEX	NA	NA	NA	10
VOCs				
1,2,4-Trimethylbenzene	0.00521 U	0.00538 U	0.00545 UJK	3900
1,2-Dichlorobenzene	0.00521 U	0.00538 U	0.00545 UJK	7000
1,3,5-Trimethylbenzene	0.00521 U	0.00538 U	0.00545 UJK	3900
2-Butanone	0.0104 UJL	0.0102 JL	0.0214 JL	47000
2-Chlorotoluene	0.00521 U	0.00538 U	0.00545 UJK	1600
Acetone	0.00415 B	0.0301 B	0.0966 BJK	7800
Benzene	0.00521 U	0.00538 U	0.00545 UJK	0.5
Ethylbenzene	0.00521 U	0.00538 U	0.00545 UJK	7800
Isopropylbenzene	0.00521 U	0.00538 U	0.00545 UJK	3100
Methylene chloride	0.0045 B	0.00538 U	0.00545 UJK	85
n-Propylbenzene	0.00521 U	0.00538 U	0.00545 UJK	NL
Naphthalene	0.00521 U	0.00538 U	0.00545 UJK	3100
o-Xylene	0.00521 U	0.00538 U	0.139 JK	160000
p-Cymene	0.00521 U	0.00538 U	0.00545 UJK	NL
sec-Butylbenzene	0.00521 U	0.00538 U	0.00545 UJK	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-403**	**SB-405**	**SB-407**	
Sample Number (96-UMT-:)	**403-SB**	**405-SB**	**407-SB**	
Duplicate Sample (96-UMT-:)				
Depth (feet BGS:)	**0**	**0**	**0**	**Screening**
Sample Date:	**8/19/96**	**8/19/96**	**8/19/96**	**Value**
tert-Butylbenzene	0.00521 U	0.00538 U	0.00545 UJK	780
Toluene	0.00521 U	0.00538 U	0.00545 UJK	16000
Total BTEX	0 U	0 U	0.139	10
Total Xylenes	0.00521 U	0.00538 U	0.138 JK	160000
Xylene (m + p)	0.00521 U	0.00538 U	0.00545 UJK	160000
BNAs				
1,2-Dichlorobenzene	0.344 U	0.72 U	1.87 UJK	7000
2-Chlorophenol	0.344 U	0.72 U	1.87 UJK	390
2-Methylnaphthalene	0.0387 J	0.101 J	2.28 JK	3100
4-Methylphenol	0.344 U	0.72 U	1.87 UJK	390
Acenaphthene	0.344 U	0.72 U	1.87 UJK	4700
Anthracene	0.344 U	0.72 U	1.87 UJK	23000
Benzo(a)anthracene	0.344 U	0.72 U	1.87 UJK	0.87
Benzo(a)pyrene	0.344 U	0.72 U	1.87 UJK	0.088
Benzo(b)fluoranthene	0.344 U	0.72 U	1.87 UJK	0.87
Benzo(k)fluoranthene	0.344 U	0.72 U	1.87 UJK	8.8
Benzoic acid	1.72 U	3.6 U	9.33 UJK	310000
bis(2-Ethylhexyl)phthalate	0.0948 J	1.58	1.595 JK	46
Chrysene	0.344 U	0.72 U	1.87 UJK	87
di-n-Butylphthalate	0.344 U	0.72 U	1.87 UJK	7800
Dibenzofuran	0.344 U	0.72 U	1.87 UJK	150
Fluoranthene	0.344 U	0.72 U	1.87 UJK	3100
Fluorene	0.344 U	0.72 U	1.87 UJK	3100
Indeno(1,2,3-cd)pyrene	0.344 U	0.72 U	1.87 UJK	0.87
Naphthalene	0.344 U	0.72 U	1.87 UJK	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-403**	**SB-405**	**SB-407**	
Sample Number (96-UMT-:)	**403-SB**	**405-SB**	**407-SB**	
Duplicate Sample (96-UMT-:)				
Depth (feet BGS:)	**0**	**0**	**0**	**Screening**
Sample Date:	**8/19/96**	**8/19/96**	**8/19/96**	**Value**
Pentachlorophenol	1.72 U	3.6 U	9.33 UJK	5.3
Phenanthrene	0.344 U	0.72 U	1.87 UJK	NL
Pyrene	0.344 U	0.72 U	1.87 UJK	2300
Pest/PCBs				
4,4'-DDD	0.417 U	0.768 JK	0.267 JK	2.7
4,4'-DDE	0.417 U	0.109 U	0.0453 U	1.9
4,4'-DDT	**4.72 JH**	0.485 JH	0.0673 JH	1.9
Aldrin	0.208 U	0.0545 U	0.0226 U	0.038
alpha-BHC	0.208 U	0.0545 U	0.0226 U	0.1
Aroclor 1254	4.17 U	1.09 U	0.453 U	10
beta-BHC	0.208 U	0.0545 U	0.0226 U	NL
Chlordane	1.67 U	0.436 U	0.181 U	0.49
Metals				
Aluminum	4340	3800	40400	78000
Antimony	2.5 J	3.7 J	**495**	31
Arsenic	4.6	3.9	**53.2**	6.4
Barium	430	706	1080	5500
Beryllium	0.17 J	0.16 J	**0.18 J**	0.24
Cadmium	0.26 UJL	0.28 UJL	2.7 JL	39
Calcium	1600	1800	13400	NL
Chromium	12.3	12.2	37.6	390
Cobalt	5.4	5.2 J	7.9	14000
Copper	220	42.3	**5920**	3100
Iron	13900	12800	**34900**	23000

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**SB-403**	**SB-405**	**SB-407**	
Sample Number (96-UMT-:)	**403-SB**	**405-SB**	**407-SB**	
Duplicate Sample (96-UMT-:)				
Depth (feet BGS:)	**0**	**0**	**0**	**Screening**
Sample Date:	**8/19/96**	**8/19/96**	**8/19/96**	**Value**
Lead	66.9	58.7	**26400**	400
Magnesium	1970	1980	3380	NL
Manganese	419	503	1430	1800
Mercury	0.05 JL	0.02 UJL	0.16 JL	23
Nickel	19.2	18.8	66	1600
Potassium	539	479 J	1700	NL
Selenium	0.42 U	0.46 U	0.47 U	390
Silver	0.21 UJL	0.23 UJL	2.3 JL	390
Sodium	92.4 J	85.7 J	1520	NL
Vanadium	15.2 JH	12.9 JH	16.2 JH	550
Zinc	208	122	4070	23000
TCLP Lead	NA	NA	NA	NL
Total Organic Carbon	NA	NA	NA	NL

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**601-SL**	**602-SL**	**602-SL**	
Sample Number (96-UMT-:)	**601-SL**	**602-SL**	**603-SL**	
Duplicate Sample (96-UMT-:)	**602-SL**	**601-SL**		
Depth (feet BGS:)	**0**	**0**	**0**	**Screening**
Sample Date:	**12/3/96**	**12/3/96**	**12/3/96**	**Value**
GRO	NA	NA	NA	100
DRO	NA	NA	NA	200
RRO	NA	NA	NA	2000
BTEX				
Benzene	NA	NA	NA	0.5
Ethylbenzene	NA	NA	NA	7800
Toluene	NA	NA	NA	16000
Total Xylenes	NA	NA	NA	160000
Total BTEX	NA	NA	NA	10
VOCs				
1,2,4-Trimethylbenzene	NA	NA	NA	3900
1,2-Dichlorobenzene	NA	NA	NA	7000
1,3,5-Trimethylbenzene	NA	NA	NA	3900
2-Butanone	NA	NA	NA	47000
2-Chlorotoluene	NA	NA	NA	1600
Acetone	NA	NA	NA	7800
Benzene	NA	NA	NA	0.5
Ethylbenzene	NA	NA	NA	7800
Isopropylbenzene	NA	NA	NA	3100
Methylene chloride	NA	NA	NA	85
n-Propylbenzene	NA	NA	NA	NL
Naphthalene	NA	NA	NA	3100
o-Xylene	NA	NA	NA	160000
p-Cymene	NA	NA	NA	NL
sec-Butylbenzene	NA	NA	NA	780

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**601-SL**	**602-SL**	**602-SL**	
Sample Number (96-UMT-:)	**601-SL**	**602-SL**	**603-SL**	
Duplicate Sample (96-UMT-:)	**602-SL**	**601-SL**		
Depth (feet BGS:)	**0**	**0**	**0**	**Screening**
Sample Date:	**12/3/96**	**12/3/96**	**12/3/96**	**Value**
tert-Butylbenzene	NA	NA	NA	780
Toluene	NA	NA	NA	16000
Total BTEX	NA	NA	NA	10
Total Xylenes	NA	NA	NA	160000
Xylene (m + p)	NA	NA	NA	160000
BNAs				
1,2-Dichlorobenzene	NA	NA	NA	7000
2-Chlorophenol	NA	NA	NA	390
2-Methylnaphthalene	NA	NA	NA	3100
4-Methylphenol	NA	NA	NA	390
Acenaphthene	NA	NA	NA	4700
Anthracene	NA	NA	NA	23000
Benzo(a)anthracene	NA	NA	NA	0.87
Benzo(a)pyrene	NA	NA	NA	0.088
Benzo(b)fluoranthene	NA	NA	NA	0.87
Benzo(k)fluoranthene	NA	NA	NA	8.8
Benzoic acid	NA	NA	NA	310000
bis(2-Ethylhexyl)phthalate	NA	NA	NA	46
Chrysene	NA	NA	NA	87
di-n-Butylphthalate	NA	NA	NA	7800
Dibenzofuran	NA	NA	NA	150
Fluoranthene	NA	NA	NA	3100
Fluorene	NA	NA	NA	3100
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.87
Naphthalene	NA	NA	NA	3100

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**601-SL**	**602-SL**	**602-SL**	
Sample Number (96-UMT-:)	**601-SL**	**602-SL**	**603-SL**	
Duplicate Sample (96-UMT-:)	**602-SL**	**601-SL**		
Depth (feet BGS:)	**0**	**0**	**0**	**Screening**
Sample Date:	**12/3/96**	**12/3/96**	**12/3/96**	**Value**
Pentachlorophenol	NA	NA	NA	5.3
Phenanthrene	NA	NA	NA	NL
Pyrene	NA	NA	NA	2300
Pest/PCBs				
4,4'-DDD	0.948	12.5 U	12.2 U	2.7
4,4'-DDE	0.0320 J	12.5 U	12.2 U	1.9
4,4'-DDT	5.28	31.3 U	30.6 U	1.9
Aldrin	0.110 U	6.27 U	6.11 U	0.038
alpha-BHC	0.110 U	6.27 U	6.11 U	0.1
Aroclor 1254	2.21 U	340	326	10
Aroclor 1260	8.63	125 U	122 U	10
beta-BHC	0.110 U	6.27 U	6.11 U	NL
Chlordane	0.882 U	50.1 U	48.9 U	0.49
Dioxin/Furan				
2, 3, 7, 8 TCDD - TEQ	1.6E-4	4.8E-4	6.1E-4	1.0E-3
Metals				
Aluminum	NA	NA	NA	78000
Antimony	NA	NA	NA	31
Arsenic	NA	NA	NA	6.4
Barium	NA	NA	NA	5500
Beryllium	NA	NA	NA	0.24
Cadmium	NA	NA	NA	39
Calcium	NA	NA	NA	NL
Chromium	NA	NA	NA	390

Table 4-23

UNIT B SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**601-SL**	**602-SL**	**602-SL**	
Sample Number (96-UMT-:)	**601-SL**	**602-SL**	**603-SL**	
Duplicate Sample (96-UMT-:)	**602-SL**	**601-SL**		
Depth (feet BGS:)	**0**	**0**	**0**	**Screening**
Sample Date:	**12/3/96**	**12/3/96**	**12/3/96**	**Value**
Cobalt	NA	NA	NA	14000
Copper	NA	NA	NA	3100
Iron	NA	NA	NA	23000
Lead	NA	NA	NA	400
Magnesium	NA	NA	NA	NL
Manganese	NA	NA	NA	1800
Mercury	NA	NA	NA	23
Nickel	NA	NA	NA	1600
Potassium	NA	NA	NA	NL
Selenium	NA	NA	NA	390
Silver	NA	NA	NA	390
Sodium	NA	NA	NA	NL
Vanadium	NA	NA	NA	550
Zinc	NA	NA	NA	23000
TCLP Lead	NA	NA	NA	NL
Total Organic Carbon	NA	NA	NA	NL

Table 4-24

UNIT B FIELD PETROLEUM HYDROCARBON (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
MW-9	5070-FL	0	0.3	100.80	25-125
MW-9	5071-FL	4.6	0.11	567.06	125-625
MW-10	5100-FL	2.5	0.46	48.29	25-125
MW-10	5101-FL	2.5	0.37	70.25	25-125
MW-11	5114-FL	0	0.03	12544.47	>625
MW-11	5115-FL	0	0.03	12544.47	>625
MW-11	5116-FL	2	0.03	12544.47	>625
MW-12	5119-FL	3	0.19	243.45	125-625
MW-13	5133-FL	1.4	0.05	445.52	125-625
MW-14	5135-FL	0	0.07	244.23	125-625
MW-14	5136-FL	2.5	0.05	372.53	125-625
MW-15	5205-FL	3	0.14	81.45	25-125
MW-15	5206-FL	3	0.09	166.31	~125
MW-16	5212-FL	2	0.34	28.12	25-125
MW-20	5224-FL	2	-0.03	830.71	>625
SB-53	040-FL	0	0.25	4.22	<25
SB-53	5072-FL	0	0.66	25.94	<25
SB-53	5073-FL	4	0.09	801.06	>625
SB-53	5004D-FL	4	0.22	26.56	~25
SB-54	5074-FL	5	0.2	202.60	125-625
SB-55	5075-FL	4	0.25	137.97	125-625
SB-56	5076-FL	5	0.56	9.11	<25
SB-57	5077-FL	5	0.52	13.13	<25
SB-58	5078-FL	0	0.53	11.99	<25
SB-58	5079-FL	5	0.46	22.72	<25
SB-59	5080-FL	0	0.26	141.20	125-625
SB-59	5081-FL	10	0.2	244.26	125-625
SB-60	5082-FL	5	0.24	169.50	125-625
SB-61	5083-FL	5	0.08	730.98	>625
SB-62	5084-FL	4	0.52	13.13	<25
SB-62	5085-FL	4	0.44	27.27	~25
SB-63	5086-FL	3	0.07	800.89	>625
SB-64	5087-FL	4	0.51	14.39	<25
SB-65	5088-FL	4	0.43	29.88	25-125
SB-66	5089-FL	4	0.16	297.49	125-625
SB-67	5090-FL	4	0.31	89.43	25-125
SB-68	5091-FL	5	0.09	667.16	~625
SB-69	5092-FL	4	0.39	43.06	25-125
SB-70	5093-FL	5	0.04	3235.82	>625

Table 4-24

UNIT B FIELD PETROLEUM HYDROCARBON (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
SB-71	5094-FL	4	0.56	34.42	25-125
SB-72	5095-FL	3.5	0.33	85.55	25-125
SB-72	5096-FL	3.5	0.37	70.25	25-125
SB-73	5097-FL	4	0.15	332.45	125-625
SB-74	5098-FL	2	0.93	14.37	<25
SB-77	5152-FL	0	0.13	219.87	125-625
SB-78	5153-FL	0	0.51	4.98	<25
SB-79	5106-FL	5	0.67	16.50	<25
SB-80	5120-FL	2	0.22	31.57	25-125
SB-81	145-FL	0	0.33	27.68	~25
SB-81	5134-FL	2	0.3	18.14	<25
SB-82	165-FL	0	0.45	16.38	<25
SB-82	5191-FL	3	0.5	5.51	<25
SB-82	5192-FL	3	0.5	5.51	<25
SB-83	175-FL	0	0.44	17.02	<25
SB-83	5208-FL	3	0	601.13	>625
SB-84	185-FL	0	0.37	22.81	<25
SB-84	5235-FL	3	0.29	63.87	25-125
SB-89	5099-FL	2.5	0.58	32.40	25-125
SB-91	5102-FL	4	0.81	18.23	<25
SB-92	5103-FL	5	0.62	28.89	25-125
SB-93	5104-FL	2	0.72	14.15	<25
SB-94	5105-FL	2	0.7	15.03	<25
SB-95	5107-FL	2.7	0.5	30.83	25-125
SB-96	5108-FL	2	0.63	18.82	<25
SB-97	5109-FL	1.5	0.63	18.82	<25
SB-98	5110-FL	1.5	0.76	12.61	<25
SB-99	5111-FL	3.2	0.75	12.97	<25
SB-100	5112-FL	3.2	0.68	15.99	<25
SB-101	5113-FL	1.8	0.73	13.74	<25
SB-102	5117-FL	0.5	0.66	17.04	<25
SB-103	5118-FL	2.7	0.63	18.82	<25
SB-104	5121-FL	2.5	0.33	15.30	<25
SB-105	5122-FL	3.2	0.11	108.92	~125
SB-106	5123-FL	3.4	0.26	23.42	<25
SB-107	5124-FL	4.8	0.31	17.11	<25
SB-108	5125-FL	2.7	0.02	2289.95	>625
SB-109	5126-FL	2.8	0.01	7900.36	>625
SB-110	5127-FL	3.3	0.03	1109.74	>625
SB-111	5128-FL	0.7	0.3	18.14	<25

Table 4-24

UNIT B FIELD PETROLEUM HYDROCARBON (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
SB-112	5129-FL	.5	0.24	27.02	~25
SB-113	5130-FL	1.1	0.001	483333.71	>625
SB-114	5131-FL	1.7	0.01	7900.36	>625
SB-115	5132-FL	1.8	0.09	155.88	125-625
SB-118	5137-FL	3	0	655.35	>625
SB-118	5138-FL	3	0	655.35	>625
SB-119	5139-FL	3	0.41	6.38	<25
SB-120	5140-FL	.5	0.36	11.23	<25
SB-121	5162-FL	3	0.41	6.38	<25
SB-122	5163-FL	1.5	0.32	17.64	<25
SB-123	5164-FL	3	0.39	8.00	<25
SB-124	5189-FL	2	0.43	11.06	<25
SB-125	5190-FL	3	0.15	180.14	~125
SB-126	5193-FL	2	0.07	399.79	125-625
SB-127	5194-FL	3	0.03	595.58	>625
SB-128	5195-FL	3	0.43	11.06	<25
SB-129	5196-FL	2	0.44	10.01	<25
SB-130	5197-FL	2	0.48	6.72	<25
SB-131	5198-FL	3	0	803.11	>625
SB-132	5199-FL	3	0.16	154.48	~125
SB-133	5200-FL	3	0.47	16.67	<25
SB-134	5201-FL	3	0	601.13	>625
SB-135	5202-FL	2	0.36	3.52	<25
SB-136	5203-FL	2.5	0.24	19.54	<25
SB-137	5204-FL	2.4	0.38	2.65	<25
SB-138	5207-FL	3	0.35	4.06	<25
SB-139	5155-FL	1	0.37	3.05	<25
SB-140	5156-FL	0	0.03	391.70	125-625
SB-140	5157-FL	3	0	601.13	>625
SB-141	5158-FL	0	0.03	391.70	125-625
SB-141	5159-FL	3	0.03	391.70	125-625
SB-142	5160-FL	0	0.11	125.00	25-125
SB-142	5161-FL	2	0	601.13	>625
SB-143	5165-FL	0	0	601.13	>625
SB-143	5166-FL	3	0.08	302.27	125-625
SB-144	5167-FL	0	0.19	110.67	25-125
SB-144	5168-FL	2.5	0.09	275.88	125-625
SB-145	5169-FL	1	0.57	3.44	<25
SB-146	5170-FL	0	0.44	11.28	<25
SB-146	5171-FL	2	0.001	622.01	>625

Table 4-24

UNIT B FIELD PETROLEUM HYDROCARBON (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
SB-147	5172-FL	0	0.45	10.29	<25
SB-147	5173-FL	2	0.25	63.97	25-125
SB-148	5209-FL	3	0.43	12.36	<25
SB-149	5210-FL	3	0.41	14.83	<25
SB-150	5211-FL	2	0.44	11.28	<25
SB-151	5213-FL	2	0.001	**622.01**	**>625**
SB-152	5214-FL	2	0.33	30.80	25-125
SB-154	5222-FL	3	0.37	6.00	<25
SB-155	5223-FL	2	0.29	16.09	<25
SB-156	5225-FL	3	0.06	**273.97**	**125-625**
SB-157	5226-FL	3	0.08	**214.12**	**125-625**
SB-158	5227-FL	3	0.02	**448.55**	**125-625**
SB-158	5228-FL	3	-0.03	**830.71**	**>625**
SB-159	5229-FL	3	0.15	90.36	25-125
SB-160	5230-FL	0	0.31	12.58	<25
SB-160	5231-FL	1.5	-0.05	**1062.92**	**>625**
SB-161	5232-FL	1.5	0.01	**507.39**	**125-625**
SB-162	5233-FL	1.5	0.37	6.00	<25
SB-163	5234-FL	1	0.42	3.24	<25
SB-164	5236-FL	1	0.53	10.66	<25
SB-165	5237-FL	3	0.47	16.67	<25
SB-165	5238-FL	3	0.58	7.34	<25
SB-166	5239-FL	0	-0.02	**645.31**	**>625**
SB-167	5241-FL	2	0.51	12.37	<25
SB-168	5242-FL	.5	0.5	13.33	<25
SB-169	5243-FL	2	0.42	24.21	25-125
SB-170	5244-FL	2	0.55	9.18	<25
SB-171	5174-FL	1.5	0.5	10.38	<25
SB-172	5175-FL	1.5	0.46	14.26	<25
5141-SL	5141-FL	0	0.22	54.59	25-125
5142-SL	5142-FL	0	0.46	3.63	<25
5143-SL	5143-FL	0	0.46	3.63	<25
5144-SL	5144-FL	0	0.45	4.06	<25
5145-SL	5145-FL	0	0.46	3.63	<25
5146-SL	5146-FL	0	0.46	3.63	<25
5147-SL	5147-FL	0	0.45	4.06	<25
5148-SL	5148-FL	0	0.43	5.09	<25
5149-SL	5149-FL	0	0.49	6.08	<25
5150-SL	5150-FL	0	0.49	6.08	<25
5151-SL	5151-FL	0	0.5	5.51	<25

Table 4-24

UNIT B FIELD PETROLEUM HYDROCARBON (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
5154-SL	5154-FL	0	0.16	163.05	25-125

Table 4-25

UNIT B FIELD LABORATORY PCB (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
MW-13	5133-FL	1.4	0.77	0.44	<1
MW-14	5135-FL	0	0.24	21.64	10-50
MW-14	5136-FL	2.5	0.35	9.66	5-10
MW-16	5212-FL	2	0.76	0.3	<1
MW-20	5224-FL	2	0.56	1.4	1-5
SB-81	5134-FL	2	0.82	0.31	<1
SB-84	5235-FL	3	0.82	0.2	<1
SB-94	5105-FL	2	0.78	0.41	<1
SB-118	5137-FL	3	0.5	3.21	1-5
SB-118	5138-FL	3	0.55	2.23	1-5
SB-119	5139-FL	3	0.8	0.36	<1
SB-120	5140-FL	0.5	0.77	0.44	<1
SB-121	5162-FL	3	0.79	0.38	<1
SB-122	5163-FL	1.5	0.81	0.33	<1
SB-123	5164-FL	3	0.82	0.31	<1
SB-131	5198-FL	3	0.49	3.46	1-5
SB-132	5199-FL	3	0.71	0.23	<1
SB-133	5200-FL	3	0.84	0.82	<1
SB-134	5201-FL	3	0.6	1.54	1-5
SB-135	5202-FL	2	0.82	0.31	<1
SB-136	5203-FL	2.5	0.7	0.47	<1
SB-139	5155-FL	1	0.76	0.63	<1
SB-140	5156-FL	0	0.2	14.4	10-50
SB-140	5157-FL	3	0.26	7.78	~10
SB-141	5158-FL	0	0.05	372.82	>50
SB-141	5159-FL	3	0.1	73.28	>50
SB-142	5160-FL	0	0.24	9.39	10-50
SB-142	5161-FL	2	0.17	21.09	10-50
SB-143	5165-FL	0	0.06	243.03	>50
SB-143	5166-FL	3	0.15	28.29	10-50
SB-144	5167-FL	0	0.3	5.56	5-10
SB-144	5168-FL	2.5	0.62	1.01	<1
SB-145	5169-FL	1	0.72	0.71	<1
SB-146	5170-FL	0	0.37	3.4	1-5
SB-146	5171-FL	2	0.17	21.09	10-50
SB-147	5172-FL	0	0.73	0.69	<1
SB-147	5173-FL	2	0.73	0.37	<1
SB-149	5210-FL	3	0.71	0.44	<1
SB-150	5211-FL	2	0.78	0.25	<1
SB-151	5213-FL	2	0.55	1.52	1-5

Table 4-25

UNIT B FIELD LABORATORY PCB (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
SB-152	5214-FL	2	0.72	0.4	<1
SB-154	5222-FL	3	0.74	0.35	<1
SB-155	5223-FL	2	0.71	0.44	<1
SB-156	5225-FL	3	0.7	0.47	<1
SB-157	5226-FL	3	0.73	0.4	<1
SB-158	5227-FL	3	0.68	0.59	<1
SB-158	5228-FL	3	0.65	0.75	<1
SB-159	5229-FL	3	0.82	0.2	<1
SB-160	5230-FL	0	0.74	0.37	<1
SB-160	5231-FL	1.5	0.43	4.05	1-5
SB-161	5232-FL	1.5	0.71	0.47	<1
SB-162	5233-FL	1.5	0.79	0.26	<1
SB-163	5234-FL	1	0.84	0.17	<1
SB-164	5236-FL	1	0.81	0.22	<1
SB-165	5237-FL	0	0.77	0.3	<1
SB-165	5238-FL	3	0.78	0.28	<1
SB-166	5239-FL	0	0.46	3.22	1-5
SB-166	5240-FL	2	0.44	3.75	1-5
SB-167	5241-FL	0.5	0.89	0.72	<1
SB-168	5242-FL	2	0.86	0.77	<1
SB-169	5243-FL	2	0.87	0.75	<1
SB-170	5244-FL	1.5	0.89	0.72	<1
SB-171	5174-FL	1.5	0.85	0.08	<1
SB-172	5175-FL	1	0.81	0.1	<1

Table 4-26

UNIT B FIELD LABORATORY DDT (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
MW-9	5070-FL	0	0.13	211.45	>10
MW-9	5071-FL	4.6	0.45	0.58	.2-1
MW-11	5114-FL	0	0.09	1079.7	>10
MW-11	5115-FL	0	0.09	1079.7	>10
MW-11	5116-FL	2	0.22	3.42	1-10
MW-12	5119-FL	3	0.45	0.03	<.2
MW-13	5133-FL	1.4	0.51	0.07	<.2
MW-16	5212-FL	2	0.26	0.6	.2-1
MW-20	5224-FL	2	0.17	22.1	>10
SB-53	040-FL	0	0.11	637.42	>10
SB-53	040D-FL	0	0.1	736.53	>10
SB-53	5072-FL	0	0.13	211.45	>10
SB-53	5073-FL	4	0.47	0.47	.2-1
SB-54	5074-FL	5	0.17	59.03	>10
SB-55	5075-FL	4	0.7	0.07	<.2
SB-56	5076-FL	5	0.29	2.02	1-10
SB-57	5077-FL	5	0.39	0.35	.2-1
SB-58	5078-FL	0	0.25	4.87	1-10
SB-58	5079-FL	5	0.58	0.03	<.2
SB-59	5080-FL	0	0.64	0.02	<.2
SB-59	5081-FL	10	0.68	0.01	<.2
SB-60	5082-FL	5	0.25	4.87	1-10
SB-61	5083-FL	5	0.35	0.66	.2-1
SB-62	5084-FL	4	0.52	0.06	<.2
SB-62	5085-FL	4	0.36	0.56	.2-1
SB-63	5086-FL	3	0.45	0.15	<.2
SB-64	5087-FL	4	0.42	0.22	~.2
SB-65	5088-FL	4	0.52	0.06	<.2
SB-66	5089-FL	4	0.46	0.52	.2-1
SB-67	5090-FL	4	0.3	1.65	1-10
SB-67	5090-FL	4	0.29	4.65	1-10
SB-68	5091-FL	5	0.41	0.26	1-10
SB-69	5092-FL	4	0.42	0.8	.2-1
SB-70	5093-FL	5	0.22	17.31	>10
SB-71	5094-FL	4	0.6	0.15	<.2
SB-72	5095-FL	3.5	0.59	0.16	<.2
SB-72	5096-FL	3.5	0.47	0.47	.2-1
SB-73	5097-FL	4	0.45	0.58	.2-1
SB-74	5098-FL	2	0.2	27.25	>10

Table 4-26

UNIT B FIELD LABORATORY DDT (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
SB-77	5152-FL	0	0.03	65.52	>10
SB-78	5153-FL	0	0.18	3.05	1-10
SB-79	5106-FL	5	0.35	0.17	<.2
SB-80	5120-FL	2	0.37	0.4	.2-1
SB-82	5191-FL	3	0.18	3.63	1-10
SB-82	5192-FL	3	0.34	0.35	.2-1
SB-84	5235-FL	3	0.29	0.47	.2-1
SB-94	5105-FL	2	0.37	0.12	<.2
SB-95	5107-FL	2.7	0.21	4.62	1-10
SB-96	5108-FL	1.95	0.21	4.62	1-10
SB-97	5109-FL	1.5	0.21	4.62	1-10
SB-98	5110-FL	1.5	0.37	0.12	<.2
SB-99	5111-FL	3.2	0.24	1.95	1-10
SB-100	5112-FL	3.2	0.4	0.07	<.2
SB-101	5113-FL	1.8	0.21	4.62	1-10
SB-102	5117-FL	0.5	0.37	0.12	<.2
SB-103	5118-FL	2.7	0.26	1.17	1
SB-104	5121-FL	2.5	0.51	0.07	<.2
SB-105	5122-FL	3.2	0.49	0.09	<.2
SB-106	5123-FL	3.4	0.51	0.07	<.2
SB-107	5124-FL	4.8	0.51	0.07	<.2
SB-108	5125-FL	2.7	0.52	0.07	<.2
SB-109	5126-FL	2.8	0.41	0.23	.2-1
SB-110	5127-FL	3.3	0.31	1.01	1
SB-111	5128-FL	0.7	0.41	0.23	.2-1
SB-112	5129-FL	0.5	0.47	0.11	<.2
SB-113	5130-FL	1.1	0.41	0.23	.2-1
SB-114	5131-FL	1.7	0.49	0.09	<.2
SB-115	5132-FL	1.8	0.3	1.2	.2-1
SB-124	5189-FL	2	0.28	0.72	.2-1
SB-125	5190-FL	3	0.36	0.29	.2-1
SB-126	5193-FL	2	0.46	0.12	<.2
SB-127	5194-FL	3	0.46	0.12	<.2
SB-128	5195-FL	3	0.58	0.05	<.2
SB-129	5196-FL	2	0.35	0.32	.2-1
SB-130	5197-FL	2	0.42	0.16	~.2
SB-131	5198-FL	3	0.15	7.09	10
SB-132	5199-FL	3	0.38	0.92	.2-1
SB-133	5200-FL	3	0.42	0.11	<.2

Table 4-26

UNIT B FIELD LABORATORY DDT (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
SB-134	5201-FL	3	0.16	4.6	1-10
SB-135	5202-FL	2	0.44	0.02	<.2
SB-136	5203-FL	2.5	0.24	0.9	~1
SB-149	5210-FL	3	0.37	0.06	<.2
SB-150	5211-FL	2	0.45	0.01	<.2
SB-151	5213-FL	2	0.36	0.08	<.2
SB-152	5214-FL	2	0.33	0.14	<.2
SB-154	5222-FL	3	0.18	17.03	>10
SB-155	5223-FL	2	0.28	1.26	1-10
SB-156	5225-FL	3	0.22	6.01	1-10
SB-157	5226-FL	3	0.27	1.63	1-10
SB-158	5227-FL	3	0.38	0.09	<.2
SB-158	5228-FL	3	0.28	1.26	1-10
SB-159	5229-FL	3	0.44	0.02	<.2
SB-160	5230-FL	0	0.39	0.07	<.2
SB-160	5231-FL	1.5	0.2	10.12	~10
SB-161	5232-FL	1.5	0.27	1.63	1-10
SB-162	5233-FL	1.5	0.3	0.75	.2-1
SB-163	5234-FL	1	0.31	0.58	.2-1
SB-164	5236-FL	1	0.28	0.54	.2-1
SB-165	5237-FL	0	0.33	0.29	.2-1
SB-165	5238-FL	3	0.37	0.19	<.2
SB-166	5239-FL	0	0.23	1.15	~1
SB-166	5240-FL	2	0.25	0.83	.2-1
SB-167	5241-FL	0.5	0.32	0.32	.2-1
SB-168	5242-FL	2	0.42	0.11	<.2
SB-169	5243-FL	2	0.35	0.23	~.2
SB-170	5244-FL	1.5	0.41	0.13	<.2
SB-171	5174-FL	1.5	0.29	2.72	1-10
SB-172	5175-FL	1	0.56	0.2	~.2
5141-SL	5141-FL	0	0.12	150.05	>10
5142-SL	5142-FL	0	0.36	0.46	.2-1
5143-SL	5143-FL	0	0.18	3.63	1-10
5144-SL	5144-FL	0	0.07	115.59	>10
5145-SL	5145-FL	0	0.2	2.47	1-10
5146-SL	5146-FL	0	0.48	0.1	<.2
5146-SL	5146D-FL	0	0.36	0.08	<.2
5147-SL	5147-FL	0	0.15	7.09	~10
5148-SL	5148-FL	0	0.16	5.6	1-10

Table 4-26

UNIT B FIELD LABORATORY DDT (PPM)
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Location	Sample	Depth (feet BGS:)	Absorbance	Estimated Concentration	Result
5149-SL	5149-FL	0	0.32	0.17	<.2
5150-SL	5150-FL	0	0.14	6.92	1-10
5151-SL	5151-FL	0	0.23	1.1	1-10
5154-SL	5154-FL	0	0.09	19.22	>10

Table 4-27

UNIT B ENGINEERING PROPERTIES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Sample Location:	MW10	SB-79	MW11	SB-81	SB-141	MW20
Sample Number (96-UMT-:)	244-SB	247-SB	270-SB	278-SB	286-SB	322-SB
Depth (feet BGS:)	2.5	5	2	2	0	2
Sample Date:	8/12/96	8/12/96	8/13/96	8/14/96	8/15/96	8/16/96
Liquid Limit	NA	30	NP	NP	NP	NP
Plastic Limit	NA	26	NP	NP	NP	NP
Plasticity Index	NA	4	NP	NP	NP	NP
Specific Gravity [g/cm^3]	NA	1.7	1.56	1.9	1.5	2.07
Unified Soil Classification	NA	GP-GM	GW	SM	SM	GW
Total Kjeldahl Nitrogen [mg/kg]	NA	259	340	635	1,130	148
Total Organic Carbon [mg/kg]	NA	16,400	21,000	19,500	25,000	15,500
Total Phosphorus [mg/kg]	NA	211	211	47.7	57.1	98.3
pH [S.U.]	NA	6.72	6.30	7.62	7.24	5.93
Total Alkalinity [mg $CaCO_3$/kg]	NA	99.4	ND	318	258	90.2
Heteratrophic Bacteria [#/dry g]	1.1E+06	3.9E+06	4.4E+05	2.0E+04	2.1E+05	4.92E+06
Percent Moisture	7.79	8.16	9.58	21.4	16.8	12.0

Key:

BGS = Below Ground Surface.
NA = Not Analyzed.
NP = Non Plastic.
GP = Poorly Graded Gravel with Sand.
GP-GM = Poorly Graded Gravel with Silt and Sand
GW = Well Graded Gravel.
SM = Silty Sand.
S.U. = Standard pH units.
g/cm^3 = grams per cubic centimeter.
mg $CaCO_3$/kg = milligrams CaCO3/ per kilogram.
#/dry g = Count per dry gram.

Table 4-28

UNIT B GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-9	MW-10	MW-10	MW-11	MW-12		
Sample Number (96-UMT-:)	337-GW	338-GW	338-GW-F	339-GW	340-GW		
Duplicate Sample (96-UMT-:)							
Depth (feet BGS:)	4.44	3.40	3.40	1.30	3.83	Screening	Background
Sample Date:	8/19/96	8/19/96	8/19/96	8/19/96	8/19/96	Value	Concentration
GRO	13700	579	NA	2890	963	350	NL
DRO	24000	2910	NA	31600	15600	1500	NL
TRPH	50600	1000 U	NA	67000	12500	NL	NL
VOCs							
1,2,4-Trimethylbenzene	143	20.9	NA	140 JH	47.6 JH	300	NL
1,3,5-Trimethylbenzene	88.9	3.08 J	NA	56 JH	32.1 JH	300	NL
2-Butanone	4.95 J	2.12 J	NA	6.26 JH	10 U	1900	NL
Acetone	6.76 BJK	3.67 BJK	NA	15 BJK	2.25 BJK	3700	NL
Benzene	4.86 J	29.8	NA	25.8 JH	4.62 JH	0.36	NL
Ethylbenzene	19.6	11.7	NA	12.2 JH	7.16 JH	700	NL
Hexachlorobutadiene	5 U	5 U	NA	5 U	5 U	0.14	NL
Isopropylbenzene	10.9	3.74 J	NA	8.76 JH	4.17 JH	1500	NL
Methylene chloride	5 U	5 U	NA	5 U	5 U	4.1	NL
n-Propylbenzene	10.9	2.35 J	NA	12 JH	5.15 JH	NL	NL
Naphthalene	126	16.6	NA	234 E	24.9 JH	1500	NL
o-Xylene	91.6	4.67 J	NA	25 JH	5.87 JH	1400	NL
p-Cymene	21.2	5.26	NA	36.2 JH	20.9 JH	NL	NL
sec-Butylbenzene	6.21	1.06 J	NA	7.62 JH	3.52 JH	61	NL
Toluene	3.33 B	3.18 B	NA	2.97 B	5 U	750	NL
Total BTEX	303.39	70.15	NA	89.77	37.25	10	NL
Total Xylenes	276	25.5	NA	48.7 JH	25.5 JH	520	NL
Trichloroethene	5 U	5 U	NA	5 U	5 U	1.6	NL
Xylene (m + p)	184	20.8	NA	23.8 JH	19.6 JH	520	NL
PAHs							
Acenaphthene	5.35 U	5.2 U	NA	5.25 U	5.25 U	2200	NL
Acenaphthylene	5.35 U	5.2 U	NA	5.25 U	5.25 U	NL	NL

Table 4-28

UNIT B GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-9	MW-10	MW-10	MW-11	MW-12		
Sample Number (96-UMT-:)	337-GW	338-GW	338-GW-F	339-GW	340-GW		
Duplicate Sample (96-UMT-:)							
Depth (feet BGS:)	4.44	3.40	3.40	1.30	3.83	Screening	Background
Sample Date:	8/19/96	8/19/96	8/19/96	8/19/96	8/19/96	Value	Concentration
Anthracene	1.07 U	1.04 U	NA	1.3	1.05 U	11000	NL
Benzo(a)anthracene	1.07 U	1.04 U	NA	1.1	1.05 U	0.092	NL
Benzo(a)pyrene	1.07 U	1.04 U	NA	1.05 U	1.05 U	0.0092	NL
Benzo(b)fluoranthene	1.07 U	1.04 U	NA	1.05 U	1.05 U	0.092	NL
Benzo(ghi)perylene	2.68 U	2.6 U	NA	2.63 U	2.63 U	NL	NL
Benzo(k)fluoranthene	1.07 U	1.04 U	NA	1.05 U	1.05 U	0.92	NL
Chrysene	1.5 JH	1.04 U	NA	1.05 U	1.05 U	9.2	NL
Dibenzo(a,h)anthracene	2.68 U	2.6 U	NA	2.63 U	2.63 U	0.0092	NL
Fluoranthene	5.8 JH	2.6 U	NA	6	2.63 U	1500	NL
Fluorene	5 JH	1.04 U	NA	6.9	2.8	1500	NL
Naphthalene	5.35 U	5.2 U	NA	33	5.25 U	1500	NL
Phenanthrene	4.1 JH	1.04 U	NA	4	1.4	NL	NL
Total PAHs + BTEX	319.79	70.15	NA	142.07	41.45	15	NL
Pest/PCBs							
4,4'-DDD	NA	NA	NA	1 U	0.5 U	0.28	NL
4,4'-DDT	NA	NA	NA	2 U	0.157 JH	0.2	NL
Aroclor 1254	NA	NA	NA	10 U	5 U	0.0087	NL
Metals	NA	NA	NA	NA	NA		
Aluminum	NA	43800	23.9 U	NA	NA	200	231000/84.8
Arsenic	NA	27.3 JH	4.3 U	NA	NA	0.045	123/ND
Barium	NA	8890	1100	NA	NA	2000	16300/1110
Beryllium	NA	6.4	0.2 U	NA	NA	0.016	11.6/ND
Calcium	NA	103000	31000	NA	NA	NL	170000/45400
Chromium	NA	69.1	4.2 U	NA	NA	100	456/ND
Cobalt	NA	190	3.4 U	NA	NA	6600	404/7.9
Copper	NA	524	2.5 U	NA	NA	1000	848/13.8

Table 4-28

UNIT B GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	**MW-9**	**MW-10**	**MW-10**	**MW-11**	**MW-12**		
Sample Number (96-UMT-:)	**337-GW**	**338-GW**	**338-GW-F**	**339-GW**	**340-GW**		
Duplicate Sample (96-UMT-:)							
Depth (feet BGS:)	**4.44**	**3.40**	**3.40**	**1.30**	**3.83**	**Screening**	**Background**
Sample Date:	**8/19/96**	**8/19/96**	**8/19/96**	**8/19/96**	**8/19/96**	**Value**	**Concentration**
Iron	NA	163000 JK	414	NA	NA	300	697000/415
Lead	NA	175	2.8 U	NA	NA	15	274/ND
Magnesium	NA	36500	13000	NA	NA	NL	146000/20800
Manganese	NA	**78300**	9770	NA	NA	50	37400/9840
Mercury	NA	1	0.1 U	NA	NA	2	1/ND
Nickel	NA	440	14.9 J	NA	NA	100	1060/6.4
Potassium	NA	6770 JK	2750 JK	NA	NA	NL	19400/2030
Selenium	NA	24	4.1 U	NA	NA	50	25/ND
Silver	NA	12.2	3.6 J	NA	NA	100	ND/ND
Sodium	NA	8640 JL	5690 JL	NA	NA	NL	6160/2700
Thallium	NA	**39.8 JH**	**6.3 JH**	NA	NA	2	6.6/4.9
Vanadium	NA	163	3.6 U	NA	NA	260	657/ND
Zinc	NA	1680	17.6	NA	NA	5000	2300/18.8

Table 4-28

UNIT B GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-13	MW-14	MW-15	MW-16	MW-20		
Sample Number (96-UMT-:)	341-GW	342-GW	343-GW	344-GW	331-GW		
Duplicate Sample (96-UMT-:)							
Depth (feet BGS:)	1.42	1.11	1.65	0.75	0.94	Screening	Background
Sample Date:	8/18/96	8/20/96	8/18/96	8/19/96	8/19/96	Value	Concentration
GRO	20000	904	1370	1230	7910	350	NL
DRO	46400	NA	6880	1730	34100	1500	NL
TRPH	28300	244000	1000 U	1000 U	104000	NL	NL
VOCs							
1,2,4-Trimethylbenzene	80.1 JH	26.8 JH	45.6 JH	7.08 JH	61.8 JH	300	NL
1,3,5-Trimethylbenzene	173 JH	18 JH	28.5 JH	1.14 JH	33.5 JH	300	NL
2-Butanone	10 U	1.63 JH	1.51 JH	10 U	8.25 JH	1900	NL
Acetone	10 UJK	5.88 BJK	4.31 BJK	10 UJK	15.1 BJK	3700	NL
Benzene	91.4 JH	9.43 JH	3.98 JH	78.2 JH	5.08 JH	0.36	NL
Ethylbenzene	129 JH	10.6 JH	25 JH	2.48 JH	8.58 JH	700	NL
Hexachlorobutadiene	5 U	25 U	5 U	5 U	1.15 JH	0.14	NL
Isopropylbenzene	36 JH	2.69 JH	11.3 JH	3.62 JH	4.28 JH	1500	NL
Methylene chloride	5 U	1.03 JH	5 U	5 U	5 U	4.1	NL
n-Propylbenzene	39.4 JH	2.83 JH	13.4 JH	1.98 JH	5.01 JH	NL	NL
Naphthalene	130 JH	8 JH	12.3 JH	5 U	82.4 JH	1500	NL
o-Xylene	121 JH	42.6 JH	39.9 JH	4.64 JH	42.4 JH	1400	NL
p-Cymene	59.8 JH	6.63 JH	18.6 JH	2.02 JH	13.9 JH	NL	NL
sec-Butylbenzene	5 U	1.54 JH	4.2 JH	5 U	5 U	61	NL
Toluene	178 JH	31.3 JH	5 U	5 U	25.5 JH	750	NL
Total BTEX	703.4	181.63	152.68	88.1	119.36	10	NL
Total Xylenes	304 JH	130 JH	124 JH	7.4 JH	80.1 JH	520	NL
Trichloroethene	5 U	25 U	5 U	5 U	3.96 JH	1.6	NL
Xylene (m + p)	184 JH	87.7 JH	83.8 JH	2.78 JH	37.8 JH	520	NL
PAHs							
Acenaphthene	7.2	76.9 UJK	5.2 U	5.4 U	54.5 U	2200	NL
Acenaphthylene	13	76.9 UJK	5.2 U	5.4 U	56 JK	NL	NL

Table 4-28

UNIT B GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-13	MW-14	MW-15	MW-16	MW-20		
Sample Number (96-UMT-:)	341-GW	342-GW	343-GW	344-GW	331-GW		
Duplicate Sample (96-UMT-:)							
Depth (feet BGS:)	1.42	1.11	1.65	0.75	0.94	Screening	Background
Sample Date:	8/18/96	8/20/96	8/18/96	8/19/96	8/19/96	Value	Concentration
Anthracene	1.03 U	18 JK	1.04 U	1.08 U	20	11000	NL
Benzo(a)anthracene	1.03 U	15.4 UJK	1.04 U	1.08 U	30	0.092	NL
Benzo(a)pyrene	1.03 U	15.4 UJK	1.04 U	1.08 U	1.6 JK	0.0092	NL
Benzo(b)fluoranthene	1.03 U	15.4 UJK	1.04 U	1.08 U	1.4 JK	0.092	NL
Benzo(ghi)perylene	2.58 U	38.5 UJK	2.6 U	2.7 U	4 JK	NL	NL
Benzo(k)fluoranthene	1.03 U	15.4 UJK	1.04 U	1.08 U	11	0.92	NL
Chrysene	1.03 U	15.4 UJK	1.04 U	1.08 U	4.3 JK	9.2	NL
Dibenzo(a,h)anthracene	2.58 U	38.5 UJK	2.6 U	2.7 U	4.3 JK	0.0092	NL
Fluoranthene	2.58 U	77 JK	2.6 U	2.7 U	88	1500	NL
Fluorene	2.6	37 JK	1.04 U	1.08 U	64	1500	NL
Naphthalene	63	170 JK	4.1 J	5.4 U	220	1500	NL
Phenanthrene	0.8 J	52 JK	1.04 U	1.08 U	54	NL	NL
Total PAHs + BTEX	790	535.63	156.78	88.1	647.96	15	NL
Pest/PCBs							
4,4'-DDD	1.47 JK	1 U	NA	0.1 U	1 U	0.28	NL
4,4'-DDT	0.617 JH	2 U	NA	0.2 U	2 U	0.2	NL
Aroclor 1254	5 U	240 E	NA	1 U	10 U	0.0087	NL
Metals							
Aluminum	NA	NA	NA	NA	NA	200	231000/84.8
Arsenic	NA	NA	NA	NA	NA	0.045	123/ND
Barium	NA	NA	NA	NA	NA	2000	16300/1110
Beryllium	NA	NA	NA	NA	NA	0.016	11.6/ND
Calcium	NA	NA	NA	NA	NA	NL	170000/45400
Chromium	NA	NA	NA	NA	NA	100	456/ND
Cobalt	NA	NA	NA	NA	NA	6600	404/7.9
Copper	NA	NA	NA	NA	NA	1000	848/13.8

Table 4-28

UNIT B GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-13	MW-14	MW-15	MW-16	MW-20		
Sample Number (96-UMT-:)	341-GW	342-GW	343-GW	344-GW	331-GW		
Duplicate Sample (96-UMT-:)							
Depth (feet BGS:)	1.42	1.11	1.65	0.75	0.94	Screening	Background
Sample Date:	8/18/96	8/20/96	8/18/96	8/19/96	8/19/96	Value	Concentration
Iron	NA	NA	NA	NA	NA	300	697000/415
Lead	NA	NA	NA	NA	NA	15	274/ND
Magnesium	NA	NA	NA	NA	NA	NL	146000/20800
Manganese	NA	NA	NA	NA	NA	50	37400/9840
Mercury	NA	NA	NA	NA	NA	2	1/ND
Nickel	NA	NA	NA	NA	NA	100	1060/6.4
Potassium	NA	NA	NA	NA	NA	NL	19400/2030
Selenium	NA	NA	NA	NA	NA	50	25/ND
Silver	NA	NA	NA	NA	NA	100	ND/ND
Sodium	NA	NA	NA	NA	NA	NL	6160/2700
Thallium	NA	NA	NA	NA	NA	2	6.6/4.9
Vanadium	NA	NA	NA	NA	NA	260	657/ND
Zinc	NA	NA	NA	NA	NA	5000	2300/18.8

Table 4-29

FLOAT PLANE LAKE SURFACE WATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	FPL-1	FPL-1	FPL-2	FPL-2	FPL-3	FPL-3	FPL-4		
Sample Number (96-UMT-:)	248-SW	248-SW-F	249-SW	249-SW-F	250-SW	250-SW-F	251-SW	Screening	Background
Sample Date:	8/13/96	8/13/96	8/13/96	8/13/96	8/13/96	8/13/96	8/13/96	Value	Concentration
VOCs									
Acetone	10 U	NA	1.02 B	NA	10 U	NA	10 U	3700	NL
Metals									
Aluminum	23.9 U	46.1 J	23.9 U	25.2 J	23.9 U	23.9 U	23.9 U	200	385/ND
Antimony	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	6	ND/ND
Arsenic	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	0.045	ND/ND
Barium	120	117	117	112	120	115	121	2000	84.4/75.9
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.016	ND/ND
Cadmium	2.6 U	2.7 JH	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	5	ND/ND
Calcium	11000	11100	10700	10500	11000	11400	11200	NL	15600/15500
Chromium	4.2 U	4.2 U	4.2 U	4.4 JH	4.2 U	4.2 U	4.2 U	100	ND/ND
Cobalt	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	6600	ND/ND
Copper	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1000	10.8/ND
Iron	179	113	185	73.7	194	71	215	300	857/68
Lead	2.8 U	2.8 U	2.9 J	2.8 U	2.8 U	2.8 U	2.8 U	15	3.1/3.7
Magnesium	5670	5700	5530	5440	5650	5910	5780	NL	6200/6070
Manganese	13.7	7.3 J	16.8	6.3 J	15.8	3.1 J	17.6	50	108/95.8
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2	ND/ND
Nickel	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	100	12.9/ND
Potassium	690	693	677	765	714	679	685	NL	513/442
Selenium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	50	5.3/ND
Silver	2.1 UJL	2.1 UJL	2.4 JL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	100	ND/ND
Sodium	1620	1600	1610	1580	1640	1600	1670	NL	5320/5250
Thallium	3 U	3 U	3 U	3 U	3 U	3 U	3 U	2	ND/ND
Vanadium	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	260	ND/ND
Zinc	5.8 JH	55.9 JH	3.8 U	88.3 JH	202 JH	5.2 JH	9.5 JH	5000	7.7/28.6

Table 4-29

FLOAT PLANE LAKE SURFACE WATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	FPL-4	FPL-5	FPL-5	FPL-6	FPL-6		
Sample Number (96-UMT-:)	251-SW-F	252-SW	252-SW-F	253-SW	253-SW-F	Screening	Background
Sample Date:	8/13/96	8/13/96	8/13/96	8/13/96	8/13/96	Value	Concentration
VOCs							
Acetone	NA	10 U	NA	10 U	NA	3700	NL
Metals							
Aluminum	23.9 U	23.9 U	23.9 U	26 J	23.9 U	200	385/ND
Antimony	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	6	ND/ND
Arsenic	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	0.045	ND/ND
Barium	111	119	115	117	112	2000	84.4/75.9
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.016	ND/ND
Cadmium	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	5	ND/ND
Calcium	11100	11000	11400	10800	11100	NL	15600/15500
Chromium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	100	ND/ND
Cobalt	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	6600	ND/ND
Copper	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1000	10.8/ND
Iron	61.3	211	29.5 J	221	27.6 J	300	857/68
Lead	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	15	3.1/3.7
Magnesium	5720	5690	5880	5540	5730	NL	6200/6070
Manganese	6.2 J	16.4	4.7 J	20.4	7.3 J	50	108/95.8
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2	ND/ND
Nickel	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	100	12.9/ND
Potassium	645	670	660	667	639	NL	513/442
Selenium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	50	5.3/ND
Silver	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	100	ND/ND
Sodium	1600	1630	1600	1640	1550	NL	5320/5250
Thallium	3 U	3 U	3 U	3 U	3 U	2	ND/ND
Vanadium	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	260	ND/ND
Zinc	3.8 U	18.9 JH	68.8 JH	120 JH	3.8 U	5000	7.7/28.6

Table 4-30

FLOAT PLANE LAKE SEDIMENT SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	FPL-1	FPL-2	FPL-3	FPL-4	FPL-5	FPL-6	
Sample Number (96-UMT-:)	254-SD	255-SD	256-SD	257-SD	258-SD	259-SD	Screening
Sample Date:	8/12/96	8/12/96	8/12/96	8/12/96	8/12/96	8/12/96	Value
RRO	52 JK	170 JK	90 JK	170 JK	98 JK	200 JK	2000
VOCs							
2-Butanone	0.0243 JL	0.0312 JL	0.0169 JL	0.00839 JL	0.023 JL	0.0167 UJL	47000
Acetone	0.085 B	0.145 B	0.0756 B	0.0475 B	0.104 B	0.00811 B	7800
Benzene	0.00706 U	0.00673 U	0.00722 U	0.00699 U	0.00632 U	0.0066 JH	0.5
Total BTEX	0 U	0 U	0 U	0 U	0 U	0.0066	10
BNAs							
2-Methylnaphthalene	0.464 U	0.455 U	0.0618 J	0.0601 J	0.0505 J	0.559 U	3100
Benzo(a)pyrene	0.0594 J	0.455 U	0.497 U	0.492 U	0.466 U	0.559 U	0.088
bis(2-Ethylhexyl)phthalate	0.0692 JB	0.068 JB	0.109 JB	0.113 JB	0.0865 JB	0.124 JB	46
di-n-Butylphthalate	0.464 U	0.455 U	0.497 U	0.492 U	0.466 U	0.138 J	7800
Phenanthrene	0.464 U	0.455 U	0.0708 J	0.0668 J	0.0582 J	0.559 U	NL
Pest/PCBs							
4,4'-DDD	0.00563 U	0.0354 JH	0.0121 U	0.127 JH	0.00282 U	0.0863 JH	2.7
4,4'-DDE	0.0043 JH	0.0119 JH	0.0121 U	0.0419 JH	0.00282 U	0.0328 JH	1.9
4,4'-DDT	0.0141 UJL	0.0276 UJL	0.0301 UJL	0.0286 JL	0.00706 UJL	0.0846 UJL	1.9

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-3	MW-3	MW-3	MW-4	MW-4	MW-5	MW-6	MW-6	
Sample Number (96-UMT-:)	195-SS	196-SB	197-SB	201-SS	202-SB	208-SB	203-SB	204-SB	
Duplicate Sample (96-UMT-:)		197-SB	196-SB					205-SB	
Depth (feet BGS:)	0	4	4	0	5	6	0	3	Screening
Sample Date:	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	Value
GRO	6.2 UJK	5.4 UJK	5.7 UJK	5.2 UJK	5.6 UJK	5.5 UJK	5.1 UJK	10 JK	100
DRO	11 JK	4.4 UJK	4.5 UJK	4.1 UJK	6.1 JK	4.4 UJK	4.1 UJK	1200 JK	200
RRO	30 JK	44 UJK	45 UJK	41 UJK	45 UJK	44 UJK	41 UJK	4100 JK	2000
BTEX									
Benzene	0.099 UJK	0.087 UJK	0.091 UJK	0.083 U	0.09 U	0.089 U	0.082 U	0.082 U	0.5
Ethylbenzene	0.11 UJK	0.098 UJK	0.1 UJK	0.093 U	0.1 U	0.1 U	0.092 U	0.092 U	7800
Toluene	0.15 UJK	0.13 UJK	0.14 UJK	0.12 U	0.14 U	0.13 U	0.12 U	0.12 U	16000
Total Xylenes	0.31 UJK	0.27 UJK	0.28 UJK	0.26 U	0.28 U	0.28 U	0.25 U	0.26 U	160000
Total BTEX	0 U	0 U	0 U	0 U	0 U	0 U	0 U	0 U	10
VOCs									
Acetone	0.0124 UJL	0.0105 UJL	0.0111 UJL	0.0101 UJL	0.0111 UJL	NA	0.0102 UJL	0.0519 UJL	7800
Methylene chloride	0.00156 JH	0.00524 U	0.00555 U	0.00505 U	0.00261 JH	NA	0.00228 J	0.00676 JH	85
o-Xylene	0.00619 U	0.00524 U	0.00555 U	0.00505 U	0.00554 U	NA	0.00509 U	0.00288 JH	160000
Toluene	0.00176 B	0.00524 U	0.00555 U	0.00505 U	0.00554 U	NA	0.00509 U	0.026 U	16000
Total BTEX	0.00176	0 U	0 U	0 U	0 U	NA	0 U	0.0086	10
Total Xylenes	0.00619 U	0.00524 U	0.00555 U	0.00505 U	0.00554 U	NA	0.00509 U	0.00859 JH	160000
Xylene (m + p)	0.00619 U	0.00524 U	0.00555 U	0.00505 U	0.00554 U	NA	0.00509 U	0.00572 JH	160000
BNAs									
2-Methylnaphthalene	0.0753	0.359 U	0.374 U	0.342 U	0.371 U	NA	0.336 U	3.39 U	3100
Benzoic acid	2.04 U	1.8 U	1.87 U	1.71 U	1.86 U	NA	1.68 U	17 U	310000
bis(2-Ethylhexyl)phthalate	0.409 U	0.0566 JB	0.0429	0.342 U	0.0461 JB	NA	0.0517	3.39 U	46
di-n-Octylphthalate	0.409 U	0.359 U	0.374 U	0.342 U	0.371 U	NA	0.336 U	3.39 U	NL
Phenanthrene	0.0691	0.359 U	0.374 U	0.342 U	0.371 U	NA	0.336 U	3.39 U	NL
Pyrene	0.409 U	0.359 U	0.374 U	0.342 U	0.371 U	NA	0.336 U	0.377	2300
Pest/PCBs									

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-3	MW-3	MW-3	MW-4	MW-4	MW-5	MW-6	MW-6	
Sample Number (96-UMT-:)	195-SS	196-SB	197-SB	201-SS	202-SB	208-SB	203-SB	204-SB	
Duplicate Sample (96-UMT-:)		197-SB	196-SB					205-SB	
Depth (feet BGS:)	0	4	4	0	5	6	0	3	Screening
Sample Date:	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	Value
4,4'-DDD	0.00384 J	0.00218 U	0.00227 U	0.00207 U	0.000563 J	0.00222 U	0.00204 U	29 JK	2.7
4,4'-DDE	0.00495 U	0.00218 U	0.00227 U	0.00207 U	0.00225 U	0.00222 U	0.00204 U	4.11 U	1.9
4,4'-DDT	0.00953 J	0.00544 UJL	0.00567 U	0.00173 J	0.00105 JL	0.00554 UJL	0.00509 U	35.5 JK	1.9
Aroclor 1254	0.0495 U	0.0218 U	0.0227 U	0.0207 U	0.0225 U	0.0222 U	0.0204 U	41.1 U	10
Metals									
Aluminum	9280	2830	1700	3470	3900	NA	1730	2340	78000
Antimony	7.1 UJL	5.6 U	6.2 UJL	5.8 UJL	6.1 UJL	NA	5.8 UJL	5 UJL	31
Arsenic	8.4 JK	1.9	1.8 JK	5.7 JK	5.1	NA	1.8 JK	2.6 JK	6.4
Barium	552	164 JK	137	220	287 JK	NA	102	140	5500
Beryllium	0.37 J	0.07 J	0.07 J	0.17 J	0.16 J	NA	0.07 J	0.09 J	0.24
Cadmium	0.32 UJL	0.25 U	0.28 UJL	0.26 UJL	0.27 UJL	NA	0.26 UJL	0.22 UJL	39
Calcium	4290	1240	718	1580	1620	NA	736	879	NL
Chromium	19.2	8.5	4	6.1	8.3	NA	3.2	5.1	390
Cobalt	13.8	3.6	2.8	5.7	5.7	NA	2.9	3.4	14000
Copper	31.4 JH	9.3 JK	7.2 JH	14.1 JH	14.4 JK	NA	8.3 JH	10.9 JH	3100
Iron	27800	7580	5590	12300	11800	NA	5800	7760	23000
Lead	10.9 JK	2.3 JK	3 JK	4.6 JK	5.6 JK	NA	3.3 JK	18 JK	400
Magnesium	5170	1650 JK	828	1880	1990 JK	NA	930	1250	NL
Manganese	805	198	215	364	391	NA	195	229	1800
Mercury	0.04	0.02 U	0.02 U	0.02 U	0.06 JH	NA	0.02 U	0.02 U	23
Nickel	38.5	10.6	9	17.8	17.4	NA	9.4	12.3	1600
Potassium	912	305	227	336	489	NA	185	227	NL
Selenium	0.5 U	0.39 U	0.43 U	0.45 J	0.43 U	NA	0.41 U	0.35 U	390
Silver	0.25 UJL	0.2 U	0.22 UJL	0.21 UJL	0.22 UJL	NA	0.21 UJL	0.18 UJL	390
Sodium	85.5 U	66.7 U	74.8 U	70.2 U	73.4 U	NA	69.7 U	60.4 U	NL

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-3	MW-3	MW-3	MW-4	MW-4	MW-5	MW-6	MW-6	
Sample Number (96-UMT-:)	195-SS	196-SB	197-SB	201-SS	202-SB	208-SB	203-SB	204-SB	
Duplicate Sample (96-UMT-:)		197-SB	196-SB					205-SB	
Depth (feet BGS:)	0	4	4	0	5	6	0	3	Screening
Sample Date:	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	8/10/96	Value
Thallium	0.36 U	0.28 U	0.32 U	0.3 U	0.31 U	NA	0.3 U	0.26 U	NL
Vanadium	30.7	11.1 JK	5.8	13.7	12.5 JK	NA	6.7	9	550
Zinc	121	21.4	47.9	59.5	39.6	NA	40.2	39.6	23000
Total Organic Carbon	NA	5550 JK	NA	NA	7080 JK	NA	NA	NA	NL

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**MW-6**	**MW-7**	**MW-7**	**MW-8**	**SB-401**	**SB-401**	**SB-44**	
Sample Number (96-UMT-:)	**205-SB**	**209-SS**	**210-SB**	**211-SB**	**401-SB**	**207-SB**	**199-SB**	
Duplicate Sample (96-UMT-:)	**204-SB**							
Depth (feet BGS:)	**3**	**0**	**6**	**3**	**0**	**3**	**5**	**Screening**
Sample Date:	**8/10/96**	**8/10/96**	**8/10/96**	**8/10/96**	**8/19/96**	**8/10/96**	**8/10/96**	**Value**
GRO	10 JK	5.2 UJK	5.8 UJK	5.2 UJK	NA	5.2 UJK	5.2 UJK	100
DRO	**1300 JK**	5.6 JK	4.6 UJK	4.9 JK	5.2 JK	4.5 JK	4.3 JK	200
RRO	**4200 JK**	100 UJK	120 UJK	42 UJK	24 JK	42 UJK	41 UJK	2000
BTEX								
Benzene	0.083 U	0.083 U	0.093 UJK	0.083 UJK	NA	0.084 U	0.083 UJK	0.5
Ethylbenzene	0.093 U	0.093 U	0.1 UJK	0.093 UJK	NA	0.094 U	0.093 UJK	7800
Toluene	0.12 U	0.12 U	0.14 UJK	0.12 UJK	NA	0.13 U	0.12 UJK	16000
Total Xylenes	0.26 U	0.26 U	0.29 UJK	0.26 UJK	NA	0.26 U	0.26 UJK	160000
Total BTEX	0 U	0 U	0 U	0 U	NA	0 U	0 U	10
VOCs								
Acetone	0.0104 UJL	0.01 UJL	0.0108 UJL	NA	0.0101 UJL	NA	NA	7800
Methylene chloride	0.00519 U	0.0135	0.00248 J	NA	0.00321 BJ	NA	NA	85
o-Xylene	0.00519 U	0.00502 U	0.0054 U	NA	0.00504 U	NA	NA	160000
Toluene	0.00519 U	0.0045 B	0.0054 U	NA	0.00504 U	NA	NA	16000
Total BTEX	0 U	0.0045	0 U	NA	0 U	NA	NA	10
Total Xylenes	0.00519 U	0.00502 U	0.0054 U	NA	0.00504 U	NA	NA	160000
Xylene (m + p)	0.00519 U	0.00502 U	0.0054 U	NA	0.00504 U	NA	NA	160000
BNAs								
2-Methylnaphthalene	3.43 U	0.341 U	0.382 U	NA	0.348 U	NA	NA	3100
Benzoic acid	17.1 U	1.7 U	1.91 U	NA	1.74 U	NA	NA	310000
bis(2-Ethylhexyl)phthalate	3.43 U	0.118 JB	0.0483 JB	NA	0.105 J	NA	NA	46
di-n-Octylphthalate	3.43 U	0.159 J	0.382 U	NA	0.348 U	NA	NA	NL
Phenanthrene	3.43 U	0.341 U	0.382 U	NA	0.348 U	NA	NA	NL
Pyrene	0.616 JH	0.341 U	0.382 U	NA	0.348 U	NA	NA	2300
Pest/PCBs								

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-6	MW-7	MW-7	MW-8	SB-401	SB-401	SB-44	
Sample Number (96-UMT-:)	205-SB	209-SS	210-SB	211-SB	401-SB	207-SB	199-SB	
Duplicate Sample (96-UMT-:)	204-SB							
Depth (feet BGS:)	3	0	6	3	0	3	5	Screening
Sample Date:	8/10/96	8/10/96	8/10/96	8/10/96	8/19/96	8/10/96	8/10/96	Value
4,4'-DDD	31.4 JK	0.00206 U	0.00231 U	0.00192 J	0.0579 JK	0.0306	0.00207 U	2.7
4,4'-DDE	4.15 U	0.00206 U	0.00231 U	0.00208 U	0.0527 U	0.000619 J	0.00207 U	1.9
4,4'-DDT	38.2 JK	0.00516 UJL	0.00579 UJL	0.00498 JL	0.376 JH	0.0435 JL	0.000363 JL	1.9
Aroclor 1254	41.5 U	0.0206 U	0.0231 U	0.0418	0.527 U	0.224	0.0207 U	10
Metals								
Aluminum	2530	4890	3040	NA	2700	NA	NA	78000
Antimony	5.9 UJL	5.5 U	6.3 U	NA	0.95 J	NA	NA	31
Arsenic	3.9 JK	5.7	3.5	NA	3.9	NA	NA	6.4
Barium	187	264 JK	271 JK	NA	200	NA	NA	5500
Beryllium	0.1 J	0.17 J	0.11 J	NA	0.12 J	NA	NA	0.24
Cadmium	0.26 UJL	0.24 U	0.28 U	NA	0.25 UJL	NA	NA	39
Calcium	1360	1930	1350	NA	2150	NA	NA	NL
Chromium	5	8.7	9.6	NA	6.9	NA	NA	390
Cobalt	3.8	7.5	4.6	NA	5.2	NA	NA	14000
Copper	11.4 JH	16.5 JK	11.9 JK	NA	12.2	NA	NA	3100
Iron	9010	16900	10400	NA	12700	NA	NA	23000
Lead	25.2 JK	5.6 JK	4 JK	NA	598	NA	NA	400
Magnesium	1320	2490 JK	1510 JK	NA	1380	NA	NA	NL
Manganese	240	461	357	NA	805	NA	NA	1800
Mercury	0.02 U	0.04 JH	0.04 JH	NA	0.02 UJL	NA	NA	23
Nickel	13.2	22.2	15.5	NA	14.7	NA	NA	1600
Potassium	278	473	340	NA	281 J	NA	NA	NL
Selenium	0.41 U	0.38 U	0.44 U	NA	0.41 U	NA	NA	390
Silver	0.21 UJL	0.2 U	0.23 U	NA	0.21 UJL	NA	NA	390
Sodium	70.4 U	65.5 U	75.6 U	NA	61.4 J	NA	NA	NL

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	MW-6	MW-7	MW-7	MW-8	SB-401	SB-401	SB-44	
Sample Number (96-UMT-:)	205-SB	209-SS	210-SB	211-SB	401-SB	207-SB	199-SB	
Duplicate Sample (96-UMT-:)	204-SB							
Depth (feet BGS:)	3	0	6	3	0	3	5	Screening
Sample Date:	8/10/96	8/10/96	8/10/96	8/10/96	8/19/96	8/10/96	8/10/96	Value
Thallium	0.3 U	0.28 U	0.32 U	NA	0.29 UJL	NA	NA	NL
Vanadium	10.4	18.5 JK	11 JK	NA	10.8 JH	NA	NA	550
Zinc	64.7	51	35.3	NA	32	NA	NA	23000
Total Organic Carbon	NA	NA	NA	NA	NA	NA	NA	NL

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-45	SB-49	SB-50	SB-50	SB-51	
Sample Number (96-UMT-:)	200-SB	212-SB	213-SS	214-SB	215-SB	
Duplicate Sample (96-UMT-:)						
Depth (feet BGS:)	3	7	0	6	7	Screening
Sample Date:	8/10/96	8/11/96	8/10/96	8/11/96	8/11/96	Value
GRO	19 JK	5.3 UJK	6 UJK	5.3 UJK	5.5 UJK	100
DRO	4.5 JK	4.3 UJK	9.6 JK	5.9 JK	4.4 UJK	200
RRO	42 UJK	43 UJK	120 UJK	110 UJK	44 UJK	2000
BTEX						
Benzene	0.083 UJK	0.085 UJK	0.096 UJK	0.085 UJK	0.088 UJK	0.5
Ethylbenzene	0.094 UJK	0.096 UJK	0.11 UJK	0.095 UJK	0.099 UJK	7800
Toluene	0.13 UJK	0.13 UJK	0.14 UJK	0.13 UJK	0.5 JK	16000
Total Xylenes	0.26 UJK	0.27 UJK	0.3 UJK	0.26 UJK	0.22 JK	160000
Total BTEX	0 U	0 U	0 U	0 U	0.72	10
VOCs						
Acetone	NA	NA	0.0199 B	0.0104 UJL	NA	7800
Methylene chloride	NA	NA	0.00248 JH	0.0117 JH	NA	85
o-Xylene	NA	NA	0.00597 U	0.00517 U	NA	160000
Toluene	NA	NA	0.00597 U	0.00517 U	NA	16000
Total BTEX	NA	NA	0 U	0 U	NA	10
Total Xylenes	NA	NA	0.00597 U	0.00517 U	NA	160000
Xylene (m + p)	NA	NA	0.00597 U	0.00517 U	NA	160000
BNAs						
2-Methylnaphthalene	NA	NA	0.0428 J	0.349 U	NA	3100
Benzoic acid	NA	NA	0.0585 J	1.75 U	NA	310000
bis(2-Ethylhexyl)phthalate	NA	NA	0.0447 JB	0.0536 JB	NA	46
di-n-Octylphthalate	NA	NA	0.396 U	0.349 U	NA	NL
Phenanthrene	NA	NA	0.396 U	0.349 U	NA	NL
Pyrene	NA	NA	0.396 U	0.349 U	NA	2300
Pest/PCBs						

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-45	SB-49	SB-50	SB-50	SB-51	
Sample Number (96-UMT-:)	200-SB	212-SB	213-SS	214-SB	215-SB	
Duplicate Sample (96-UMT-:)						
Depth (feet BGS:)	3	7	0	6	7	Screening
Sample Date:	8/10/96	8/11/96	8/10/96	8/11/96	8/11/96	Value
4,4'-DDD	0.00208 U	0.0154 JH	0.0393	0.00219	0.00221 U	2.7
4,4'-DDE	0.00208 U	0.00851 U	0.000504 J	0.00212 U	0.00221 U	1.9
4,4'-DDT	0.00198 JL	0.0423 JL	0.171 JL	0.0111 JL	0.00254 J	1.9
Aroclor 1254	0.0208 U	0.0851 U	0.24 U	0.0212 U	0.0221 U	10
Metals						
Aluminum	NA	NA	8060	3260	NA	78000
Antimony	NA	NA	6.3 U	5.6 U	NA	31
Arsenic	NA	NA	**6.8**	3.4	NA	6.4
Barium	NA	NA	537 JK	222 JK	NA	5500
Beryllium	NA	NA	**0.28 J**	0.11 J	NA	0.24
Cadmium	NA	NA	0.28 U	0.25 U	NA	39
Calcium	NA	NA	2670	1230	NA	NL
Chromium	NA	NA	16	6.2	NA	390
Cobalt	NA	NA	11.8	4.7	NA	14000
Copper	NA	NA	24.7 JK	11.8 JK	NA	3100
Iron	NA	NA	**25000**	11100	NA	23000
Lead	NA	NA	17.6 JK	4.7 JK	NA	400
Magnesium	NA	NA	4130 JK	1580 JK	NA	NL
Manganese	NA	NA	737	286	NA	1800
Mercury	NA	NA	0.06 JH	0.02 U	NA	23
Nickel	NA	NA	33.3	14.9	NA	1600
Potassium	NA	NA	756	396	NA	NL
Selenium	NA	NA	0.44 U	0.39 U	NA	390
Silver	NA	NA	0.23 U	0.2 U	NA	390
Sodium	NA	NA	76.2 U	67.2 U	NA	NL

Table 4-31

UNIT C SOIL SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	SB-45	SB-49	SB-50	SB-50	SB-51	
Sample Number (96-UMT-:)	200-SB	212-SB	213-SS	214-SB	215-SB	
Duplicate Sample (96-UMT-:)						
Depth (feet BGS:)	3	7	0	6	7	Screening
Sample Date:	8/10/96	8/11/96	8/10/96	8/11/96	8/11/96	Value
Thallium	NA	NA	0.32 U	0.29 U	NA	NL
Vanadium	NA	NA	26.8 JK	12.3 JK	NA	550
Zinc	NA	NA	78.9	33.5	NA	23000
Total Organic Carbon	NA	NA	NA	NA	NA	NL

Table 4-32

UNIT C ENGINEERING PROPERTIES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Sample Location:	***MW3***	***MW4***
Sample Number (96-UMT-:)	***196-SB***	***202-SB***
Depth (feet BGS:)	***4***	***5***
Sample Date:	***8/10/96***	***8/10/96***
Liquid Limit	*NP*	*NP*
Plastic Limit	*NP*	*NP*
Plasticity Index	*NP*	*NP*
Specific Gravity [g/cm^3]	*1.92*	*2.12*
Unified Soil Classification	*GW*	*GP*
Total Kjeldahl Nitrogen [mg/kg]	*209*	*207*
Total Organic Carbon [mg/kg]	*6,040*	*7,960*
Total Phosphorus [mg/kg]	*268*	*219*
pH [S.U.]	*9.31*	*7.53*
Total Alkalinity [mg $CaCO_3$/kg]	*24.8*	*25.7*
Heteratrophic Bacteria [#/dry g]	*1.2E+06*	*NA*
Percent Moisture	*8.14*	*11.1*

Key:

BGS = Below Ground Surface.
NA = Not Analyzed.
NP = Non Plastic.
GP = Poorly Graded Gravel with Sand.
GP-GM = Poorly Graded Gravel with Silt and Sand
GW = Well Graded Gravel.
SM = Silty Sand.
S.U. = Standard pH units.
g/cm^3 = grams per cubic centimeter.
mg $CaCO_3$/kg = milligrams CaCO3/ per kilogram.
#/dry g = Count per dry gram.

Table 4-33

UNIT C GROUNDWATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	MW-3	MW-3	MW-4	MW-5	MW-6	MW-7	MW-7	MW-8	
Sample Number (96-UMT-:)	348-GW	349-GW	332-GW	333-GW	334-GW	335-GW	351-GW	336-GW	
Duplicate Sample (96-UMT-:)	349-GW	348-GW				351-GW	335-GW		
Depth (feet BGS:)	3.36	3.36	3.54	5.10	2.69	5.32	5.32	0.58	Screening
Sample Date:	8/19/96	8/19/96	8/19/96	8/20/96	8/20/96	8/19/96	8/19/96	8/20/96	Value
GRO	100 U	100 U	100 U	119	761	100 U	100 U	481	350
DRO	100 U	178	76100	335	4020	217	100 U	100 U	1500
TRPH	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	NL
VOCs									
2-Butanone	5.53 J	4.23 J	5.26 JH	10 U	10 U	6.12 JH	3.26 JH	10 U	1900
Acetone	2.72 BJK	10 UJK	1.83 BJK	10 UJK	10 UJK	10 UJK	10 UJK	10 UJK	3700
PAHs	NA	NA	NA	NA	NA	NA	NA	NA	
Anthracene	1.08 U	1.1 U	1.1 JH	1.01 U	1.03 U	1.04 U	1.03 U	1.04 U	11000
Fluorene	1.08 U	1.1 U	5.32 JH	1.01 U	1.03 U	1.04 U	1.03 U	1.04 U	1500
Naphthalene	5.4 U	5.5 U	350	5.05 U	5.15 U	5.2 U	5.15 U	5.2 U	1500
Phenanthrene	1.08 U	1.1 U	4.17 JH	1.01 U	1.03 U	1.04 U	1.03 U	1.04 U	NL
Total PAHs + BTEX	0 U	0 U	360.59	0 U	0 U	0 U	0 U	0 U	15
Pest/PCBs	NA	NA	NA	NA	NA	NA	NA	NA	
4,4'-DDD	0.05 U	0.05 U	0.05 UJK	0.05 U	17.3 JK	0.05 U	0.05 U	0.05 U	0.28
4,4'-DDT	0.1 U	0.1 U	0.1 UJK	0.105 JH	31.1 JH	0.1 U	0.1 U	0.1 U	0.2

Table 4-34

UNIT C SEASONAL STREAM SURFACE WATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	LA	LA	LB	LB	LC	LC	LC		
Sample Number (96-UMT-:)	231-SW	231-SW-F	233-SW	233-SW-F	227-SW	227-SW-F	228-SW		
Duplicate Sample (96-UMT-:)					228-SW	228-SW-F	227-SW	Screening	Background
Sample Date:	8/11/96	8/11/96	8/11/96	8/11/96	8/11/96	8/11/96	8/11/96	Value	Concentration
VOCs									
Acetone	1.35 B	NA	10 U	NA	10 UJK	NA	10 UJK	3700	NL
Metals									
Aluminum	24.3 J	23.9 U	30.2 J	23.9 U	136	24.2 J	33 J	200	385/ND
Antimony	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	4.9 U	6	ND/ND
Arsenic	4.3 U	4.3 U	4.3 U	4.3 U	4.3 UJL	4.3 UJL	4.3 UJL	0.045	ND/ND
Barium	192	188	179	182	139	130	131	2000	84.4/75.9
Beryllium	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.016	ND/ND
Cadmium	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	5	ND/ND
Calcium	20600	19700	19500	19700	14700	14700	14700	NL	15600/15500
Chromium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	100	ND/ND
Cobalt	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	6600	ND/ND
Copper	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	1000	10.8/ND
Iron	24.1 J	11 J	49 J	20.4 J	390	17.3 J	162	300	857/68
Lead	3 J	2.8 U	2.9 J	2.8 U	2.8 U	2.8 U	2.8 U	15	3.1/3.7
Magnesium	8200	7850	7730	7870	6400	6370	6400	NL	6200/6070
Manganese	5.3 J	7.2 J	4.8 J	6.3 J	35.5	26.9	27.8	50	108/95.8
Mercury	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2	ND/ND
Nickel	8.6 UJL	8.6 UJL	8.6 UJL	8.6 UJL	8.6 U	8.6 U	8.6 U	100	12.9/ND
Potassium	1080	1060	1050	1100	696	692	699	NL	513/442
Selenium	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	4.2 U	50	5.3/ND
Silver	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	2.1 UJL	100	ND/ND
Sodium	1650	1670	1570	1930	1510 JK	1500 JK	1510 JK	NL	5320/5250
Thallium	3 U	3 U	3 U	3 U	3 U	3 U	3 U	2	ND/ND
Vanadium	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	3.6 U	260	ND/ND
Zinc	3.8 U	19.6 JH	20.6 JH	4.6 JH	1.7 UJK	2.9 JK	1.7 UJK	5000	7.7/28.6

Table 4-34

UNIT C SEASONAL STREAM SURFACE WATER SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(µg/L)

Sample Location:	**LC**		
Sample Number (96-UMT-:)	**228-SW-F**		
Duplicate Sample (96-UMT-:)	**227-SW-F**	**Screening**	**Background**
Sample Date:	**8/11/96**	**Value**	**Concentration**
VOCs			
Acetone	NA	3700	NL
Metals			
Aluminum	23.9 U	200	385/ND
Antimony	4.9 U	6	ND/ND
Arsenic	4.3 UJL	0.045	ND/ND
Barium	131	2000	84.4/75.9
Beryllium	0.2 U	0.016	ND/ND
Cadmium	2.6 U	5	ND/ND
Calcium	14700	NL	15600/15500
Chromium	4.2 U	100	ND/ND
Cobalt	3.4 U	6600	ND/ND
Copper	2.5 U	1000	10.8/ND
Iron	5.3 U	300	857/68
Lead	2.8 U	15	3.1/3.7
Magnesium	6400	NL	6200/6070
Manganese	26.8	50	108/95.8
Mercury	0.1 U	2	ND/ND
Nickel	8.6 U	100	12.9/ND
Potassium	696	NL	513/442
Selenium	4.2 U	50	5.3/ND
Silver	2.1 UJL	100	ND/ND
Sodium	1510 JK	NL	5320/5250
Thallium	3 U	2	ND/ND
Vanadium	3.6 U	260	ND/ND
Zinc	1.9 JK	5000	7.7/28.6

Table 4-35

UNIT C SEASONAL STREAM SEDIMENT SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	**LA**	**LB**	**LC**	**LC**	
Sample Number (96-UMT-:)	**230-SD**	**232-SD**	**224-SD**	**225-SD**	
Duplicate Sample (96-UMT-:)			**225-SD**	**224-SD**	**Screening**
Sample Date:	**8/11/96**	**8/11/96**	**8/11/96**	**8/11/96**	**Value**
RRO	31 JK	50 UJK	14 JK	47 UJK	2000
VOCs					
2-Butanone	0.0118 JL	0.0125 UJL	0.0115 UJL	0.0116 UJL	47000
Acetone	0.0443 BJK	0.00678 B	0.00245 B	0.00078 B	7800
Methylene chloride	0.00629 UJK	0.00625 U	0.00267 B	0.00232 BJ	85
BNAs					
2-Methylnaphthalene	0.0523 J	0.41 U	0.387 U	0.385 U	3100
bis(2-Ethylhexyl)phthalate	0.135 JB	0.0655 JB	0.0478 J	0.385 U	46
Pest/PCBs					
4,4'-DDD	0.00838 J	0.124 U	0.00234 U	0.00467 U	2.7
4,4'-DDT	0.0325 JL	0.311 UJL	0.00586 UJL	0.0117 UJL	1.9
Aroclor 1254	**0.641**	**17.8 JK**	**0.156**	**0.211**	0.083
Metals					
Aluminum	6250	3500	2960	2490	78000
Antimony	7.9 U	6.8 U	0.55 U	0.57 U	31
Arsenic	5	3.8	2.8	3.2	7.1
Barium	309 JK	214 JK	183	247	5500
Beryllium	0.22 J	0.14 J	0.15 J	0.14 J	0.76
Cadmium	0.35 U	0.3 U	0.29 UJL	0.3 UJL	39
Calcium	2030	1410	957	1180	NL
Chromium	12.1	6.4	4.8	4	390
Cobalt	8.7	5.3	4.3 J	3.6 JL	14000
Copper	19.4 JK	14.1 JK	14.3	12.8	3100
Iron	18800	11800	8710	7490	27700
Lead	9.7 JK	8.8 JK	4.5	5	400
Magnesium	3270 JK	1840 JK	1640	1290	NL

Table 4-35

UNIT C SEASONAL STREAM SEDIMENT SAMPLE DETECTED ANALYTES
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA
(mg/kg)

Sample Location:	LA	LB	LC	LC	
Sample Number (96-UMT-:)	230-SD	232-SD	224-SD	225-SD	
Duplicate Sample (96-UMT-:)			225-SD	224-SD	Screening
Sample Date:	8/11/96	8/11/96	8/11/96	8/11/96	Value
Manganese	608	378	290	233	1800
Mercury	0.05 JH	0.02 U	0.04 JL	0.04 JL	23
Nickel	25	17.4	18.4	12.5	1600
Potassium	695	367	285 J	284 J	NL
Selenium	0.55 U	0.48 U	0.47 U	0.49 U	390
Silver	0.28 U	0.24 U	0.24 UJL	0.25 UJL	390
Sodium	95.4 U	82 U	64.3 J	60.2 JL	NL
Thallium	0.41 U	0.35 U	0.34 UJL	0.35 UJL	NL
Vanadium	19.5 JK	12.4 JK	9.8 JH	8	550
Zinc	164	64.9	33	27.4	23000

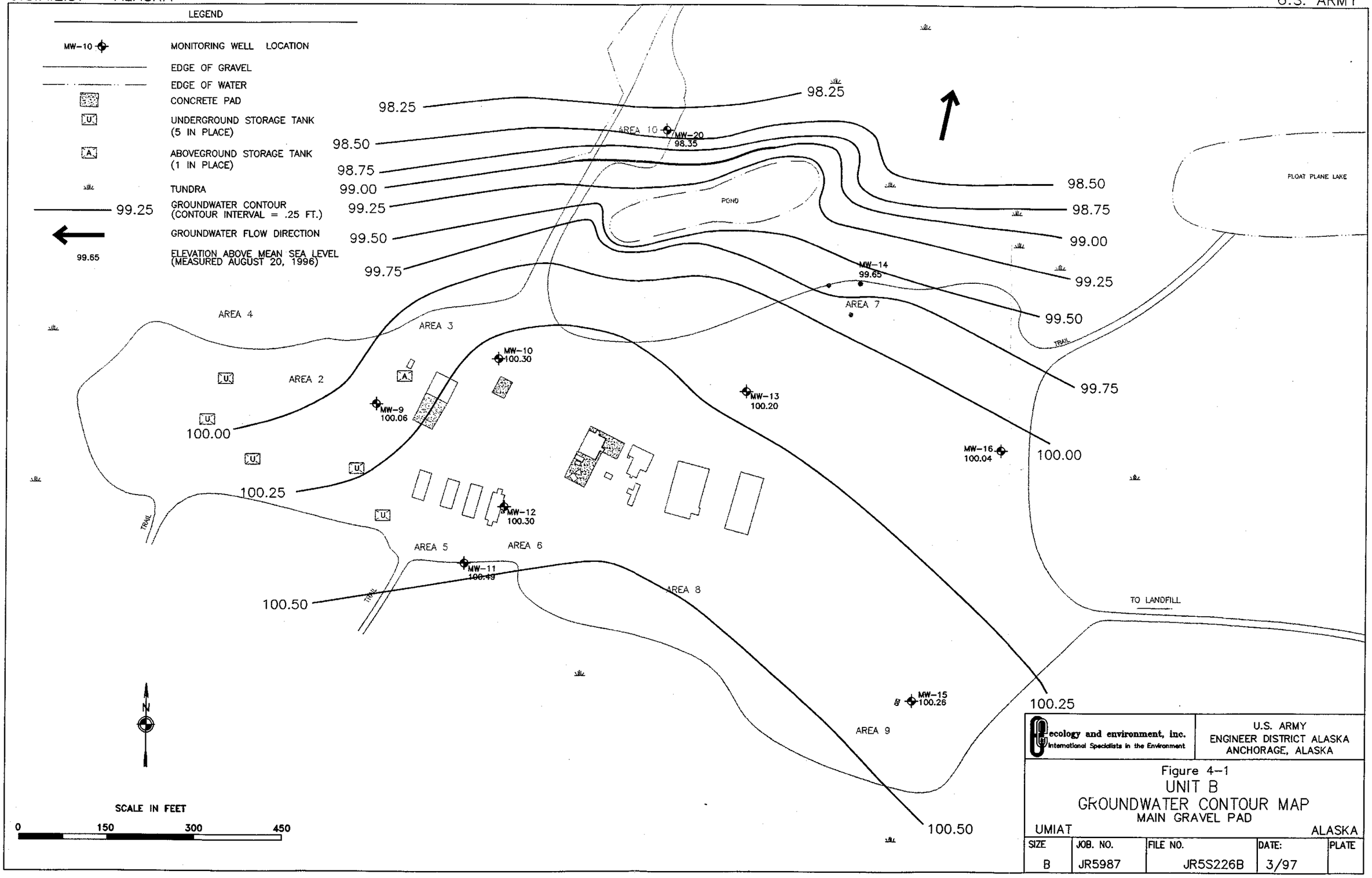

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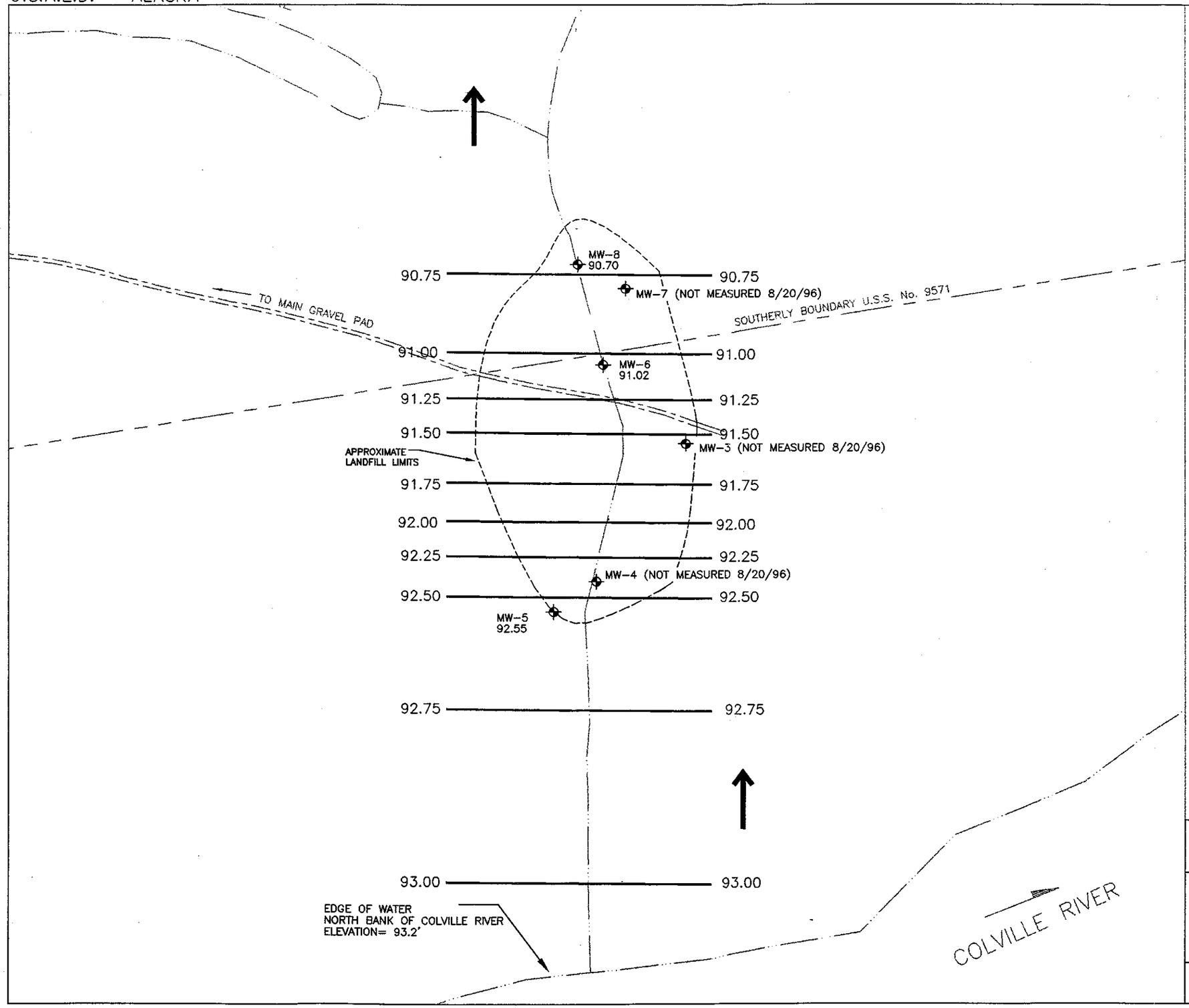
Figure 4-1
UNIT B
GROUNDWATER CONTOUR MAP
MAIN GRAVEL PAD
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S226B	3/97	

BUFF Plotted: 03/10/97

DRAFT



LEGEND

MW-7 ⊕	1996 RI MONITORING WELL LOCATION
92.55	ELEVATION IN FEET MEASURED ABOVE MEAN SEA LEVEL (MEASURED ON 8/20/96)
———	GROUNDWATER CONTOUR
←	GROUNDWATER FLOW DIRECTION
– – – –	EDGE OF GRAVEL
——·——	EDGE OF WATER
——▷	RIVER FLOW DIRECTION

N

SCALE IN FEET

0 300 600 900

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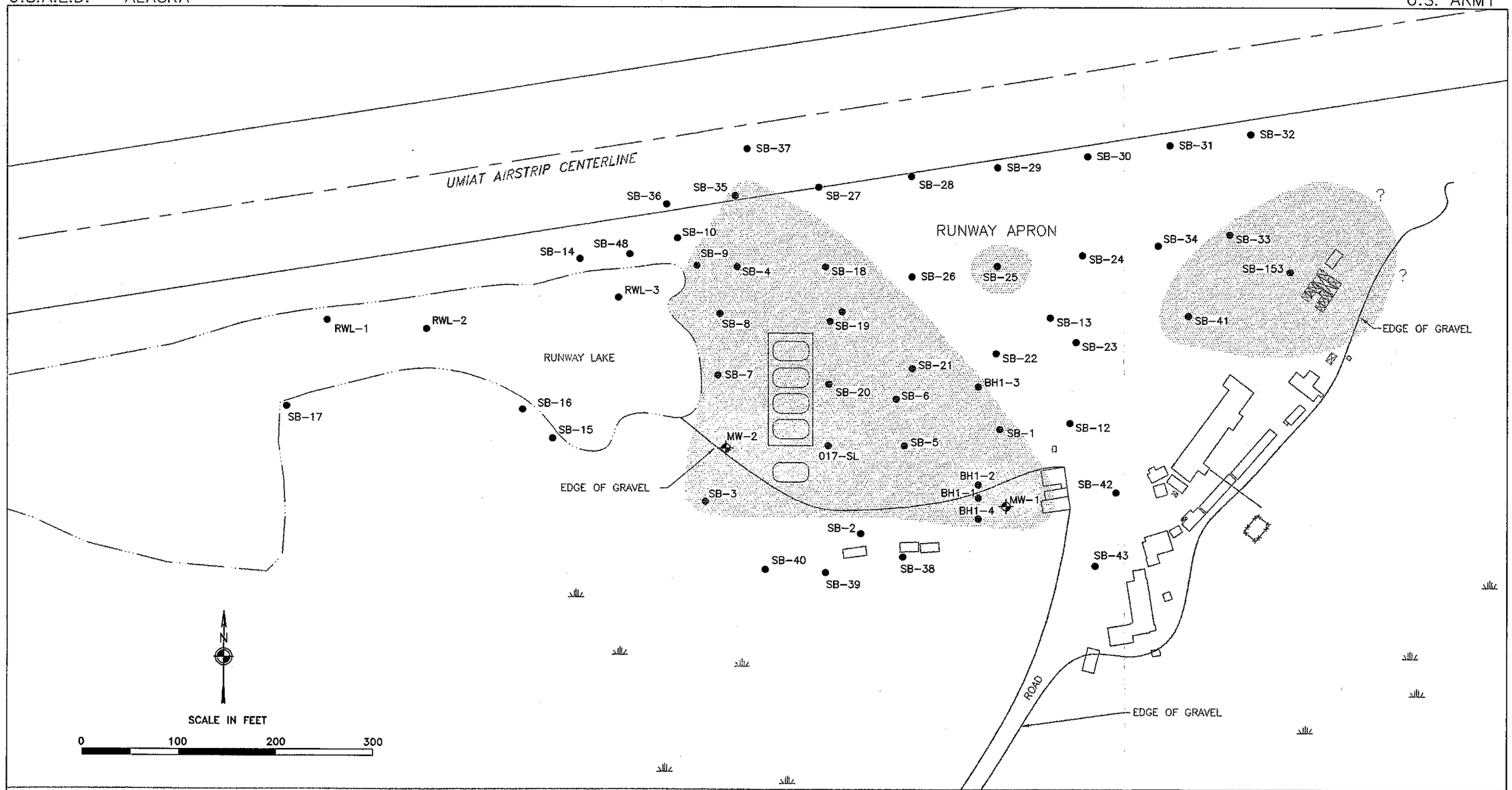
Figure 4-2
UNIT C
GROUNDWATER CONTOUR MAP
LANDFILL

UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S227B	3/97	

BUFF Plotted 03/10/97



NOTE:
APPROXIMATE EXTENT OF CONTAMINATION BASED ON SOIL SAMPLES EXCEEDING REGULATORY GUIDANCE LEVELS (PRIMARILY ADEC NORTH SLOPE) OR RISK-BASED CONCENTRATIONS.

LEGEND

- SURFACE SOIL CONTAMINATION (APPROXIMATELY 0 TO 0.5' BGS)
- SOIL CONTAMINATION AT GROUNDWATER INTERFACE (APPROXIMATELY 1.5 TO 4' BGS)
- TUNDRA
- EDGE OF GRAVEL
- EDGE OF WATER
- SB-12 ● 1996 RI SAMPLE LOCATION
- BH1-1 ● 1994 RI SAMPLE LOCATION
- MW-1 ⊕ 1996 RI MONITORING WELL LOCATION
- RWL-1 ● 1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
- 017-SL ● 1996 RI SAMPLE LOCATION
- ? EXTENT UNKNOWN

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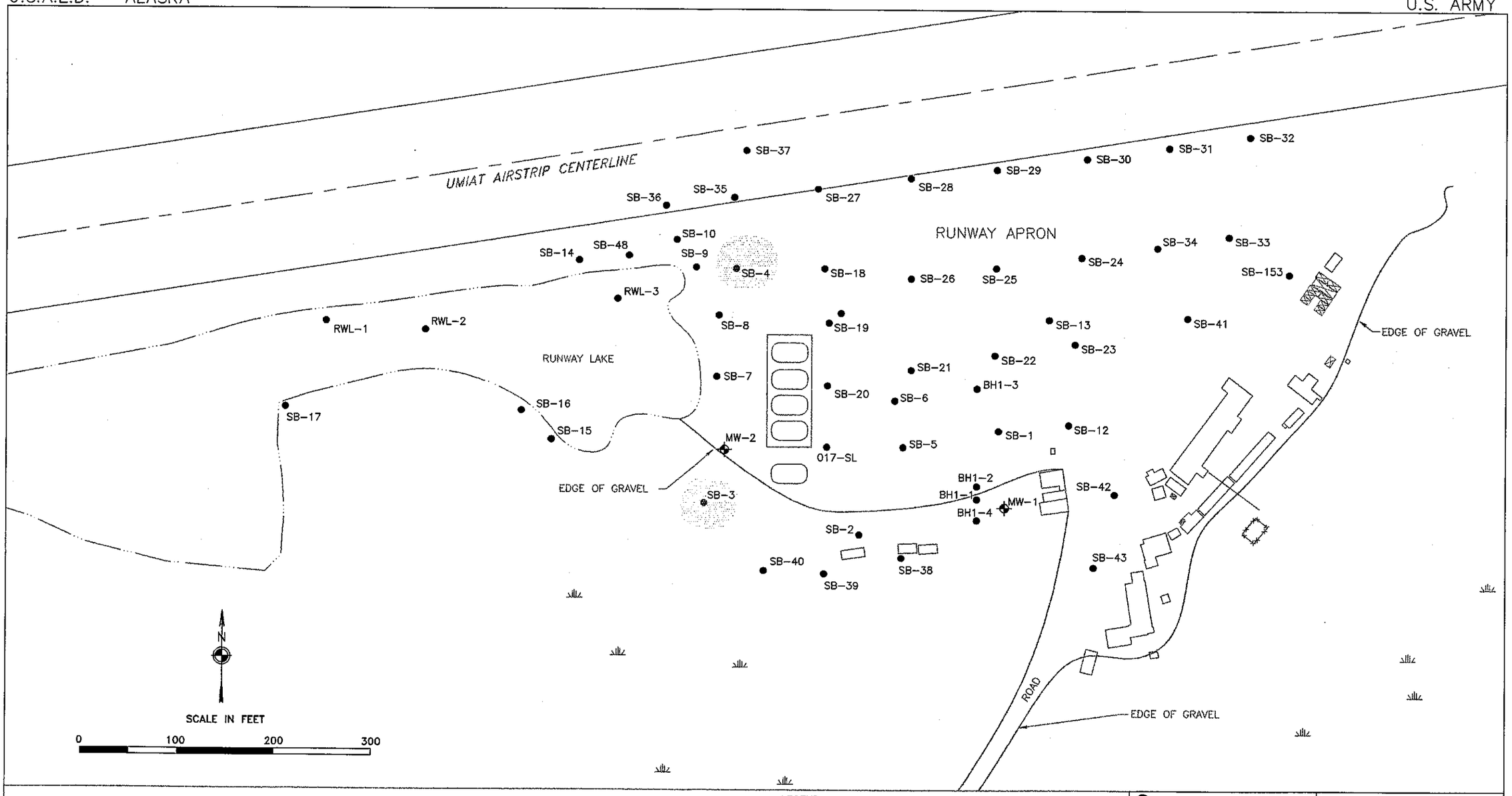
Figure 4-3
UNIT A
AREAL EXTENT OF SOIL CONTAMINATION BY PETROLEUM
AIRSTRIP COMPLEX
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S216B	3/97	



NOTE:
APPROXIMATE EXTENT OF CONTAMINATION BASED ON SOIL SAMPLES EXCEEDING REGULATORY GUIDANCE LEVELS (PRIMARILY ADEC NORTH SLOPE) OR RISK-BASED CONCENTRATIONS.

LEGEND

———	EDGE OF GRAVEL	BH1-1 ●	1994 RI SAMPLE LOCATION
———	EDGE OF WATER	SB-12 ●	1996 RI SAMPLE LOCATION
	TUNDRA	017-SL ●	1996 RI SAMPLE LOCATION
	SURFACE SOIL CONTAMINATION (APPROXIMATELY 0 TO 0.5' BGS)	RWL-1 ●	1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
		MW-1 ⊕	1996 RI MONITORING WELL LOCATION

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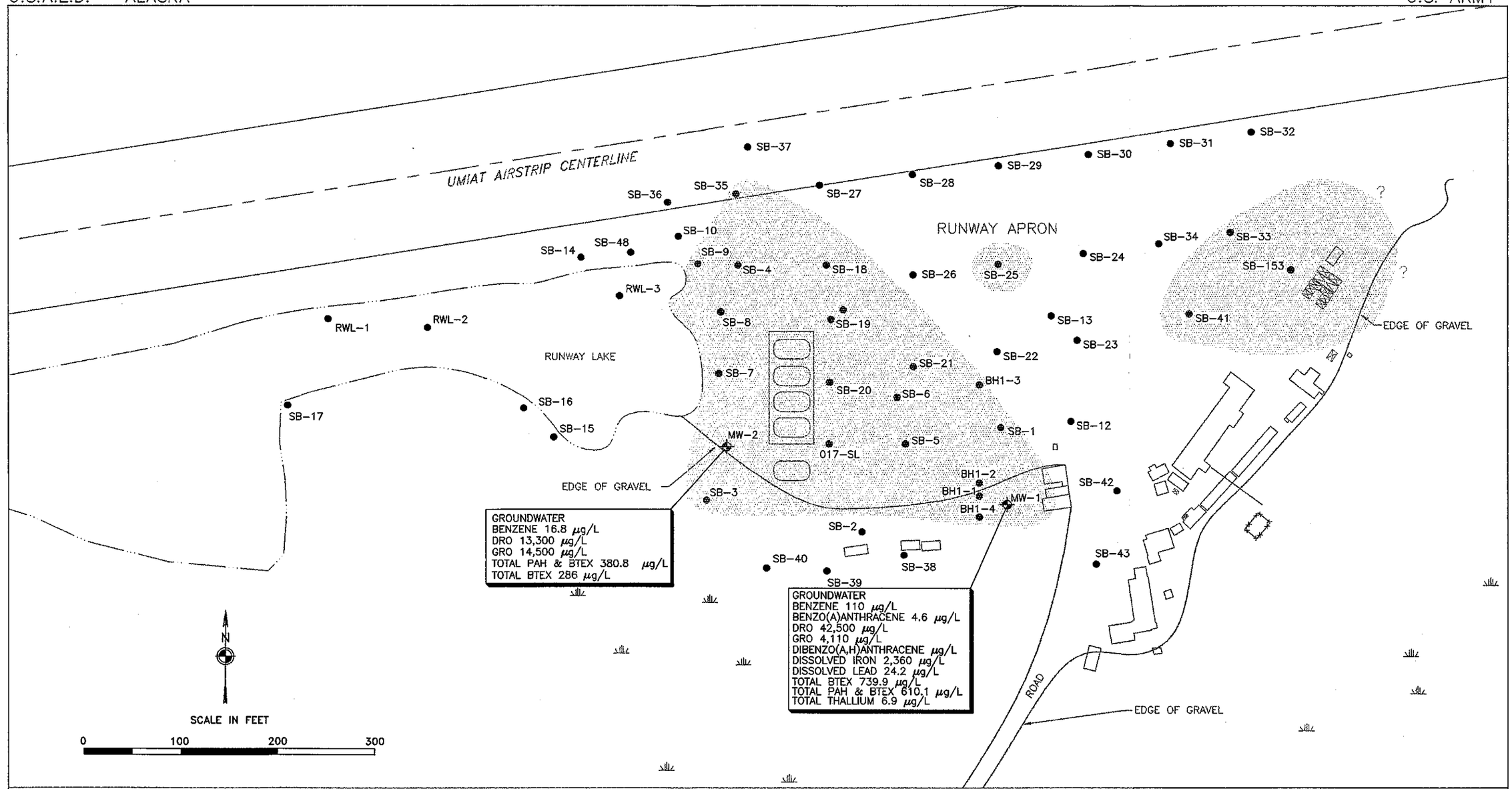
Figure 4-4
UNIT A
AREAL EXTENT OF SOIL CONTAMINATION BY CHLORINATED PESTICIDE
AIRSTRIP COMPLEX
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S241B	3/97	

BUFF Plotted: 3/7/97



LEGEND

BTEX	BENZENE, TOLUENE, ETHYLBENZENE, XYLENE		GROUNDWATER CONTAMINATION EXCEEDING REGULATORY GUIDANCE LEVELS	SB-12 ●	1996 RI SAMPLE LOCATION
DRO	DIESEL RANGE ORGANICS			BH1-1 ●	1994 RI SAMPLE LOCATION
GRO	GASOLINE RANGE ORGANICS	?	EXTENT UNKNOWN	MW-1 ⊕	1996 RI MONITORING WELL LOCATION
PAH	POLYAROMATIC HYDROCARBONS	———	EDGE OF GRAVEL	RWL-1 ●	1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
µg/L	MICROGRAM PER LITER	——·——	EDGE OF WATER	017-SL ●	1996 RI SAMPLE LOCATION
	TUNDRA				

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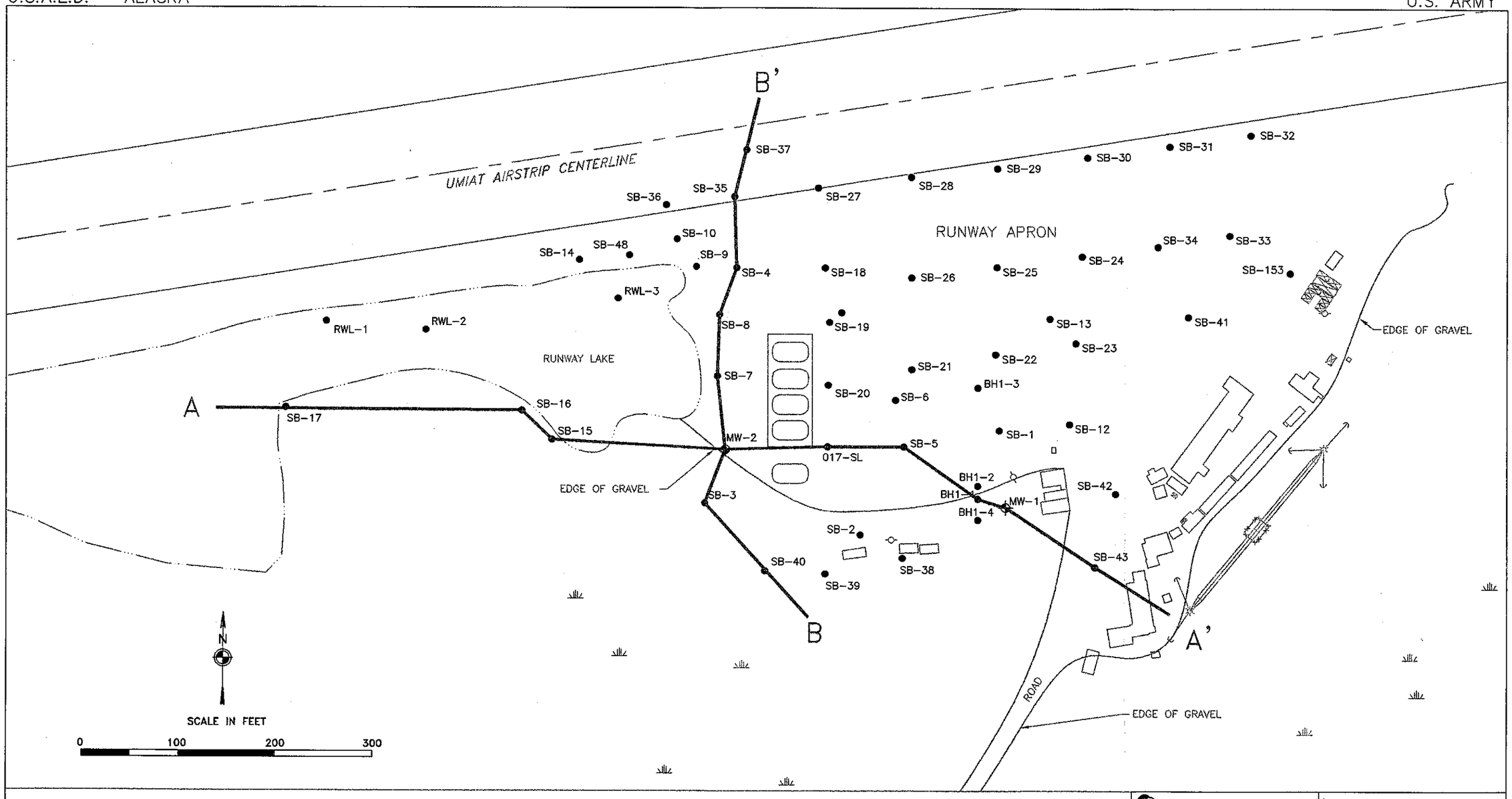
Figure 4-5
UNIT A
AREAL EXTENT OF GROUNDWATER CONTAMINATION
AIRSTRIP COMPLEX
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S242B	3/97	



LEGEND

	TUNDRA	SB-12 ●	1996 RI SAMPLE LOCATION
———	EDGE OF GRAVEL	BH1-1 ●	1994 RI SAMPLE LOCATION
——·——·——	EDGE OF WATER	017-SL●	1996 RI SAMPLE LOCATION
A ———	SECTION LINE	RWL-1 ●	1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
		MW-1 ⊕	1996 RI MONITORING WELL LOCATION

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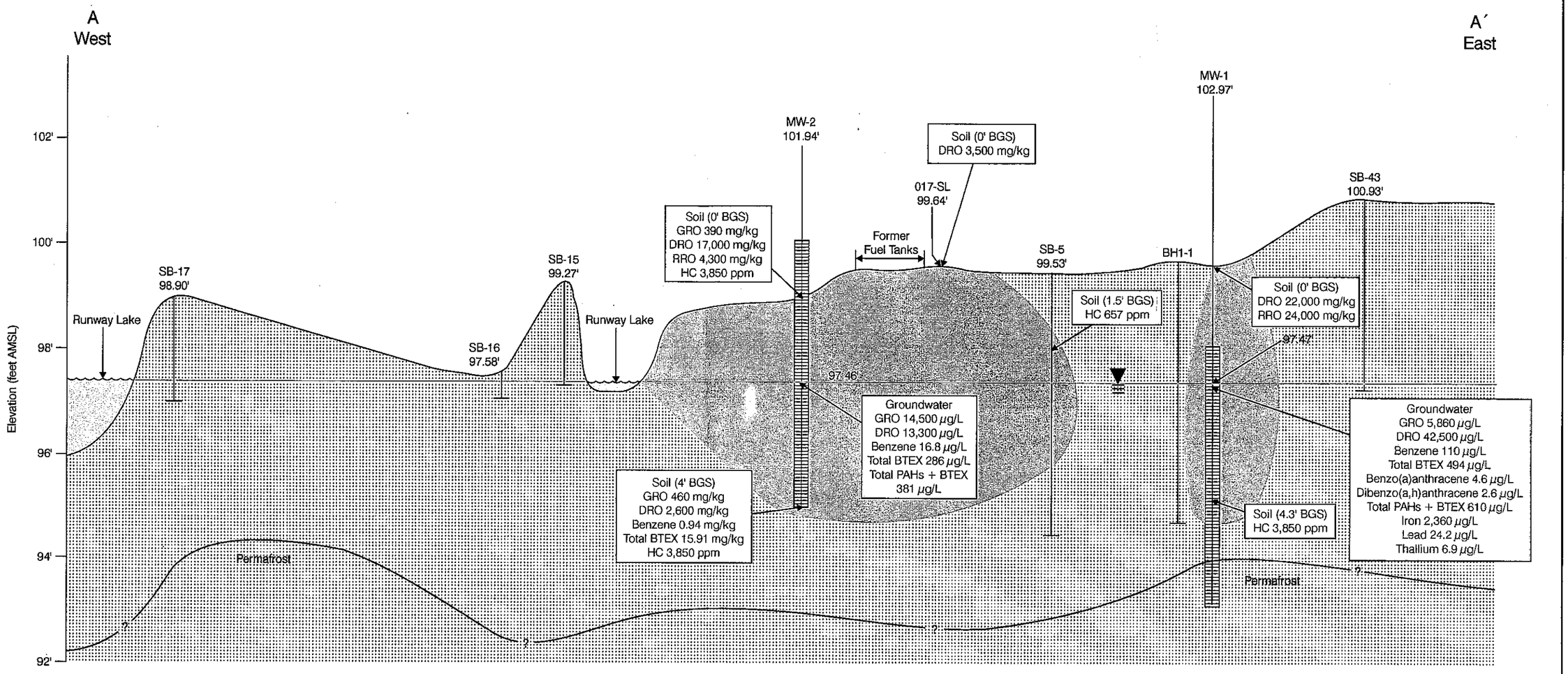
Figure 4-6
UNIT A
KEY TO CROSS SECTIONS A AND B
AIRSTRIP COMPLEX
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S232B	3/97	

BUFF - Plotted: 03/10/97



LEGEND			
mg/kg	Milligram per kilogram	DRO	Diesel range organics
ug/L	Microgram per liter	BTEX	Benzene, toluene, ethylbenzene, xylene
SB-17	1996 soil boring location	BGS	Below ground surface
MW-1	Monitoring well location	AMSL	Above mean sea level
BH1-1	1994 soil boring location	PAHs	Polyaromatic Hydrocarbons
017-SL	1996 surface soil sample location	HC	Field screeing for petroleum hydrocarbons
GRO	Gasoline range organics	▼	Groundwater table (measured on 8/19/96)
RRO	Residual range organics	?	Extent or depth unknown
	Sandy gravel		
	Approximate extent of contamination based on soil and/or groundwater samples exceeding regulatory guidance levels (primarily ADEC North Slope).		

HORIZONTAL SCALE 1" = 80'

0 80 160 Feet

VERTICAL SCALE 1" = 2'

0 2 4 Feet

Vertical Exaggeration 1:40

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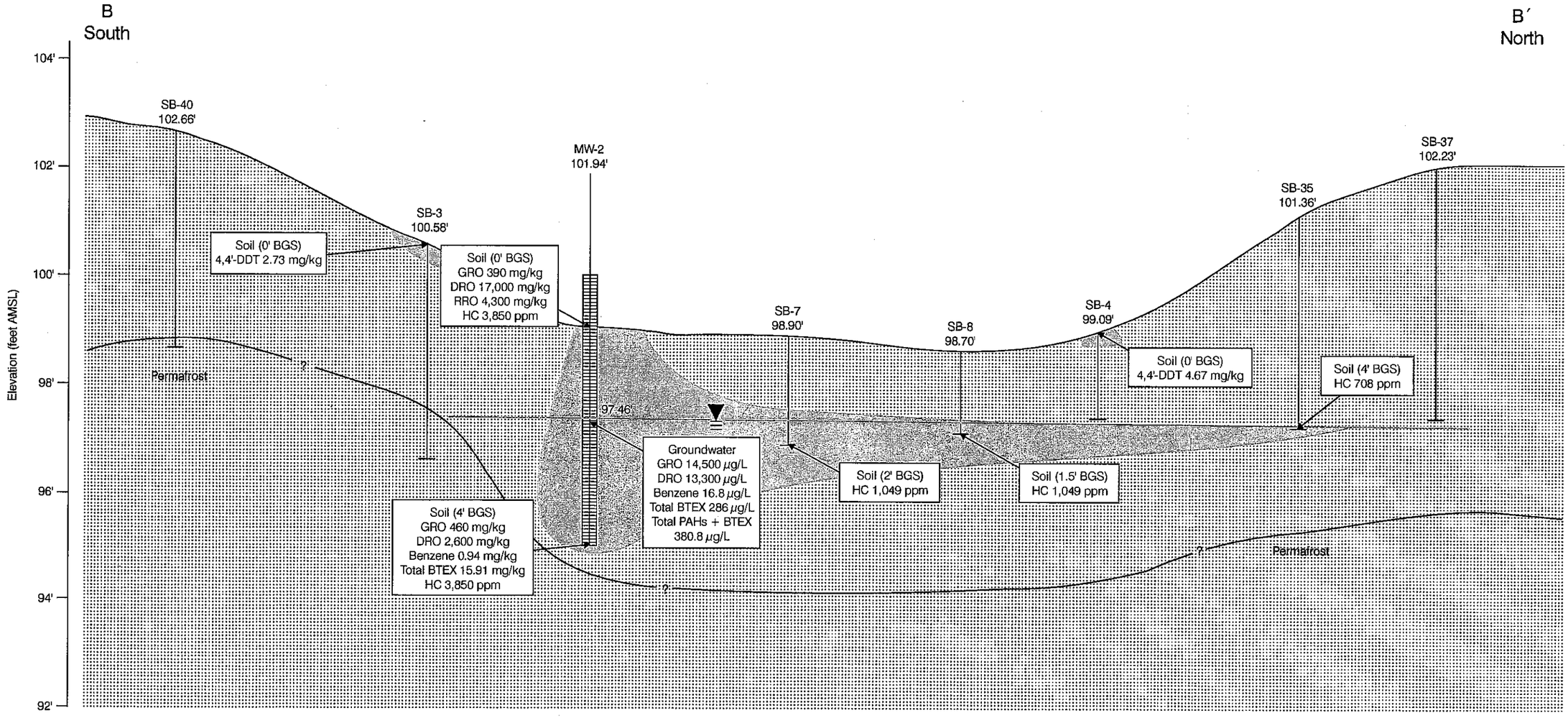
Figure 4-7
UNIT A
CROSS SECTION A-A´
AIRSTRIP COMPLEX
UMIAT ALASKA

Size	Job. No.	File No.	Date:	Plate
	JR5070	JR5_a.cdr	2/97	

SOURCE: Ecology and Environment, Inc. 1997.



LEGEND			
mg/kg	Milligram per kilogram	BGS	Below ground surface
ug/L	Microgram per liter	AMSL	Above mean sea level
SB-40	1996 soil boring location	PAHs	Polyaromatic hydrocarbons
MW-2	Monitoring well location	HC	Field screening for petroleum hydrocarbons
GRO	Gasoline range organics	▼	Groundwater table (measured on 8/19/96)
RRO	Residual range organics	?	Extent or depth unknown
DRO	Diesel range organics	DDT	Dichlorodiphenyltrichloroethane
BTEX	Benzene, toluene, ethylbenzene, xylene		
	Sandy gravel		
	Approximate extent of contamination based on soil and/or groundwater samples exceeding regulatory guidance levels (primarily ADEC North Slope).		

HORIZONTAL SCALE 1"=40'

0 40 80 Feet

VERTICAL SCALE 1"=2'

0 2 4 Feet

Vertical Exaggeration 1:20

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Figure 4-8

UNIT A
CROSS SECTION B-B´
AIRSTRIP COMPLEX

UMIAT ALASKA

Size	Job. No.	File No.	Date:	Plate
	JR5070	JR5_b.cdr	2/97	

SOURCE: Ecology and Environment, Inc. 1997.

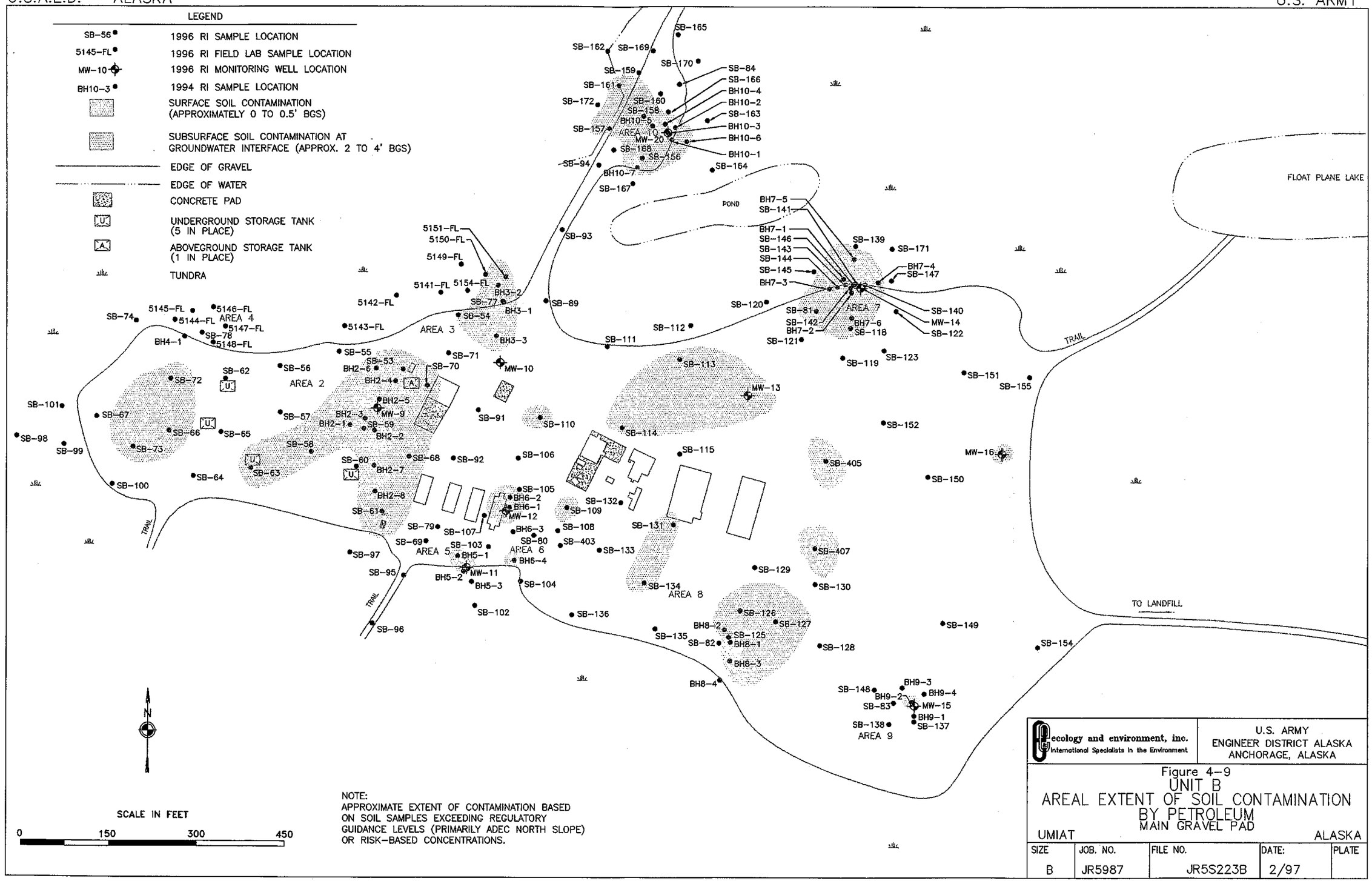

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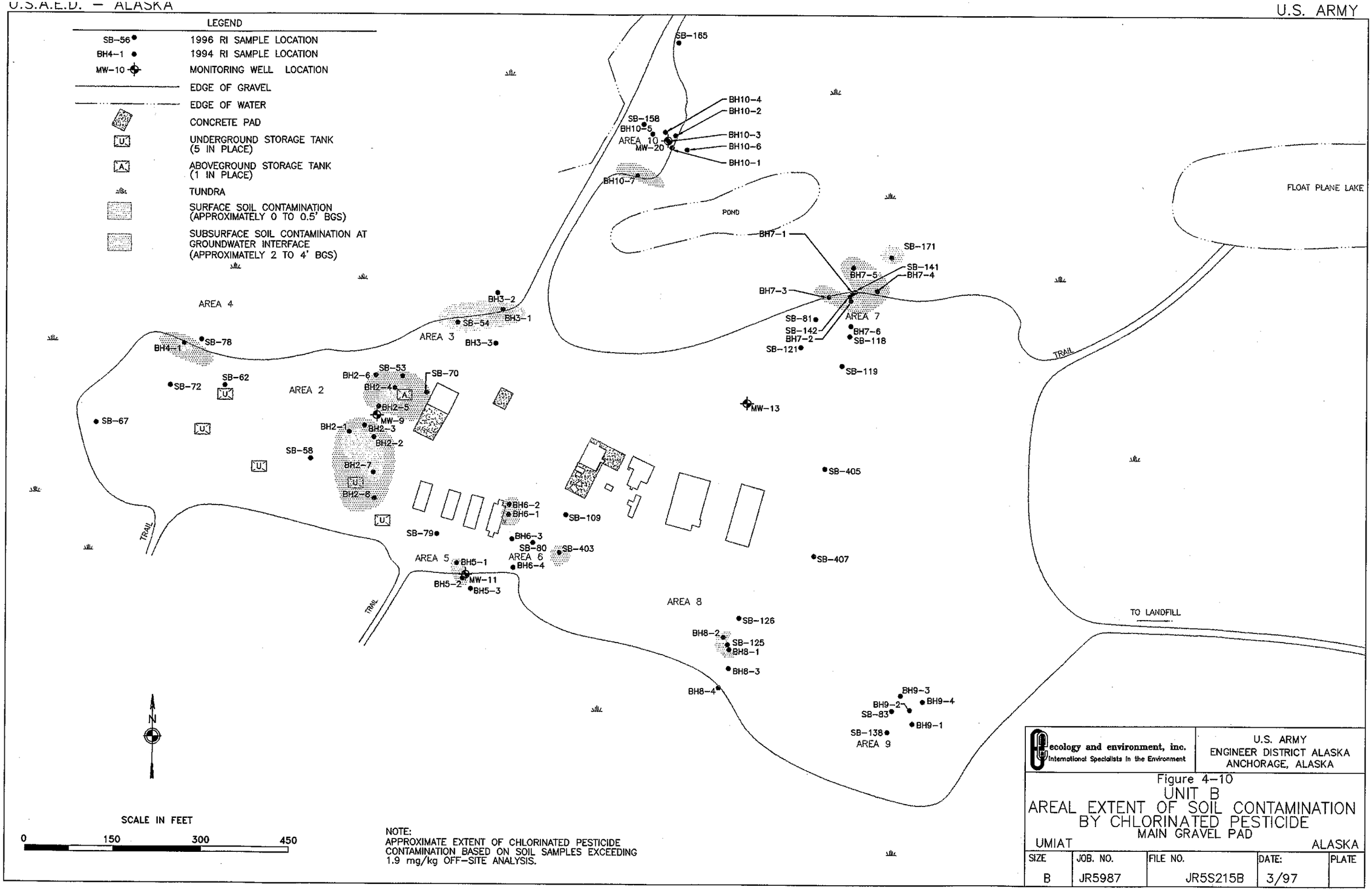
Figure 4-9
UNIT B
AREAL EXTENT OF SOIL CONTAMINATION BY PETROLEUM
MAIN GRAVEL PAD
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S223B	2/97	



NOTE:
APPROXIMATE EXTENT OF CHLORINATED PESTICIDE CONTAMINATION BASED ON SOIL SAMPLES EXCEEDING 1.9 mg/kg OFF-SITE ANALYSIS.

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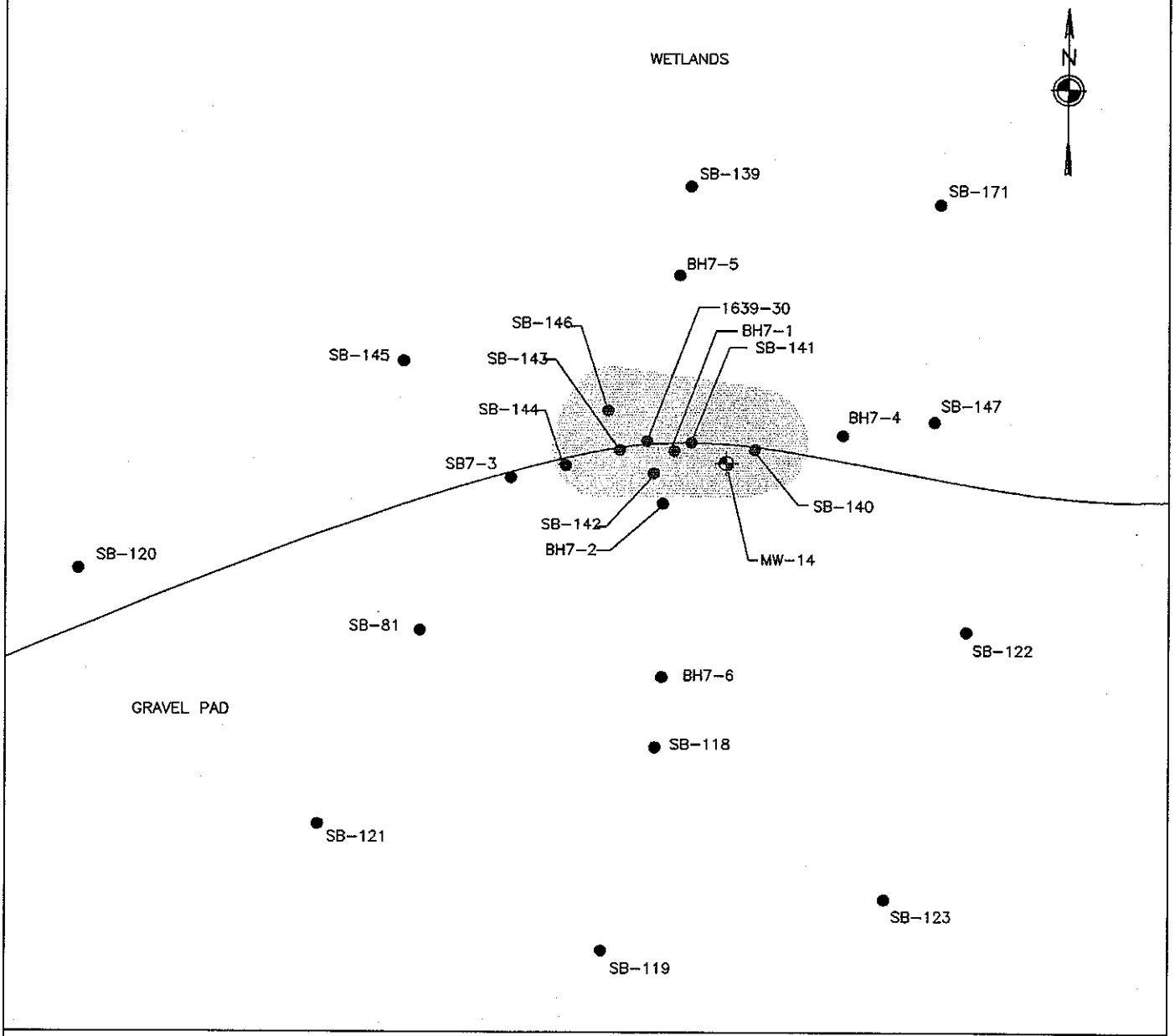
Figure 4-10
UNIT B
AREAL EXTENT OF SOIL CONTAMINATION BY CHLORINATED PESTICIDE
MAIN GRAVEL PAD
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S215B	3/97	



LEGEND

SB–81 ●	1996 RI SAMPLE LOCATION
BH7–4 ●	1994 RI SAMPLE LOCATION
MW–14 ⊕	1996 RI MONITORING WELL LOCATION
	SURFACE SOIL CONTAMINATION (APPROXIMATELY 0 TO 0.5' BGS)
	SUBSURFACE SOIL CONTAMINATION AT GROUNDWATER INTERFACE (APPROXIMATELY 1 TO 3' BGS)
———	EDGE OF GRAVEL

SCALE IN FEET

0 40 80 120

NOTE: APPROXIMATE EXTENT OF PCB CONTAMINATION BASED ON SOIL SAMPLES EXCEEDING 10 mg/kg OFF–SITE ANALYSIS OR 10 ppm FIELD SCREENING.

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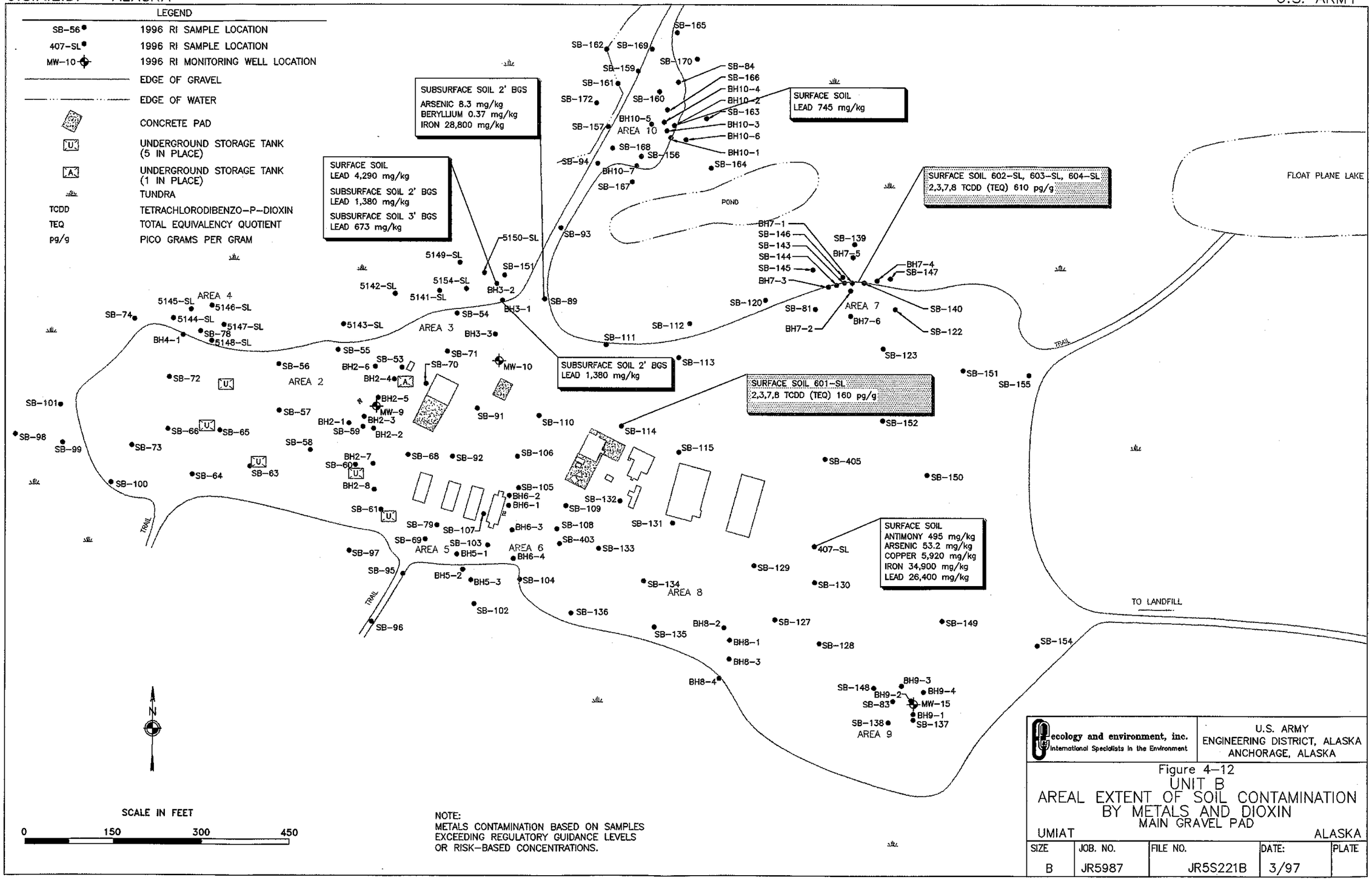
Figure 4–11
UNIT B
AREAL EXTENT OF
SOIL CONTAMINATION BY PCB
AREA 7 OF MAIN GRAVEL PAD
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S229A	2/97	

BUFF Plotted:03/10/97



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ANCHORAGE, ALASKA

Figure 4-12
UNIT B
AREAL EXTENT OF SOIL CONTAMINATION BY METALS AND DIOXIN
MAIN GRAVEL PAD
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S221B	3/97	

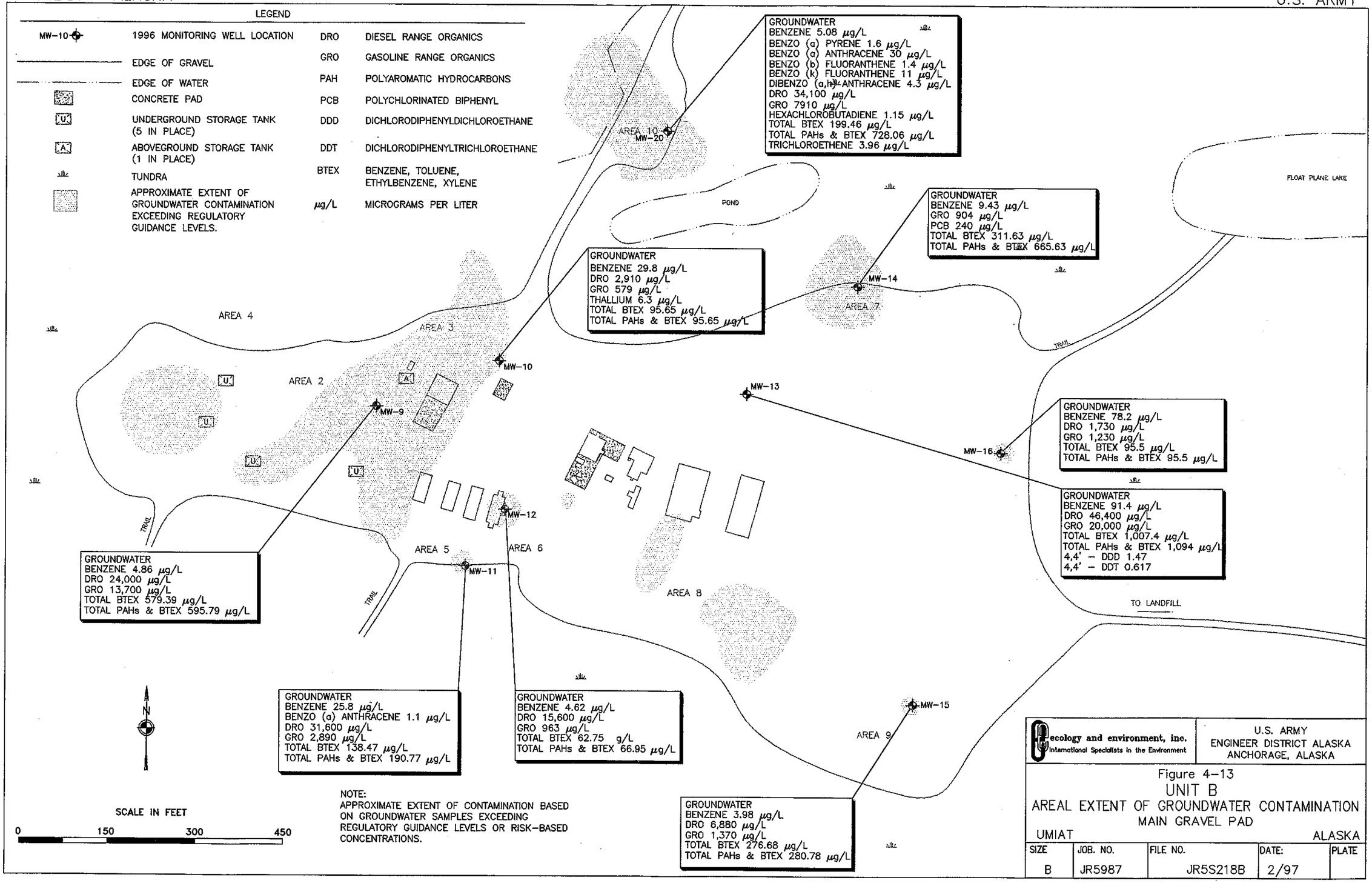

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Figure 4-13
UNIT B
AREAL EXTENT OF GROUNDWATER CONTAMINATION
MAIN GRAVEL PAD
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S218B	2/97	

Date Plotted: 10/97

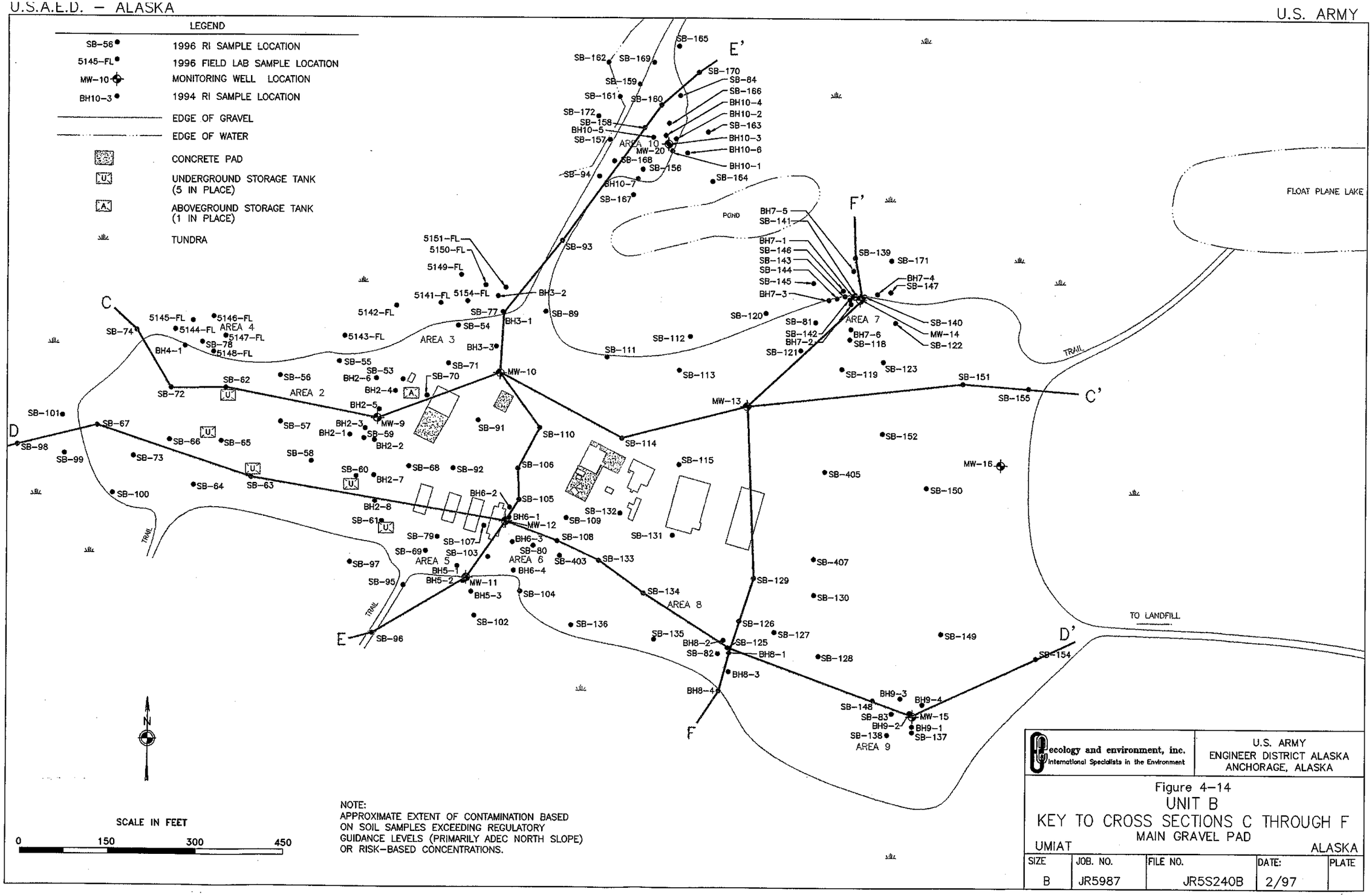

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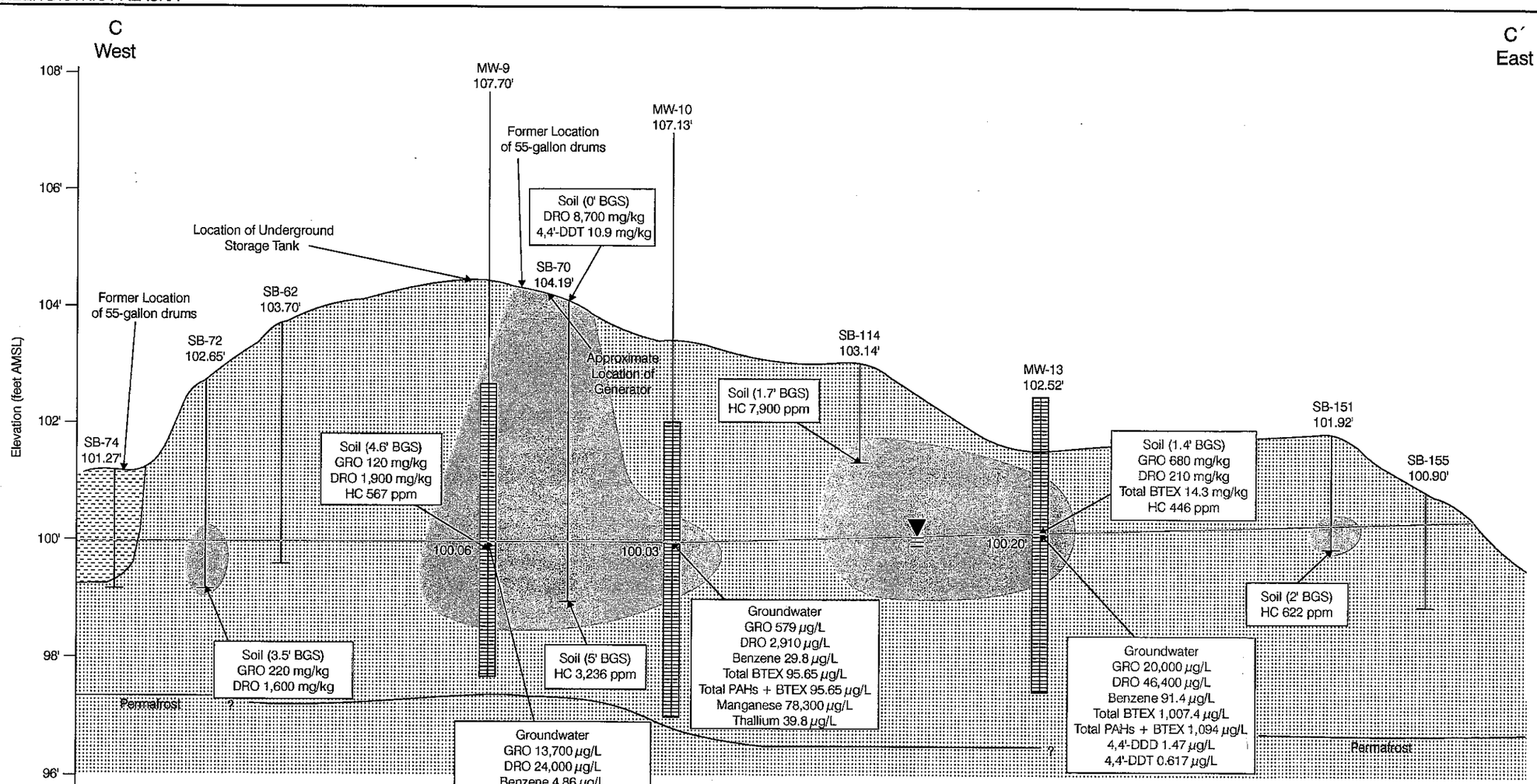
Figure 4-14
UNIT B
KEY TO CROSS SECTIONS C THROUGH F
MAIN GRAVEL PAD
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S240B	2/97	

BUFF Plotted: 03/10/97



LEGEND

mg/kg	Milligram per kilogram	BGS	Below ground surface
ug/L	Microgram per liter	AMSL	Above mean sea level
SB-74	1996 soil boring location	PAHs	Polyaromatic hydrocarbons
MW-9	Monitoring well location	HC	Field screening for petroleum hydrocarbons
GRO	Gasoline range organics	▼	Groundwater table (measured on 8/19/96)
DRO	Diesel range organics	?	Extent or depth unknown
BTEX	Benzene, toluene, ethylbenzene, xylene	DDT	Dichlorodiphenyltrichloroethane
		DDD	Dichlorodiphenyldichloroethane

Sandy gravel

Organic silt

Approximate extent of contamination based on soil and/or groundwater samples exceeding regulatory guidance levels (primarily ADEC North Slope).

HORIZONTAL SCALE 1"=150'

0 150 300 Feet

VERTICAL SCALE 1"=2'

0 2 4 Feet

Vertical Exaggeration 1:75

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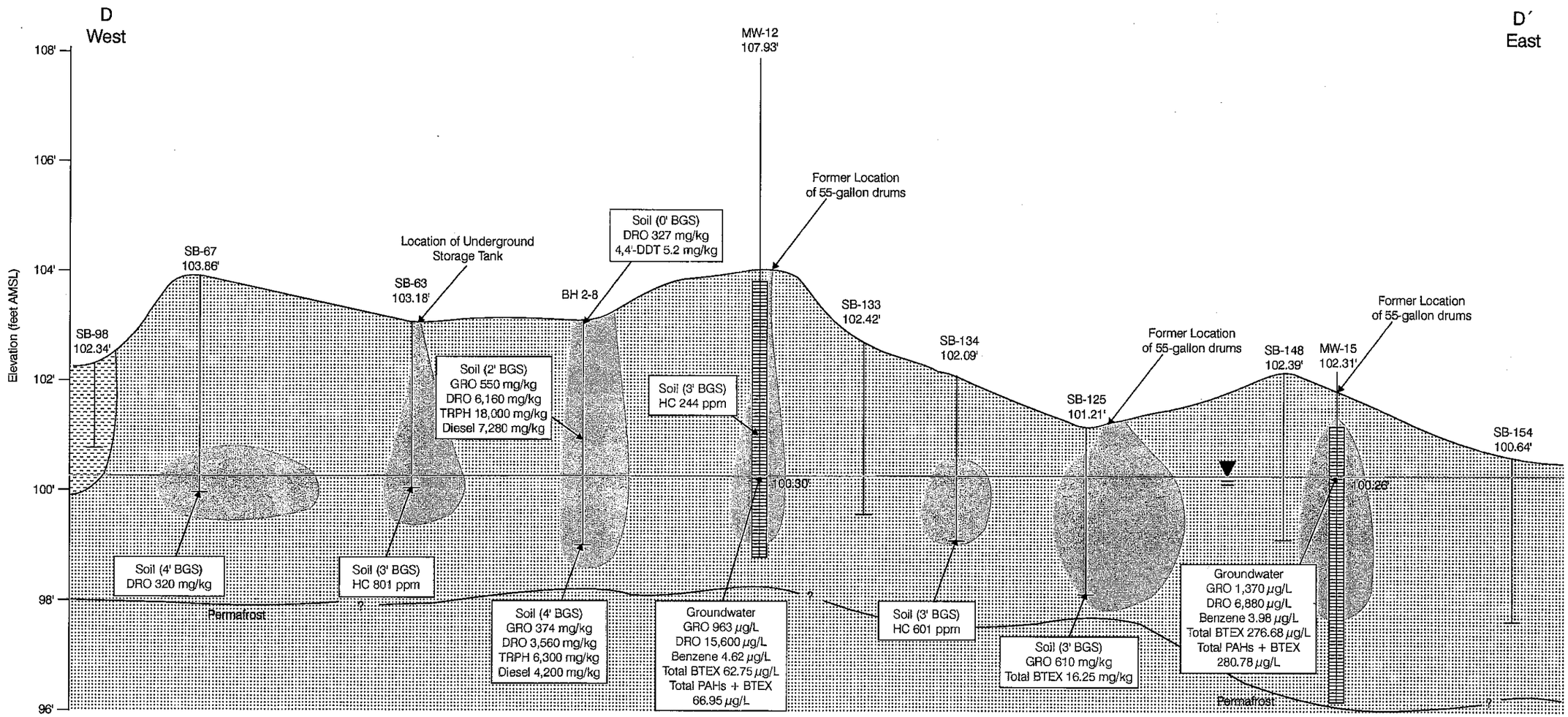
Figure 4-15

UNIT B
CROSS SECTION C-C´
MAIN GRAVEL PAD

UMIAT ALASKA

Size	Job. No.	File No.	Date:	Plate
	JR5070	JR5_c.cdr	2/97	

SOURCE: Ecology and Environment, Inc. 1997.



LEGEND			
mg/kg	Milligram per kilogram	BGS	Below ground surface
ug/L	Microgram per liter	AMSL	Above mean sea level
SB-98	1996 soil boring location	TRPH	Total recoverable petroleum hydrocarbons
MW-12	Monitoring well location	PAHs	Polyaromatic hydrocarbons
BH2-8	1994 soil boring location	HC	Field screening for petroleum hydrocarbons
GRO	Gasoline range organics	▼	Groundwater table (measured on 8/18/96 and 8/19/96)
DRO	Diesel range organics		
BTEX	Benzene, toluene, ethylbenzene, xylene	?	Extent or depth unknown
	Sandy gravel	DDT	Dichlorodiphenyltrichloroethane
	Organic silt		
	Approximate extent of contamination based on soil and/or groundwater samples exceeding regulatory guidance levels (primarily ADEC North Slope).		

HORIZONTAL SCALE 1"=150'

0 150 300 Feet

VERTICAL SCALE 1"=2'

0 2 4 Feet

Vertical Exaggeration 1:75

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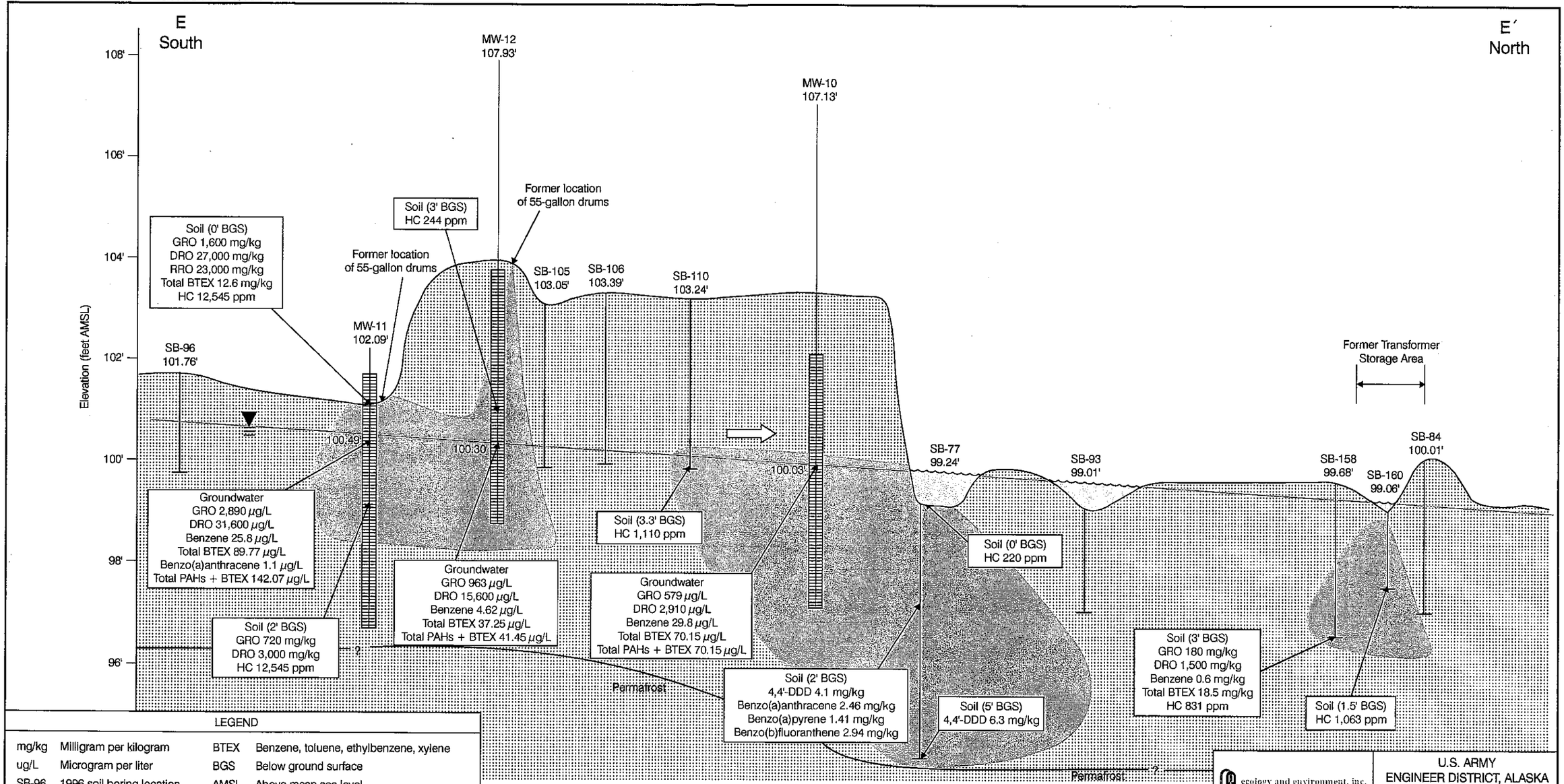
Figure 4-16

UNIT B
CROSS SECTION D-D´
MAIN GRAVEL PAD

UMIAT ALASKA

Size	Job. No.	File No.	Date:	Plate
	JR5070	JR5_d.cdr	2/97	

SOURCE: Ecology and Environment, Inc. 1997.



LEGEND

mg/kg	Milligram per kilogram	BTEX	Benzene, toluene, ethylbenzene, xylene
ug/L	Microgram per liter	BGS	Below ground surface
SB-96	1996 soil boring location	AMSL	Above mean sea level
MW-11	Monitoring well location	PAHs	Polyaromatic hydrocarbons
GRO	Gasoline range organics	HC	Field screening for petroleum hydrocarbons
RRO	Residual range organics	▼	Groundwater table (measured on 8/19/96)
DRO	Diesel range organics	DDT	Extent or depth unknown
⇨	Groundwater flow direction	DDD	Dichlorodiphenyltrichloroethane
	Sandy gravel	?	Dichlorodiphenyldichloroethane

Approximate extent of contamination based on soil and/or groundwater samples exceeding regulatory guidance levels (primarily ADEC North Slope).

HORIZONTAL SCALE 1"=100'

0 100 200 Feet

VERTICAL SCALE 1"=2'

0 2 4 Feet

Vertical Exaggeration 1:50

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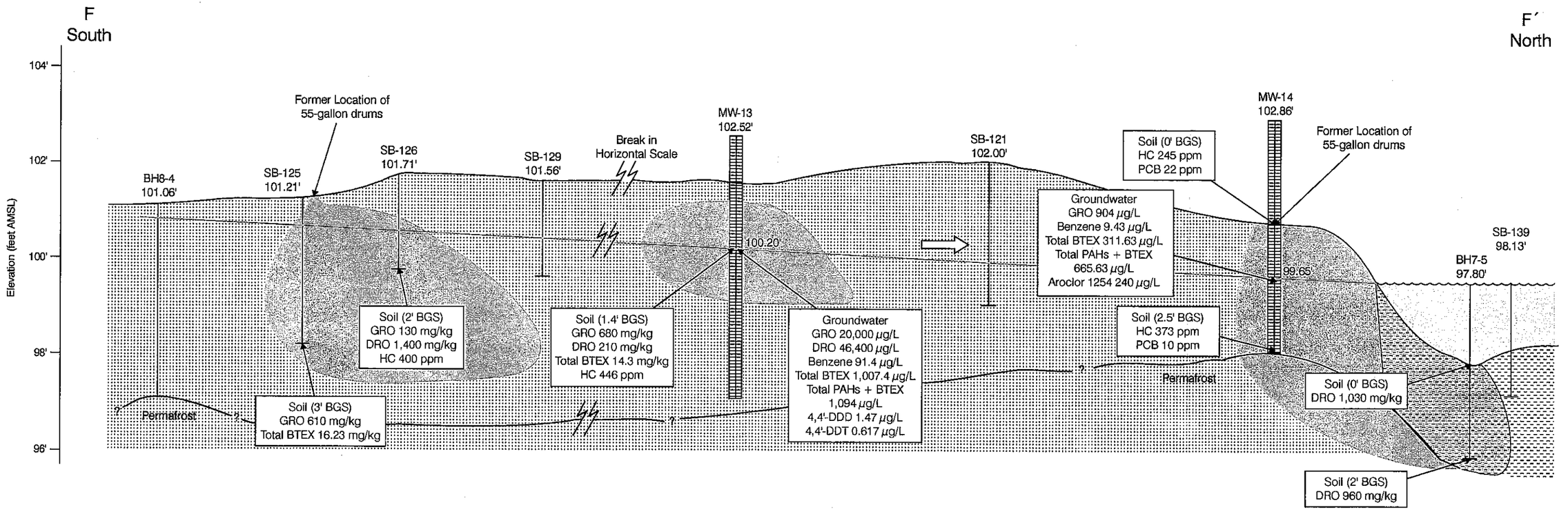
ANCHORAGE, ALASKA

Figure 4-17
UNIT B
CROSS SECTION E-E´
MAIN GRAVEL PAD
UMIAT ALASKA

Size	Job. No.	File No.	Date:	Plate
	JR5070	JR5_e.cdr	2/97	

SOURCE: Ecology and Environment, Inc. 1997.



LEGEND			
mg/kg	Milligram per kilogram	BTEX	Benzene, toluene, ethylbenzene, xylene
ug/L	Microgram per liter	PCB	Polychlorinated biphenyls
SB-125	1996 soil boring location	BGS	Below ground surface
MW-13	Monitoring well location	AMSL	Above mean sea level
BH8-4	1994 soil boring location	PAHs	Polyaromatic hydrocarbons
GRO	Gasoline range organics	HC	Field screening for petroleum hydrocarbons
DRO	Diesel range organics	▼	Groundwater table (measured on 8/18/96 and 8/20/96)
⇨	Groundwater flow direction	?	Extent or depth unknown
	Sandy gravel		
	Organic silt		
	Approximate extent of contamination based on soil and/or groundwater samples exceeding regulatory guidance levels (primarily ADEC North Slope).		

HORIZONTAL SCALE 1"=50'

0 50 100 Feet

VERTICAL SCALE 1"=2'

0 2 4 Feet

Vertical Exaggeration 1:25

SOURCE: Ecology and Environment, Inc. 1997.

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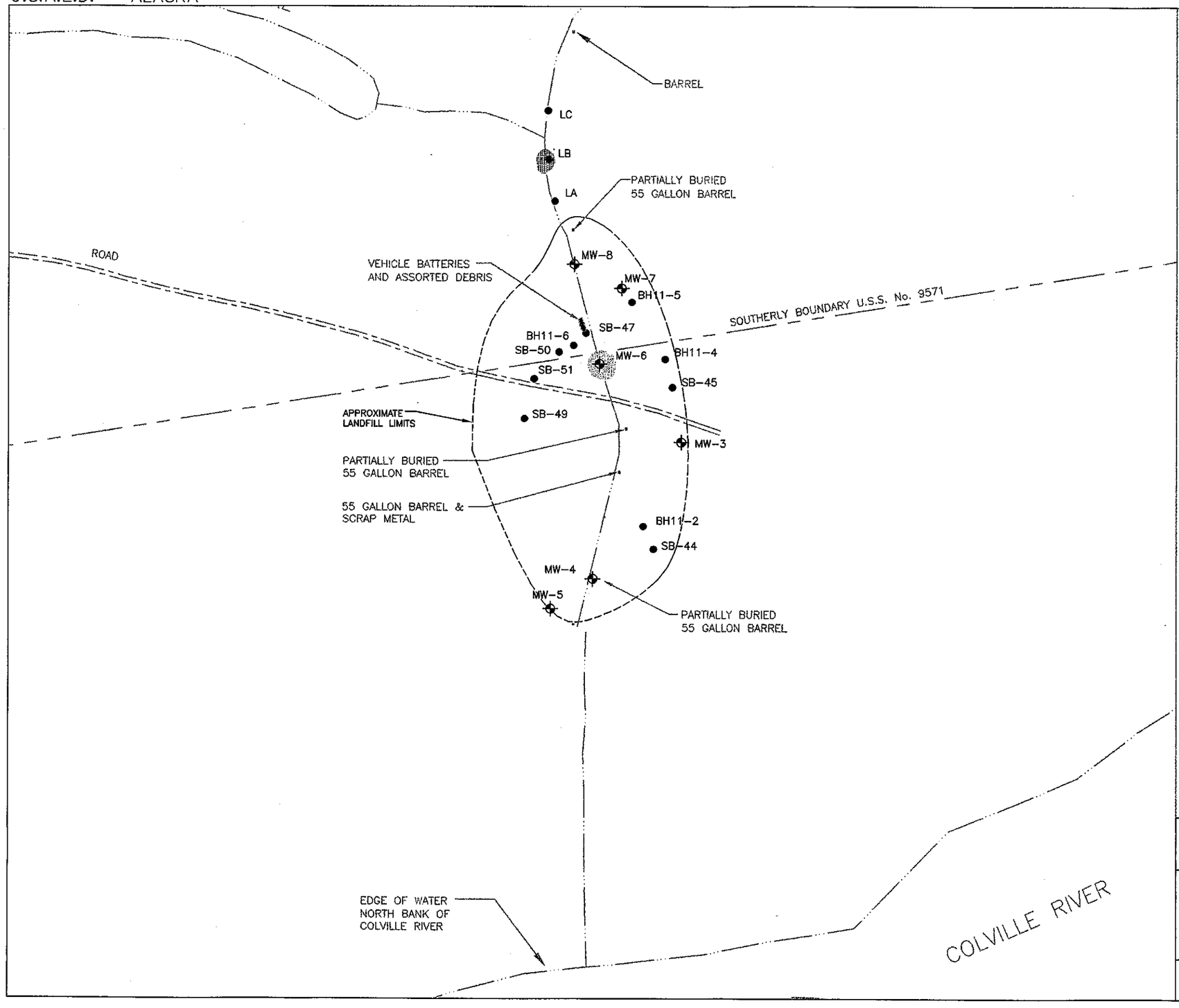
Figure 4-18
UNIT B
CROSS SECTION F-F´
MAIN GRAVEL PAD
UMIAT ALASKA

Size	Job. No.	File No.	Date:	Plate
	JR5070	JR5_f.cdr	2/97	



LEGEND

BH11-5 ●	1994 RI SAMPLE LOCATION
SB-44 ●	1996 RI SAMPLE LOCATION
MW-7 ⊕	1996 RI MONITORING WELL LOCATION
— — — — — —	EDGE OF GRAVEL
——·——·——	EDGE OF WATER
LA.	1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
DRO	DIESEL RANGE ORGANICS
GRO	GASOLINE RANGE ORGANICS
RRO	RESIDUAL RANGE ORGANICS
PCBs	POLYCHLORINATED BIPHENYL
	SUBSURFACE SOILS AT GROUNDWATER INTERFACE EXCEEDING ADEC NORTH SLOPE SOIL CLEANUP MATRIX (DRO > 200mg/kg) (RRO > 2,000mg/kg) (GRO > 100mg/kg)
	SEDIMENTS EXCEEDING TSCA CLEANUP LEVELS (PCBs > 10 mg/kg)

N

SCALE IN FEET

0 300 600 900

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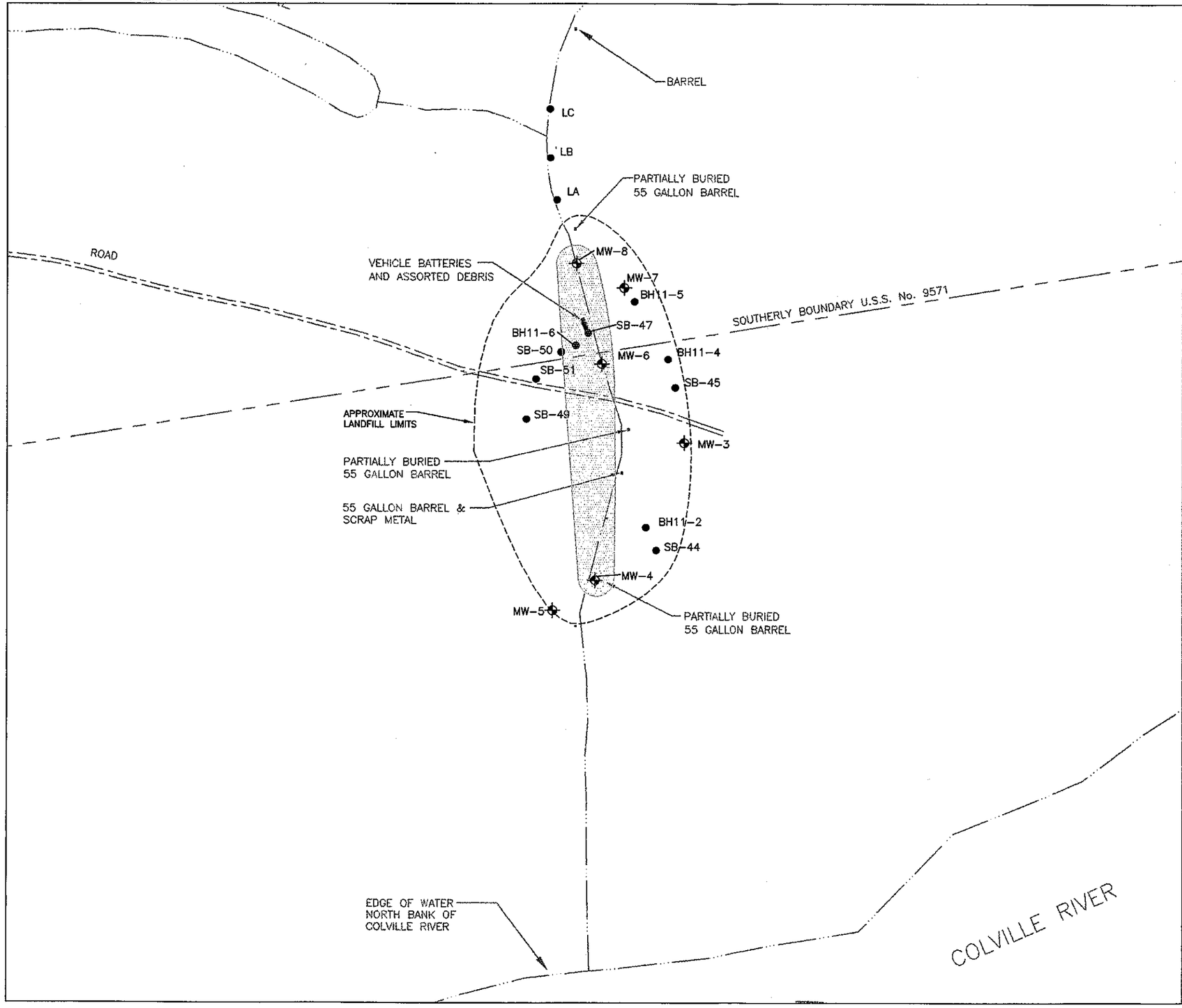
ANCHORAGE, ALASKA

Figure 4-19
UNIT C
AREAL EXTENT OF
SOIL AND SEDIMENT CONTAMINATION
UMIAT LANDFILL ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S246B	3/97	

BUFF Plotted: 03/10/97



LEGEND

BH11-5 ●	1994 RI SAMPLE LOCATION
SB-44 ●	1996 RI SAMPLE LOCATION
MW-7 ⊕	1996 RI MONITORING WELL LOCATION
———	EDGE OF GRAVEL
———	EDGE OF WATER
LA.	1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
▒	APPROXIMATE EXTENT OF GROUNDWATER CONTAMINATION EXCEEDING REGULATORY GUIDENCE LEVELS.

N

SCALE IN FEET

0 300 600 900

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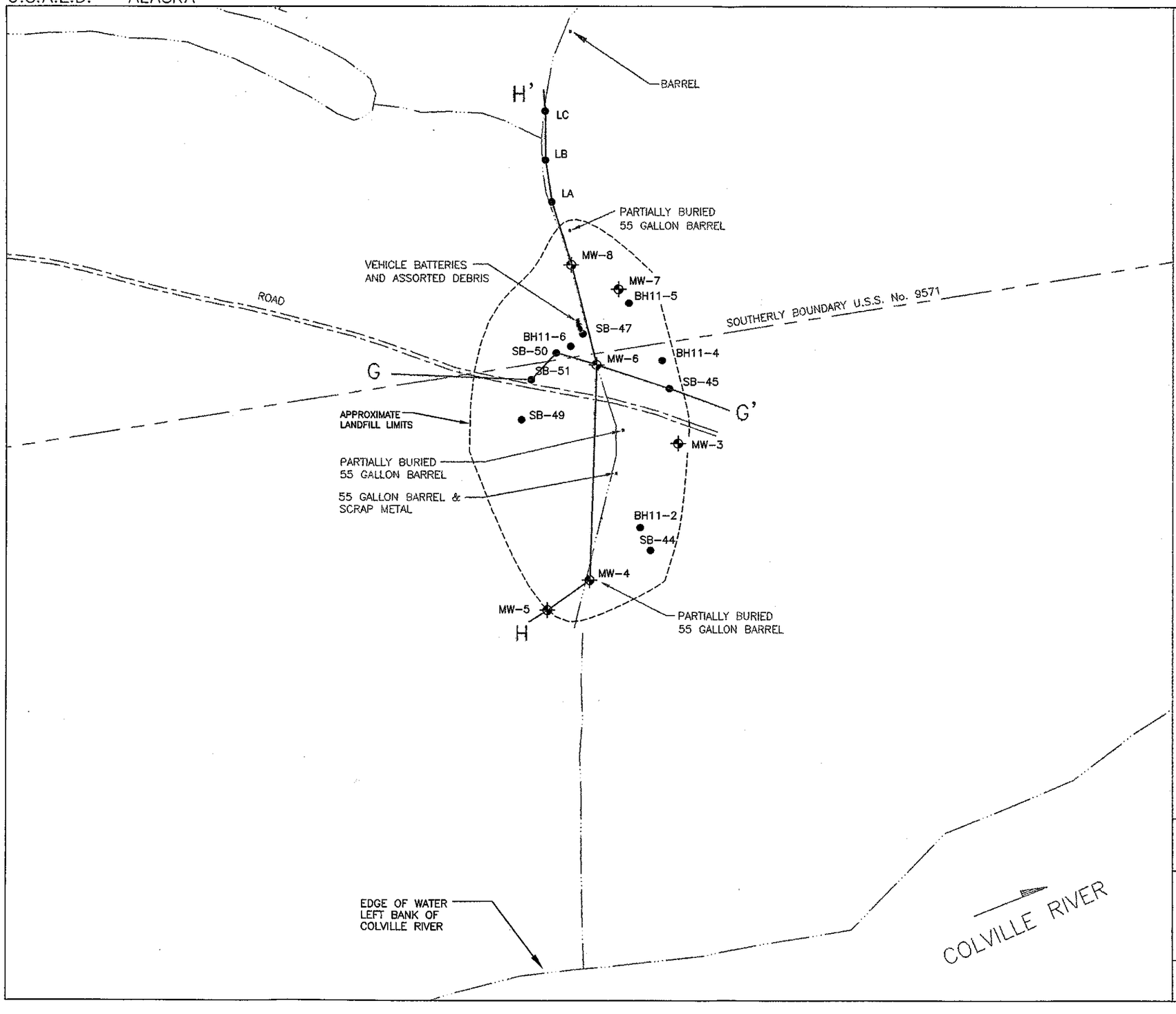
ANCHORAGE, ALASKA

Figure 4-20
UNIT C
AREAL EXTENT OF
GROUNDWATER CONTAMINATION
LANDFILL
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S245B	3/97	



LEGEND

MW-7 ⊕	1996 RI MONITORING WELL LOCATION
LC (224,225-SD) ●	1996 RI SEDIMENT SAMPLE LOCATION
BH11-5 ●	1994 RI SAMPLE LOCATION
SB-47 ●	1996 RI SAMPLE LOCATION
LA. ●	1996 RI SURFACE WATER AND SEDIMENT SAMPLE LOCATION
– – – – – –	EDGE OF GRAVEL
——·——·——	EDGE OF WATER

N

SCALE IN FEET

0 300 600 900

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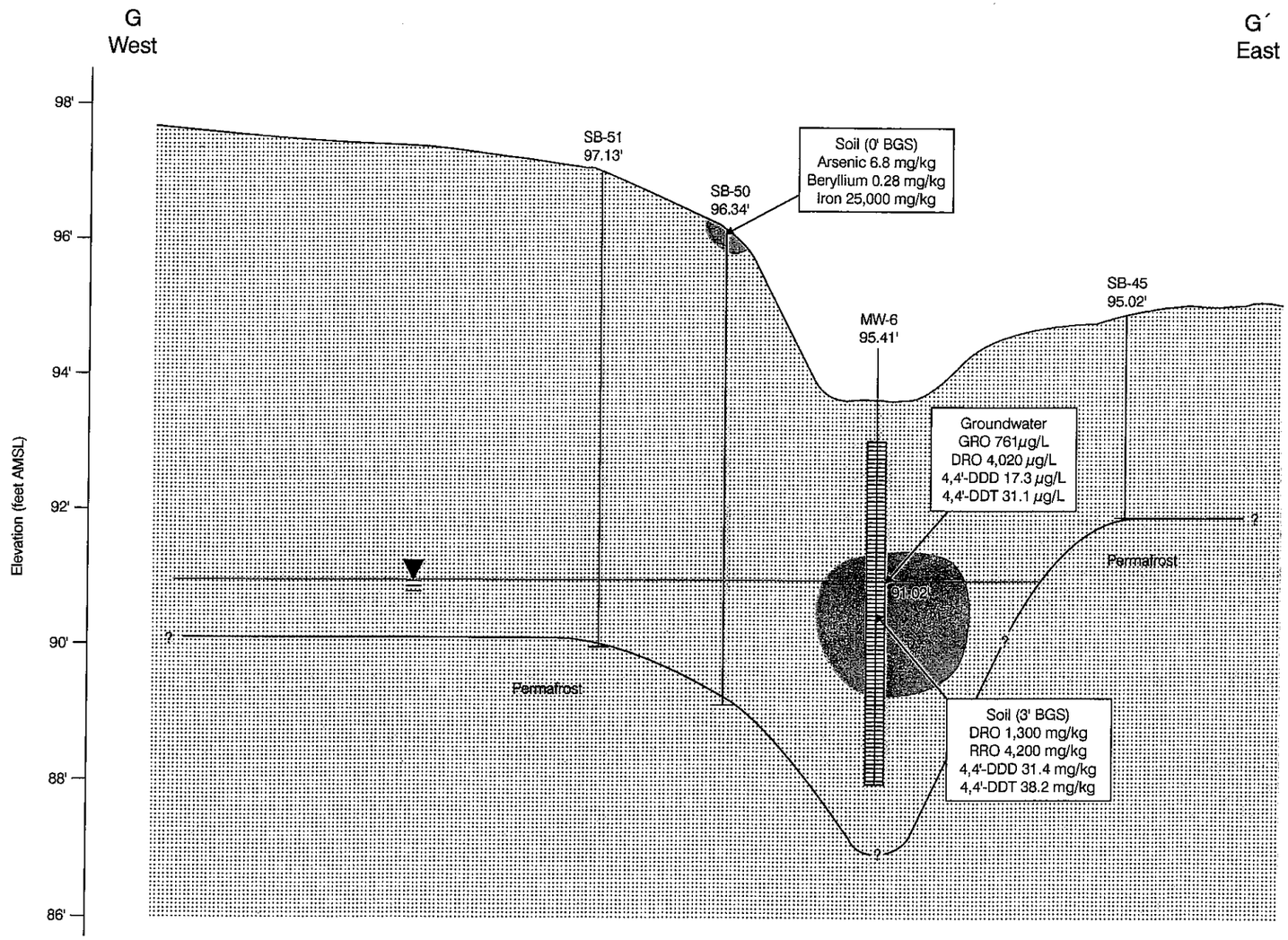
ANCHORAGE, ALASKA

Figure 4-21
UNIT C
KEY TO CROSS SECTIONS G AND H
LANDFILL
UMIAT ALASKA

SIZE	JOB. NO.	FILE NO.	DATE:	PLATE
B	JR5987	JR5S234B	2/97	

BUFF Plotted: 03/03/97



LEGEND			
mg/kg	Milligram per kilogram	RRO	Residual range organics
ug/L	Microgram per liter	DDD	Dichlorodiphenyldichloroethane
SB-51	1996 soil boring location	DDT	Dichlorodiphenyltrichloroethane
MW-6	Monitoring well location	▼	Groundwater table (measured on 8/20/96)
GRO	Gasoline range organics	?	Extent or depth unknown
DRO	Diesel range organics		
	Sandy gravel		
	Approximate extent of contamination based on soil and/or groundwater samples exceeding regulatory guidance levels (primarily ADEC North Slope).		

HORIZONTAL SCALE
0 60 120 Feet

VERTICAL SCALE
0 2 4 Feet
Vertical Exaggeration 1:30

SOURCE: Ecology and Environment, Inc. 1997.

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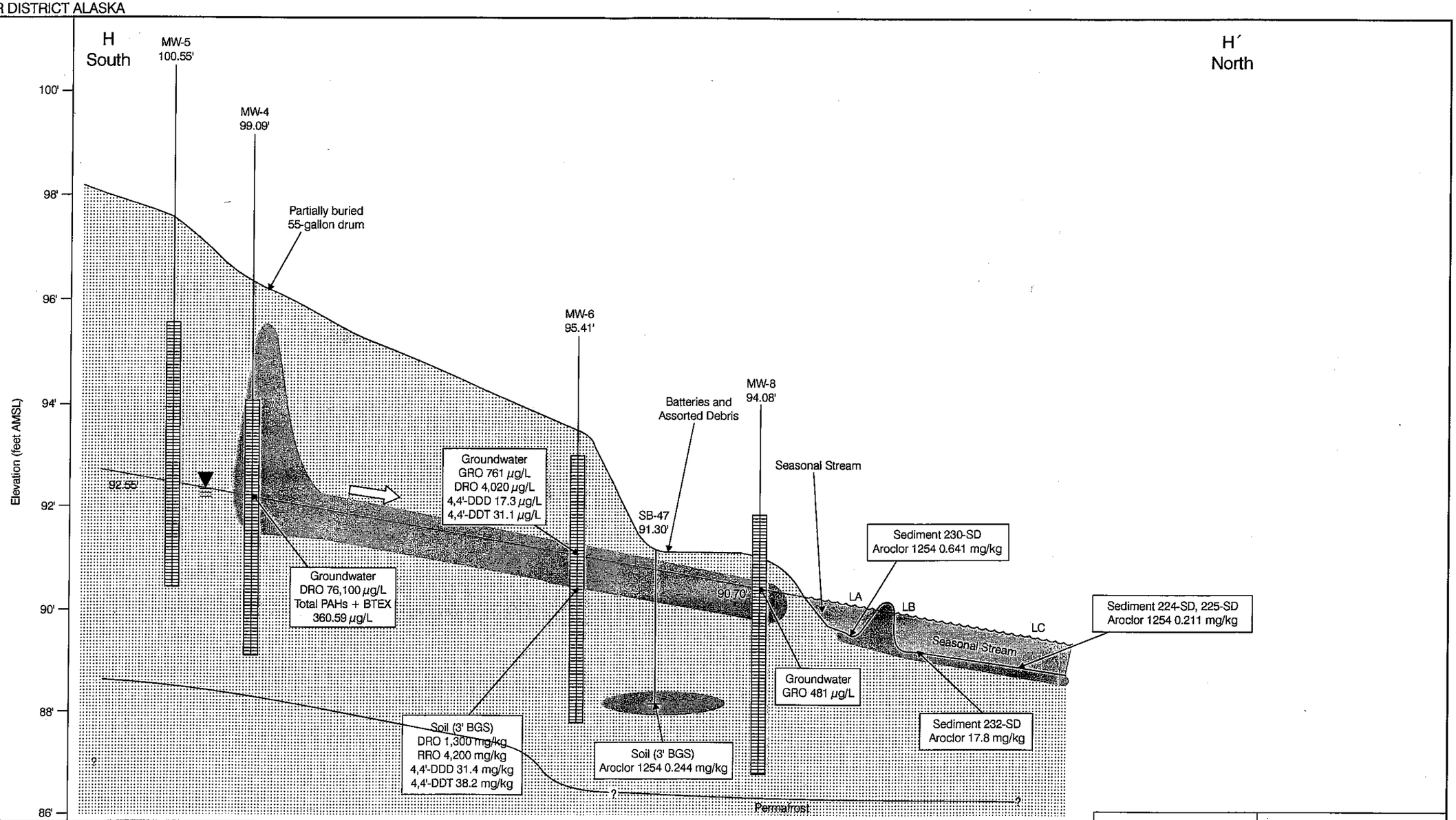
Figure 4-22
UNIT C
CROSS SECTION G-G´
LANDFILL
UMIAT ALASKA

Size	Job. No.	File No.	Date:	Plate
	JR5070	JR5_g.cdr	2/97	



LEGEND			
mg/kg	Milligram per kilogram	RRO	Residual range organics
ug/L	Microgram per liter	PAHs	Polyaromatic hydrocarbons
SB-51	1996 soil boring location	DDD	Dichlorodiphenyltrichloroethane
MW-6	Monitoring well location	DDT	Dichlorodiphenyldichloroethanel
GRO	Gasoline range organics	▼	Groundwater table (measured on 8/20/96)
DRO	Diesel range organics	?	Extent or depth unknown
⇨	Groundwater flow direction	LA	1996 sediment sample location
	Sandy gravel		
	Approximate extent of contamination based on soil and/or groundwater samples exceeding regulatory guidance levels (primarily ADEC North Slope).		

HORIZONTAL SCALE 1"=200'
0 200 400 Feet

VERTICAL SCALE 1"=2'
0 2 4 Feet
Vertical Exaggeration 1:100

SOURCE: Ecology and Environment, Inc. 1997.

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Figure 4-23
UNIT C
CROSS SECTION H-H´
LANDFILL
UMIAT ALASKA

Size	Job. No.	File No.	Date:	Plate
	JR5070	JR5_h.cdr	2/97	

5 Conclusions and Recommendations

5.1 Conclusions

Phase I (1994) of the Umiat RI documented petroleum, pesticide, PCB, and metals contamination. Phase II (1996) of the RI was designed to delineate the extent of contamination in soils, sediment, surface water, and groundwater. The results of both phases were used to produce this RIR and form the basis for potential future remedial design or removal efforts. These data also were used by E & E to create an HHRA and ERA, which were completed under this delivery order and submitted under separate cover.

Units A and B of the former Umiat AFS are gravel pads that were laid down directly on the wetlands and tundra. Based on the August 1996 sampling effort, groundwater under these gravel pads is shallow, ranges from 2 feet to 5 feet BGS, and generally flows north-northeast. Permafrost underlies the groundwater and was encountered as shallow as 2 feet BGS and shown to be greater than 12 feet BGS. The soil in the wetlands immediately adjacent to the gravel pads comprises organic silt. Phase II soil borings show that permafrost under the wetlands is as shallow as 2 feet BGS. Unit C rests on the floodplain gravels of the Colville River. Permafrost under this unit was found to be generally deeper than that under Units A and B.

E & E compared the analytical results from the Phase I and Phase II RI to the applicable regulatory guidance levels and RBCs. These screening levels were used as benchmarks against which to compare the concentration of contaminants and calculate the areal extent and volumes of contaminated media. The screening levels used for soil and sediment were the ADEC North Slope Cleanup Levels; EPA, Region 3, RBCs; and background concentrations. Surface water and groundwater analyses were compared to Alaska MCLs; Alaska Water Quality Standards; and EPA, Region 3, RBCs.

5.1.1 Unit A—Airstrip Operations Complex

At Unit A, contaminants are present above screening levels in the surface soil, subsurface soil, and groundwater. Petroleum is the most widespread contaminant type in Unit A, including GRO, DRO, and RRO. The estimated volume of petroleum-contaminated soil in Unit A is 12,500 cubic yards (cy; see Table 5-1). In addition to petroleum contamination, chlorinated pesticides (DDT) are present in surface soils above EPA, Region 3, RBCs and are estimated at 100 cy in volume. Groundwater contamination in Unit A includes GRO, DRO, benzene, total BTEX, dissolved lead, dissolved iron, and total thallium. The extent of groundwater contamination has been only approximately defined; therefore, no volume of contaminated groundwater has been estimated. No contaminants were detected above the screening levels in the Runway Lake sediment and surface water samples.

5.1.2 Unit B—Main Gravel Pad

Unit B contamination is present in the surface soil, subsurface soil, and groundwater. Five contaminant types are present in Unit B: petroleum, pesticides, PCBs, metals, and dioxins. The estimated volume of petroleum-contaminated soil in Unit B is 16,300 cy. The estimated volume of pesticide-contaminated soil in Unit B is 2,365 cy. PCB contamination in Unit B is localized at former defined Area 7, with an estimated volume of 200 cy. An engineering design for the removal of the PCB-contaminated materials was prepared under a separate delivery order (E & E 1997b). Metals contamination of surface and subsurface soils includes lead, antimony, arsenic, copper, and iron. Because the extent of metals contamination in soils has not been delineated, no estimate of soil volume has been calculated. Dioxin contamination in soil ranges up to 610 pg/g of 2,3,7,8-TCDD (TEQ). Only two locations were sampled for dioxin; however, these locations are considered "worst-case" scenarios. Concentrations are well below cleanup levels accepted at other dioxin-contaminated sites throughout the country and within Alaska. The dioxins detected in former Unit 7 (containing the higher dioxin levels) will be removed during the scheduled PCB soil removal. Groundwater contamination throughout Unit B consisted of GRO, benzene, total BTEX, total PAHs + BTEX, DDD, PCBs, and thallium. Groundwater contamination is only approximately estimated; thus, no estimate of the volume of contaminated groundwater was calculated. No contaminants were detected above the screening levels in the Floatplane Lake sediments and surface waters associated with Unit B.

5.1.3 Unit C—Landfill

The results of the Phase I RI (E & E 1995a) at Unit C, the Landfill, indicated that petroleum products and DDT were present in soils at the Landfill, but not at concentrations exceeding regulatory or risk-based screening criteria. No surface water, sediment, or groundwater samples were collected during the Phase I investigation.

During the Phase II investigation, Landfill surface soil contained lead, arsenic, beryllium, and iron above screening levels. Lead contamination is attributable to a lead-acid battery present on the surface. The arsenic, beryllium, and iron concentrations did not significantly exceed background levels; therefore, the elevated concentrations of these metals may be attributable to a natural variation in metals concentrations in this area. There is no evidence that these contaminants have migrated laterally or vertically.

In the Phase II investigation, PCBs, DRO, RRO, DDT, and DDD were detected above screening levels in subsurface soils. The PCB contamination is limited to the north portion of the Landfill, and the concentrations detected are less than the required cleanup level under TSCA. DDT, DDD, DRO, and RRO contamination in subsurface soil appears to be limited to one location. However, these contaminants have been detected in groundwater at the Landfill. The absence of petroleum products in subsurface soils may be due to the properties of the Landfill soils, periodic flooding, or the location of the source.

DDT and DDD were detected only in an unfiltered Landfill groundwater sample collected from the same location where they were found in the associated subsurface soil sample. These contaminants probably are adhered to suspended solids in groundwater. There is no evidence that they have migrated.

The distribution of DRO and GRO in Landfill monitoring wells suggests that there may be a petroleum groundwater plume originating from an unknown source in the south portion of the Landfill. The source and associated plume have not been well-defined. Given that groundwater at the Landfill is assumed to discharge north to the downgradient seasonal stream and that no petroleum was detected in surface water or sediments, there is no evidence to suggest that petroleum contamination is migrating from the Landfill.

No analytes were detected above screening levels in Unit C surface water samples. PCBs were detected above screening levels in all three sediment samples collected downgradient of the Landfill. This contamination likely originated from groundwater discharge from the Landfill. No other nearby sources were found. Although the PCB-contaminated sediment could migrate via surface water, collocated surface water samples do not indicate that contaminants are migrating actively off site. However, the seasonal stream was not flowing during the sampling period and active sediment transport was not likely at that time because

of quiescent conditions. The intermittent nature of the stream suggests that sediment transport may, however, occur at times of high runoff (i.e., spring breakup).

The estimated volume of petroleum-contaminated soil in Unit C is 410 cy. The estimated volume of PCB-contaminated sediment is 300 cy. These estimates are considered preliminary because the extent of contamination has not been well-defined in Unit C.

5.2 Recommendations

Recommendations for remedial options will be determined in the subsequent FS in conjunction with the conclusions of the RAR. However, further site characterization is recommended at Unit C (the Landfill). The nature and extent of DoD contamination at the Airstrip Operations Complex and Main Gravel Pad (Units A and B, respectively) have been defined adequately for the purposes of implementing the FS.

The Phase II sampling effort for Unit C was designed based on the results of the 1994 (Phase I) RIR (which did not find any contaminants above risk-based or regulatory screening levels) and the requirements of the risk assessment to be performed. The Phase II results herein show levels of petroleum, chlorinated pesticides, and PCBs in Unit C; however, the areal extent of each has not been well-defined. Specifically, all three of the sediment samples that were collected downstream of the Landfill contained PCBs at levels of concern. These samples were collected for risk assessment purposes and were not adequate in number to determine the extent of PCBs in sediments. Additional sampling for PCBs in these sediments therefore is recommended.

PCBs also were detected at low levels in the subsurface soils of the Landfill, upgradient of the sediment sampling. This, or other PCB sources, likely is contributing to the sediment contamination. Therefore, any future remedial efforts also should address PCB source areas. Subsurface soil sampling to delineate these PCB sources therefore is recommended.

Petroleum contamination in groundwater within the Landfill also is documented herein. The extent of the groundwater plume and its sources are, however, not well-defined. In addition, petroleum may be acting as a carrier for PCBs from the subsurface to the downgradient sediments. Additional subsurface soil borings and monitoring wells are recommended to fill these data gaps.

Table 5-1

SUMMARY of CONTAMINATION EXTENT
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Unit		Area [ft2]		Volume
		Surface	Subsurface	[c.y.]
A				
	Petroleum	15,900	125,200	12,500
	Pesticides	5,500	0	100
B				
	Petroleum	43,000	184,100	16,300
	Pesticides	31,175	13,765	2,365
	PCBs	1,650	1,650	200
C				
	Petroleum	0	4,420	410
	Pesticides	0	4,420	410
	PCBs *	8,125	0	300

Key:

c.y. = Cubic yard.
ft^2 = Square feet.
PCBs = Polychlorinated biphenals.
* = In sediment only.

6 References

18 Alaska Administrative Code, 70, 75, 78, 80.

49 Code of Federal Regulations, Parts 100-199.

Alaska Department of Environmental Conservation, June 23, 1993, letter to United States Army Corps of Engineers, Alaska District, (Corps) Fairbanks, Alaska.

_____, February 11, 1992a, note to file, Fairbanks, Alaska.

_____, February 1992b, *Draft Method for Determination of Diesel-Range Organics,* Revision 2.

_____, February 1992c, *Draft Method for Determination of Gasoline-Range Organics,* Revision 5.

_____, July 1991, *Interim Guidance for Non-UST Contaminated Soil Cleanup Levels,* Guidance No. 001, Revision No. 1.

_____, August 12, 1976, Umiat letter to governor, Fairbanks, Alaska.

_____, June 28, 1974a, *Observations at United Geophysical Camp at Umiat*, Fairbanks, Alaska.

_____, 1974b, *Umiat Observations on August 1, 1974,* Fairbanks, Alaska.

_____, September 11, 1973, Umiat observations memorandum, Fairbanks, Alaska.

Alaska Department of Fish and Game, July 24, 1996, personal communication, telephone conversation with Dave Ott.

Alaska Department of Natural Resources, 1997, *Proposed Oil and Gas Lease Sale 86, Central Beaufort Sea, Preliminary Findings of the Director, Volume I.*

Alaska Department of Transportation, 1992a, *January 31 Umiat Airstrip Hazardous Materials Assessment*, Fairbanks, Alaska.

_____, 1992b, *Umiat Airport Hazardous Materials Inspection, 6/17/92*, Fairbanks, Alaska.

Alaska Heritage Resource Survey, 1996, file search conducted by Ecology and Environment, Inc., (E & E) Anchorage, Alaska.

American Society for Testing and Materials (ASTM), 1989, Philadelphia, Pennsylvania.

Balding, G.O., 1977, *Water Availability, Quality, and Use in Alaska*, United States Geological Survey Open File Report 76-513, pp. 2-18, 55-62.

Blackman, Margaret, 1989, *Sadie Brown Neakok, An Inupiaq Woman*, University of Washington Press, Seattle, Washington.

Bureau of Land Management, 1996, file search conducted by E & E, Anchorage, Alaska.

Churchill, E. D., 1955, *Phytosocial and Environemental Characteristics of Some Plant Cummunities in the Umiat Region of Alaska*, Ecology V. 36 No. 4 :606-621.

Dalton, James W., October 10, 1973a, *Statistics of Accomplishment, Final Report, Umiat Clean-Up Program*, Barrow, Alaska.

_____, September 21, 1973b, *Letter to Alaska Department of Environmental Conservation*, Fairbanks, Alaska.

_____, August 5, 1973c, *Umiat Environmental Improvement Program*, Barrow, Alaska.

_____, December 20, 1972, *Environmental Assessment Statement, Proposed Clean-Up Operations, Umiat Camp and Vicinity, NPR No. 4, Alaska*, Barrow, Alaska.

_____, April 27, 1971, *Recommended Procedure and Cost Estimate, Clean-Up of NPR No. 4, Alaska, Part III: Umiat and Vicinity*, Barrow, Alaska.

Denfeld, Colt, 1994, *The Cold War in Alaska: A Management Plan for Cultural Resources, 1994-1999*, Corps, Anchorage, Alaska.

Ecology and Environment, Inc., 1997a, *Dioxin Evaluation Technical Memorandum for Soils at the Former Air Force Station, Umiat, Alaska*, Anchorage, Alaska.

_____, February 1997b, *Delivery Order, Request for Proposal, Indefinite Delivery Type (IDT), Remedial Action (RA), Umiat, Alaska*, Anchorage, Alaska.

_____, July 1996a, *Phase II Remedial Investigation Work Plans, Former Umiat Air Force Station, Umiat, Alaska*, Anchorage, Alaska.

_____, May 22, 1996b, "Contract No. DACA85-93-D-0009, Delivery Order No. 0040; Historical Site Uses Technical Memorandum (Tech Memo); Former Umiat Air Force Station (AFS); Umiat, Alaska," memorandum from S. Florio, E & E, Anchorage, Alaska, to J. Baker, United States Army Engineer District, Alaska.

_____, 1995a, *Umiat Remedial Investigation Project Report, Umiat Air Force Station, Umiat, Alaska*, Anchorage, Alaska.

_____, December 1995b, *Risk Assessment Work Plan, Former Umiat Air Force Station, Umiat, Alaska*, Anchorage, Alaska.

_____, April 1994, *Work Plan, Field Investigation, Umiat Air Force Station, Umiat, Alaska*, Anchorage, Alaska.

Environmental Science and Engineering, Inc. (ESE), September 1983, Installation Assessment of the Headquarters, 172nd Infantry Brigade (Alaska), Fort Wainwright, Alaska, Report No. 328B.

Federal Aviation Administration, Alaskan Region, (FAA) 1973, list of lease agreements for Umiat Airport, Anchorage, Alaska.

Federal Register, Volume 53, No. 168, proposed rules, pages 33314-33422.

Federal Register, Volume 55, No. 46, Thursday, March 8, 1990, pg. 8756.

Holder, Bob, May 18, 1990, personal communication, Klondike Drilling, Fairbanks, Alaska.

Kessel, R. and Cade, T. J., 1958, *Birds of the Colleville River, Northern Alaska*, Biological Papers of the University of Alaska No. 2, The Intelligencer Printing Company, Lancaster, PA.

MacDonald, Kathy, 1997, personal communication, United States Fish and Wildlife Service.

Mould, E. D., 1977, *Movement Patterns of Moose in the Colleville River Area, Alaska*, Thesis presented to the faculty of the University of Alaska, Fairbanks.

Nortech Environmental and Engineering Consultants, January 1994, Underground Storage Tank No. 355 Closure Report, Birch Hill Tank Farm, Fort Wainwright, Alaska.

Oil Spill Consultants, Inc., 1995, *Hazardous and Toxic Waste Removal and Disposal, Umiat Air Force Station, Umiat, Alaska*, Anchorage, Alaska.

Reed, John C., 1958, *Exploration of Naval Petroleum Reserve No. 4 and Adjacent Areas, Northern Alaska, 1944-1953, Part 1, History of the Exploration*, Geological Survey Professional Paper 301, United States Government Printing Office, Washington, DC.

Sele, Daryl, May 15, 1990, personal communication, Municipal Utilities System, Fairbanks, Alaska.

Selkregg, L., 1977, *Alaska Regional Profile, Arctic Region*, University of Alaska, Arctic Environmental Information and Data Center, University of Alaska, Anchorage, p. 203.

Smith, O.J., December 6, 1995, personal communication, owner, Umiat Enterprises, with E & E, Anchorage, Alaska.

_____, February, 19, 1997, personal communication, owner, Umiat Enterprises, with E & E, Anchorage, Alaska.

Smith, Elle, February 25, 1997, personal communication, owner, Umiat Enterprises, with E & E, Anchorage, Alaska.

State of Alaska Department of Public Works, Division of Aviation, 1984, *Umiat Airport Lease Status Map*, Anchorage, Alaska.

State of Alaska Historic Preservation Office, 1996, file search conducted by E & E, Anchorage, Alaska.

United States Army Corp of Engineers, Alaska District (Corps), 1968, Report of Inspection, East Birch Hill Tank Farm, Fort Wainwright, Alaska.

_____, 1985, Chemical Quality Management—Toxic and Hazardous Waste Sites, ER 1110-1-263 (Government furnished materials [GFM] 'h').

_____, 1986, Sample Handling Protocol for Low, Medium, and High Concentration Samples of Hazardous Waste (GFM 'g').

_____, 1987, *Report on Results of Hazardous Waste Sampling and Analysis for Umiat Air Force Station*, Anchorage, Alaska.

_____, 1991, Groundwater Monitoring Network, Fort Wainwright, Alaska, United States Army Installation Restoration Program.

United States Environmental Protection Agency (EPA), 1984a, Characterization of Hazardous Waste Sites—Methods Manual, Volume II, EPA 60/4-84-076.

_____, December 7, 1984b, Region 10, Environmental Sampling Procedures Training Course Notebook.

_____, 1985, National Enforcement Investigations Center Policy and Procedures, EPA 330/9-78-001R.

_____, 1986, *RCRA Ground-water Monitoring Technical Enforcement Guidance Document*, Office of Waste Programs Enforcement, Office of Solid Waste and Emergency Response, OSWER-99501.1.

_____, 1988, Draft Groundwater Monitoring and Corrective Action, Subpart E, *Criteria for Municipal Solid Waste Landfills*, EPA/530-SW-88-043.

_____, April 1989, *Specification and Guidance for the Preparation of Contaminant - Free Sample Containers*.

_____, July 10, 1992, personal communication, letter to Ken Lauzan, FAA, Anchorage, Alaska.

_____, 1996, Risk-Based Concentration Table, EPA Region 3, Philadelphia, Pennsylvania.

Williams, John R., 1970, "Groundwater in the Permafrost Regions of Alaska," United States Geological Survey Professional Paper No. 696, United States Department of Interior, p. 27.

Woodward-Clyde Consultants (WCC), 1986, *Site Inventory Report, Defense Environmental Restoration Program, Umiat Air Force Station, Alaska*, Anchorage, Alaska.

_____, June 1989, Installation Restoration Program Stage 1, Site 3, Fort Wainwright Landfill, Volume 3, Second Draft.

_____, 1990, Installation Restoration Program Stage 1, Joint Resources Project, Fort Richardson, Fort Wainwright, and Fort Greely, Alaska, Site 3, Fort Wainwright Landfill, United States Air Force OEHL, Brooks Air Force Base, Texas.

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 9

Subject: Unit A drilling SB-42 located in the center of north-south road that runs from Unit A to Unit B.

Photographer: Brad Ackman

Date: 8/96

Direction: South

Photo Number: 10

Subject: Unit A drilling SB-2.

Photographer: Brad Ackman

Date: 8/96

Direction: Northeast

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 11

Subject: Unit B aerial photograph with two large metal storage buildings to east and two smaller storage buildings to west.

Photographer: Brad Ackman

Date: 8/96

Direction: North is at top of aerial photograph

Photo Number: 12

Subject: Unit B drilling SB-51 located east of ADOT Building.

Photographer: Brad Ackman

Date: 8/96

Direction: South

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 13

Subject: Unit B drilling SB-131. Surface soil staining is in foreground.

Photographer: Brad Ackman

Date: 8/96

Direction: North

Photo Number: 14

Subject: Petroleum stain on Main Gravel Pad at Unit B.

Photographer: Brad Ackman

Date: 8/96

Direction: North-northwest

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 15

Subject: Unit B drilling SB-154. SB-154 is the easternmost soil boring at Unit B.

Photographer: Brad Ackman

Date: 8/96

Direction: North

Photo Number: 16

Subject: Unit B location of MW-10. Unit A is in background.

Photographer: Brad Ackman

Date: 8/96

Direction: North

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 17

Subject: Unit C aerial photograph of the Landfill.

Photographer: Brad Ackman

Date: 8/96

Direction: North is at top of photograph

Photo Number: 18

Subject: Little Beaver at SB-47 at Unit C. Permanent monitoring well MW-7 is in background.

Photographer: Brad Ackman

Date: 8/96

Direction: —

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 19

Subject: Unit C drilling SB-44 using Little Beaver. Debris located in background on slope.

Photographer: Brad Ackman

Date: 8/96

Direction: South

Photo Number: 20

Subject: Unit C drilling SB-50 using Little Beaver.

Photographer: Brad Ackman

Date: 8/96

Direction: West

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 21

Subject: Unit C drilling MW-7 permanent monitoring well location.

Photographer: Brad Ackman

Date: 8/96

Direction: South

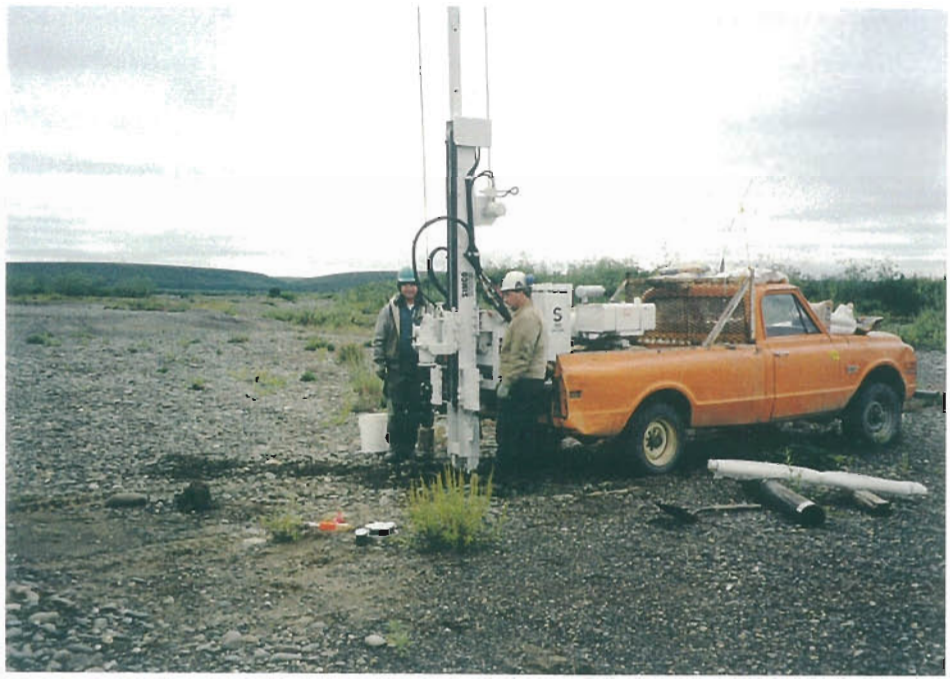


Photo Number: 22

Subject: Unit C, location of permanent monitoring well MW-3.

Photographer: Brad Ackman

Date: 8/96

Direction: North

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 23

Subject: Unit C drilling MW-7, permanent monitoring well location.

Photographer: Brad Ackman

Date: 8/96

Direction: Northeast

Photo Number: 24

Subject: Unit C, light vegetation covering sandy gravel portions of Landfill.

Photographer: Brad Ackman

Date: 8/96

Direction: East

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 25

Subject: Unit C vehicle batteries and assorted debris at Landfill.

Photographer: Brad Ackman

Date: 8/96

Direction: West

Photo Number: 26

Subject: Unit C drilling SB-51. Vehicle batteries and assorted debris pile in foreground.

Photographer: Brad Ackman

Date: 8/96

Direction: South

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 27

Subject: Unit C, debris at Landfill. Stake in water is sample location LA.

Photographer: Brad Ackman

Date: 8/96

Direction: Northeast

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 1

Subject: Unloading of sampling equipment during mobilization from Air Cargo Express DC-10.

Photographer: Brad Ackman

Date: 8/96

Direction: Northeast

Photo Number: 2

Subject: Truck-mounted SIMCO drill rig setting up at MW-1 at Unit A.

Photographer: Brad Ackman

Date: 8/96

Direction: Northwest

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 3

Subject: Preparing GRO trip blank sample (Method AK-101) for analysis.

Photographer: Brad Ackman

Date: 8/96

Direction: Not applicable

Photo Number: 4

Subject: Surface water and sediment sampling conducted at Unit B Floatplane Lake.

Photographer: Brad Ackman

Date: 8/96

Direction: Northwest

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

Photo Number: 5

Subject: Aerial photograph of Unit A Airstrip Operations Complex. Area 10 is located at bottom, east of north-south road.

Photographer: Brad Ackman

Date: 8/96

Direction: Northwest

Photo Number: 6

Subject: Unit A drilling SB-29 at south edge of airstrip. Umiat Enterprises, Inc., compound and ASTs in background.

Photographer: Brad Ackman

Date: 8/96

Direction: East-southeast

Ecology and Environment, Inc.

PHOTOGRAPHIC RECORD

SITE NAME: Former Umiat Air Force Station
SITE LOCATION: Umiat, Alaska
JOB NUMBER: JR5000

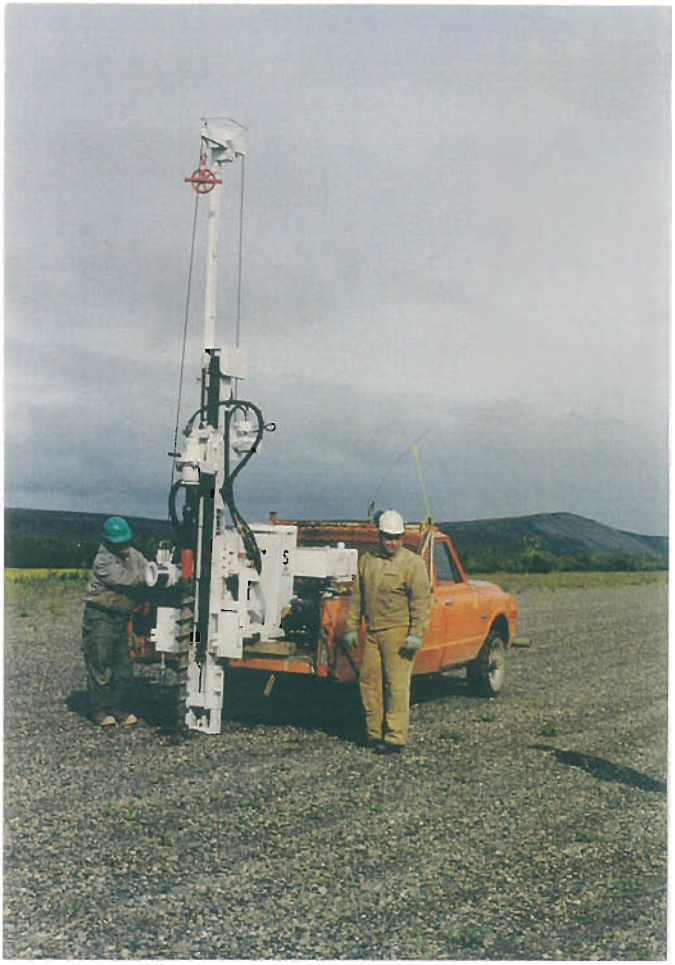


Photo Number: 7

Subject: Unit A drilling SB-37 in the center of the airstrip.

Photographer: Brad Ackman

Date: 8/96

Direction: East-northeast

Photo Number: 8

Subject: Unit A drilling MW-1, located behind the Umiat Enterprises, Inc., meat house.

Photographer: Brad Ackman

Date: 8/96

Direction: —

B

Soil Boring Logs and Monitoring Well Construction Diagram

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Umiat Phase II RI	SHEET # 1 OF 1
	LOCATION COORD N. 5623273.92 - E. 738140.6	
	DRILLING AGENCY other (X) USACE ( )	
HOLE NO. (field): Background MW-17 (West End of Airstrip) HOLE NO. (permanent):	NAME OF DRILLER Hughes Drilling, Inc./Gary Wilson	WEATHER 40°F heavy rain, overcast

TYPE OF HOLE Test Pit ( ) Auger Hole (X) Churn Drill ( )	HAMMER WEIGHT 140 pounds	SIZE AND TYPE OF BIT 6" hollow stem auger
TOTAL DEPTH OF HOLE 2'	DATUM FOR ELEVATION SHOWN (X) MSL ____	TYPE OF EQUIPMENT Truck-Mounted SIMCO
TOTAL # OF SAMPLES 3	TYPE OF SAMPLES 1.5" O.D. split spoon	DEPTH TO GROUNDWATER 1.35' TOC
		DATE HOLE STARTED: 8-16-96 DATE HOLE COMPLETED: 8-16-96
ELEV. TOP OF HOLE 101.09'	INSPECTOR Jackie Donley	CHIEF SOILS SECTION Jerry Raychel
		CHIEF GEOTECHNICAL BRANCH Del Thomas

DEPTH IN FEET	GROUND-WATER	BLOW COUNTS	% RECOVERY	CLASSIFI-CATION	DESCRIPTION AND REMARKS	PID (ppm)
	▽	NA	100%	SW	0' Dark brown, silty SAND, 60% sand, 40% silt, well-graded, dry, no petroleum odor. 96UMT316SS, 96UMT5216FL	NR
		NA	100%	GW	2' Dark brown, sandy GRAVEL, 60% gravel, 30% sand, 10% silt, well-graded, saturated, no petroleum odor, no sheen. 96UMT317SB, 96UMT5217FL, 96UMT345GW	NR
					Bottom of exploration @ 2' BGS.	
5						
10						
15						
20						

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Umiat Phase II RI		SHEET # 1 OF 1
	LOCATION COORD	N. 5624152.74	E. 744069.7
	DRILLING AGENCY	other (X)	USACE ( )

HOLE NO. (field): Background MW-18 (East of Airstrip) HOLE NO. (permanent):	NAME OF DRILLER Hughes Drilling, Inc./Gary Wilson	WEATHER 40°F heavy rain, overcast

TYPE OF HOLE Test Pit ( ) Auger Hole (X) Churn Drill ( )	HAMMER WEIGHT 140 pounds	SIZE AND TYPE OF BIT 6" hollow stem auger

TOTAL DEPTH OF HOLE 5'	DATUM FOR ELEVATION SHOWN (X) MSL ____	TYPE OF EQUIPMENT Truck-Mounted SIMCO

TOTAL # OF SAMPLES 3	TYPE OF SAMPLES 1.5" O.D. split spoon	DEPTH TO GROUNDWATER 2.86' TOC	DATE HOLE STARTED: 8-16-96 DATE HOLE COMPLETED: 8-16-96

ELEV. TOP OF HOLE 91.22'	INSPECTOR Jackie Donley	CHIEF SOILS SECTION Jerry Raychel	CHIEF GEOTECHNICAL BRANCH Del Thomas

DEPTH IN FEET	GROUND-WATER	BLOW COUNTS	% RECOVERY	CLASSIFI-CATION	DESCRIPTION AND REMARKS	PID (ppm)
		NA	100%	GW	0' Dark brown, sandy GRAVEL, 60% gravel, 40% sand, well-graded, moist, no petroleum odor. 96UMT318SS, 96UMT5218FL	NR
	▽					
		NA	100%	GW	3' Dark brown, sandy GRAVEL, 60% gravel, 40% sand, well-graded, saturated, no petroleum odor, no sheen. 96UMT319SB, 96UMT5219FL, 96UMT346GW	NR
5					Bottom of exploration @ 3' BGS.	
10						
15						
20						

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Umiat Phase II RI	SHEET # 1 OF 1
	LOCATION COORD N. 5625304.62	E. 745587.4
	DRILLING AGENCY other (X)	USACE ( )

HOLE NO. (field): Background MW-19 (East End of Airstrip) HOLE NO. (permanent):	NAME OF DRILLER Hughes Drilling, Inc./Gary Wilson	WEATHER 40°F heavy rain, overcast

TYPE OF HOLE Test Pit ( ) Auger Hole (X) Churn Drill ( )	HAMMER WEIGHT 140 pounds	SIZE AND TYPE OF BIT 6" hollow stem auger

TOTAL DEPTH OF HOLE 3'	DATUM FOR ELEVATION SHOWN (X) MSL ____	TYPE OF EQUIPMENT Truck-Mounted SIMCO

TOTAL # OF SAMPLES 3	TYPE OF SAMPLES 1.5 O.D. split spoon	DEPTH TO GROUNDWATER 2.70' TOC	DATE HOLE STARTED: 8-16-96 DATE HOLE COMPLETED: 8-16-96

ELEV. TOP OF HOLE 97.2'	INSPECTOR Jackie Donley	CHIEF SOILS SECTION Jerry Raychel	CHIEF GEOTECHNICAL BRANCH Del Thomas

DEPTH IN FEET	GROUND-WATER	BLOW COUNTS	% RECOVERY	CLASSIFI-CATION	DESCRIPTION AND REMARKS	PID (ppm)
	▽	NA	100%	GW	0' Dark brown, sandy GRAVEL, 60% gravel, 40% sand, well-graded, moist, no petroleum odor. 96UMT320SS, 96UMT5220FL	NR
		NA	100%	GW	3' Dark brown, sandy GRAVEL, 60% gravel, 40% sand, well-graded, saturated, no petroleum odor, no sheen. 96UMT321SB, 96UMT5221FL, 96UMT347GW Bottom of exploration @ 3' BGS.	NR
5						
10						
15						
20						

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Umiat Phase II RI	SHEET # 1 OF 1
	LOCATION COORD N.	E.
	DRILLING AGENCY other (X)	USACE ( )
HOLE NO. (field): Area A Airstrip Complex HOLE NO. (permanent):	NAME OF DRILLER Hughes Drilling, Inc./Gary Wilson	WEATHER 32-45°F
TYPE OF HOLE Test Pit ( ) Auger Hole (X) Churn Drill ( )	HAMMER WEIGHT 140 pounds	SIZE AND TYPE OF BIT 6" hollow stem auger
TOTAL DEPTH OF HOLE Approximately 5' BGS	DATUM FOR ELEVATION SHOWN (X) MSL ____	TYPE OF EQUIPMENT Truck-Mounted SIMCO
APPROXIMATE # OF SAMPLES 2 per soil boring	TYPE OF SAMPLES 1.5" O.D. split spoon	DEPTH TO GROUNDWATER Approximately 2' BGS
		DATE HOLE STARTED: 8-8-96 DATE HOLE COMPLETED: 8-16-96
ELEV. TOP OF HOLE	INSPECTOR Jackie Donley/Brad Ackman	CHIEF SOILS SECTION Jerry Raychel
		CHIEF GEOTECHNICAL BRANCH Del Thomas

DEPTH IN FEET	GROUND-WATER	BLOW COUNTS	% RECOVERY	CLASSIFI-CATION	DESCRIPTION AND REMARKS	PID (ppm)
	▽	NA	100%	GW	0' Gray to black, sandy GRAVEL, 20-65% gravel, 20-60% sand, 15-30% silt, well-graded, max. size=10 cm, moist.	NR
5		NA	100%	GW	2' Dark brown, sandy GRAVEL, 0-65% gravel, 10-20% sand, 15-20% silt, minor debris (flagging, tape, wood), max. size=2 cm, well-graded, moist to saturated.	NR
		NA	100%	GW	4' Dark brown, sandy GRAVEL, 40-50% gravel, 30-40% sand, 20% silt, max. size=10 cm, well-graded, saturated.	NR
10		NA	100%	GW	5' Dark gray, sandy GRAVEL, 30-80% gravel, 15-50% sand, 5-20% silt, max. size=4 cm, well-graded, saturated. Permafrost discontinuous and variable from approximately 2 to 6.5 feet.	NR
15					Bottom of exploration @ approximately 5' BGS.	
20						

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Umiat Phase II RI	SHEET # 1 OF 1
	LOCATION COORD N.	E.
	DRILLING AGENCY other (X)	USACE ( )
HOLE NO. (field): Area B Main Pad Area (Off pad) HOLE NO. (permanent):	NAME OF DRILLER Hughes Drilling, Inc./Gary Wilson	WEATHER 32-45°F

TYPE OF HOLE Test Pit ( ) Auger Hole (X) Churn Drill ( )	HAMMER WEIGHT 140 pounds	SIZE AND TYPE OF BIT 6" hollow stem auger

TOTAL DEPTH OF HOLE Approximately 9' BGS	DATUM FOR ELEVATION SHOWN (X) MSL ___	TYPE OF EQUIPMENT Truck-Mounted SIMCO

APPROXIMATE # OF SAMPLES 2 per soil boring	TYPE OF SAMPLES 1.5" O.D. split spoon	DEPTH TO GROUNDWATER Approximately 2' BGS	DATE HOLE STARTED: 8-11-96 DATE HOLE COMPLETED: 8-17-96

ELEV. TOP OF HOLE	INSPECTOR Jackie Donley/Brad Ackman	CHIEF SOILS SECTION Jerry Raychel	CHIEF GEOTECHNICAL BRANCH Del Thomas

DEPTH IN FEET	GROUND-WATER	BLOW COUNTS	% RECOVERY	CLASSIFI-CATION	DESCRIPTION AND REMARKS	PID (ppm)
	▽	NA	100%	OL	0' Dark gray, silty SAND, 40% sand, 20-25% silt, 15% gravel, 20% organic matter, max. size=3 cm, well-graded, wet.	NR
5		NA	100%	OL	2' Dark gray, ORGANIC SILT, 100% silt, minor sand, poorly graded, saturated.	NR
10		NA	100%	GW	9' Dark brown, sandy GRAVEL, 50% gravel, 40% sand, 10% silt, max. size=4 cm, well-graded, saturated. Permafrost discontinuous and variable from approximately 2.5 to 9 feet. Bottom of exploration @ approximately 9' BGS.	NR
15						
20						

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Umiat Phase II RI	SHEET # 1 OF 1
	LOCATION COORD N.	E.
	DRILLING AGENCY other (X)	USACE ( )
HOLE NO. (field): Area B Main Pad Area (On pad) HOLE NO. (permanent):	NAME OF DRILLER Hughes Drilling, Inc./Gary Wilson	WEATHER 32-45°F

TYPE OF HOLE Test Pit ( ) Auger Hole (X) Churn Drill ( )	HAMMER WEIGHT 140 pounds	SIZE AND TYPE OF BIT 6" hollow stem auger

TOTAL DEPTH OF HOLE Approximately 9' BGS	DATUM FOR ELEVATION SHOWN (X) MSL ____	TYPE OF EQUIPMENT Truck-Mounted SIMCO

APPROXIMATE # OF SAMPLES 2 per soil boring	TYPE OF SAMPLES 1.5" O.D. split spoon	DEPTH TO GROUNDWATER Approximately 3' BGS	DATE HOLE STARTED: 8-11-96 DATE HOLE COMPLETED: 8-17-96

ELEV. TOP OF HOLE	INSPECTOR Jackie Donley/Brad Ackman	CHIEF SOILS SECTION Jerry Raychel	CHIEF GEOTECHNICAL BRANCH Del Thomas

DEPTH IN FEET	GROUND-WATER	BLOW COUNTS	% RECOVERY	CLASSIFI-CATION	DESCRIPTION AND REMARKS	PID (ppm)
		NA	100%	GW	0' Brownish gray, sandy GRAVEL, 50-80% gravel, 10-40% sand, 5-20% silt, max. size=10 cm; well-graded, moist.	NR
	▽	NA	100%	GW	2' Brown to gray, sandy GRAVEL, 20-60% gravel, 30-50% sand, 10-45% silt, max. size=6 cm, well-graded, moist. Permafrost discontinuous at 2.5 feet.	NR
5		NA	100%	GW	3' Brown to gray, sandy GRAVEL, 20-60% gravel, 25-40% sand, 10-40% silt, max. size=3 cm, well-graded, saturated.	NR
10		NA	100%	GW	9' Dark brown to dark gray, sandy GRAVEL, 70% gravel, 20-40% sand, 5-10% silt, well-graded, max. size=5 cm, saturated. Bottom of exploration @ approximately 9' BGS.	NR
15						
20						

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Umiat Phase II RI	SHEET # 1 OF 1
	LOCATION COORD N.	E.
	DRILLING AGENCY other (X)	USACE ( )
HOLE NO. (field): Area C Landfill (North of Road) HOLE NO. (permanent):	NAME OF DRILLER Hughes Drilling, Inc./Gary Wilson	WEATHER 32-45°F
TYPE OF HOLE Test Pit ( ) Auger Hole (X) Churn Drill ( )	HAMMER WEIGHT 140 pounds	SIZE AND TYPE OF BIT 6" hollow stem auger
TOTAL DEPTH OF HOLE Approximately 9' BGS	DATUM FOR ELEVATION SHOWN (X) MSL ____	TYPE OF EQUIPMENT Truck-Mounted SIMCO
APPROXIMATE # OF SAMPLES 2 per soil boring	TYPE OF SAMPLES 1.5" O.D. split spoon	DEPTH TO GROUNDWATER Approximately 3' BGS	DATE HOLE STARTED: 8-10-96 DATE HOLE COMPLETED: 8-11-96
ELEV. TOP OF HOLE	INSPECTOR Jackie Donley/Brad Ackman	CHIEF SOILS SECTION Jerry Raychel	CHIEF GECTECHNICAL BRANCH Del Thomas

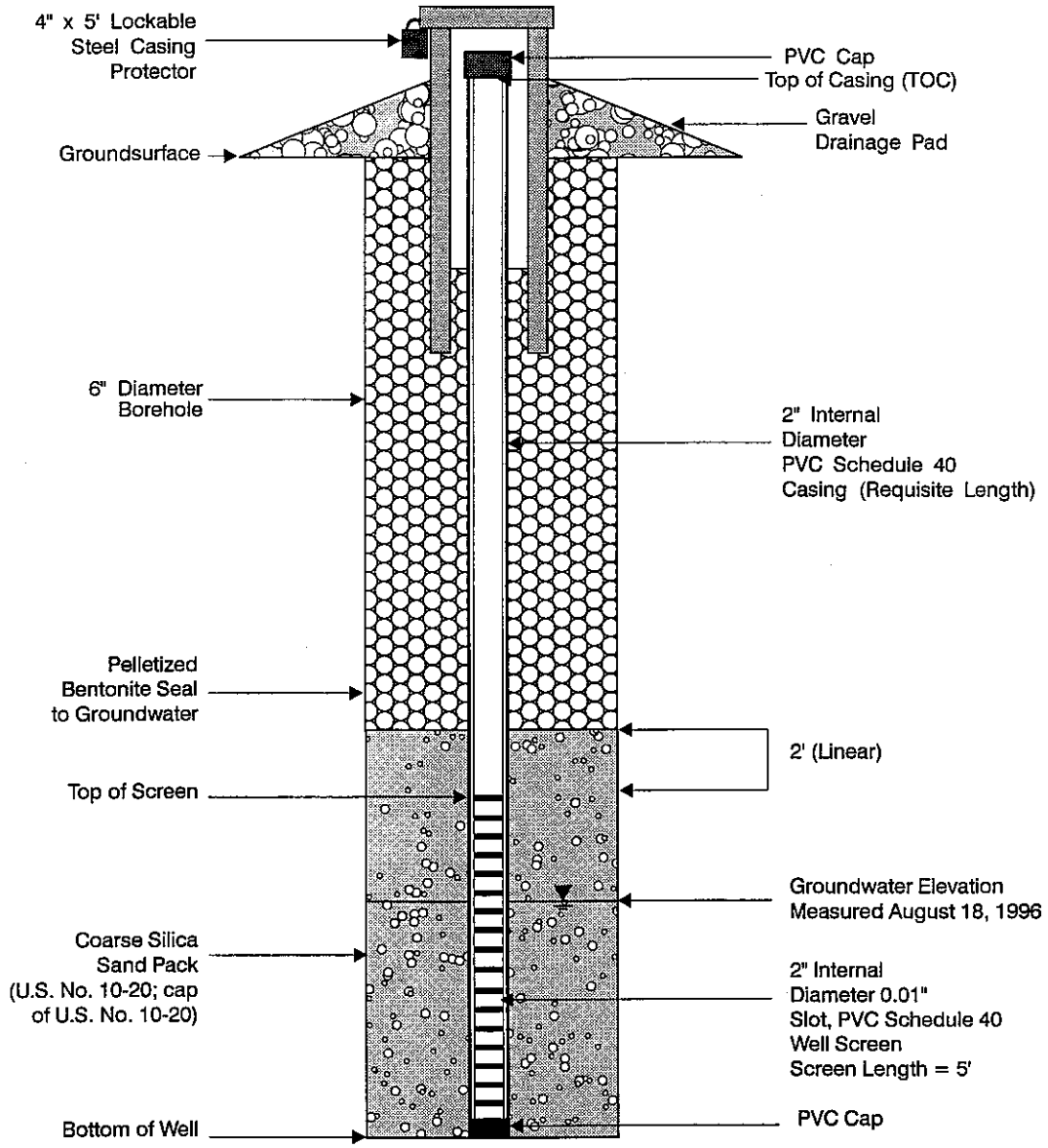
DEPTH IN FEET	GROUND-WATER	BLOW COUNTS	% RECOVERY	CLASSIFI-CATION	DESCRIPTION AND REMARKS	PID (ppm)
		NA	100%	GW	0' Dark brown, sandy GRAVEL, 40-60% gravel, 30-50% sand, 10% silt, max. size=15 cm, well-graded, dry.	NR
	▽	NA	100%	GW	2' Dark brown, sandy GRAVEL, 40-60% gravel, 30-50% sand, 10% silt, max. size=10 cm, well-graded, moist.	NR
5		NA	100%	GW	3' Bluish gray, sandy GRAVEL, 40% gravel, 40% sand, 20% silt and clay, max. size=3 cm, saturated.	NR
		NA	100%	GW	6' Dark brown, sandy GRAVEL, 60% gravel, 30% sand, 10% silt, well-graded, max. size=15 cm, saturated.	NR
10		NA	100%	GW	9' Dark brown, sandy GRAVEL, 40-65% gravel, 30-50% sand, 5-10% silt, max. size=4 cm, well-graded, saturated.	NR
					Bottom of explorations @ approximately 9' BGS.	
15						
20						

DEPARTMENT OF THE ARMY NORTH PACIFIC DIVISION U.S. ARMY ENGINEER DISTRICT, ALASKA EXPLORATION LOG	PROJECT: Umiat Phase II RI	SHEET # 1 OF 1
	LOCATION COORD N.	E.
	DRILLING AGENCY other (X)	USACE ( )
HOLE NO. (field): Area C Landfill (South of Road) HOLE NO. (permanent):	NAME OF DRILLER Hughes Drilling, Inc./Gary Wilson	WEATHER 32-45°F

TYPE OF HOLE Test Pit ( ) Auger Hole (X) Churn Drill ( )	HAMMER WEIGHT 140 pounds	SIZE AND TYPE OF BIT 6" hollow stem auger
TOTAL DEPTH OF HOLE Approximately 9' BGS	DATUM FOR ELEVATION SHOWN (X) MSL ____	TYPE OF EQUIPMENT Truck-Mounted SIMCO
APPROXIMATE # OF SAMPLES 2 per soil boring	TYPE OF SAMPLES 1.5" O.D. split spoon	DEPTH TO GROUNDWATER Approxiimately 3' BGS
		DATE HOLE STARTED: 8-10-96 DATE HOLE COMPLETED: 8-11-96
ELEV. TOP OF HOLE	INSPECTOR Jackie Donley/Brad Ackman	CHIEF SOILS SECTION Jerry Raychel
		CHIEF GEOTECHNICAL BRANCH Del Thomas

DEPTH IN FEET	GROUND-WATER	BLOW COUNTS	% RECOVERY	CLASSIFI-CATION	DESCRIPTION AND REMARKS	PID (ppm)
		NA	100%	GW	0' Dark brown, sandy GRAVEL, 40% gravel, 40% sand, 20% silt, max. size=3 cm, well-graded, dry.	NR
	▽	NA	100%	GW	3' Grayish brown, sandy GRAVEL, 40-50% gravel, 40% sand, 10-20% silt, max. size=3 cm, saturated.	NR
5		NA	100%	GW	6' Dark brown, sandy GRAVEL, 40-60% gravel, 30-40% sand, 10-20% silt, max. size=15 cm, well-graded, saturated.	NR
10		NA	100%	SW	9' Dark brown, gravelly SAND, 50% sand, 40% gravel, 10% silt, max. size=4 cm, well-graded, saturated.	NR
15					Permafrost discontinuous and variable from approximately 3 to 6' BGS.	
					Bottom of explorations @ approximately 9' BGS.	
20						

19: JV6902/JV6_NEW.CDR



Monitoring Wells	Groundwater Elevation	Elevation to TOC	Groundsurface Elevation
MW-3	93.53'	99.89'	96.89'
MW-4	92.85'	99.09'	96.39'
MW-7	91.32'	99.84'	96.64'

NOT TO SCALE

SOURCE: Ecology and Environment, Inc., 1997

PERMANENT MONITORING WELL CONSTRUCTION DIAGRAM (ABOVEGROUND CASING)

E Contaminant Characteristics

E Contaminant Characteristics

Appendix E presents chemical contaminants present at the former Umiat AFS that can be attributed to the site based on background information and available literature regarding the constituents of petroleum products. In addition, the physical-chemical characteristics affecting the environmental fate and transport of the identified contaminants are presented. Table E-1 summarizes the chemical contaminants of potential concern identified at the Former Umiat AFS.

Petroleum Hydrocarbons

Petroleum fuels are associated with each contaminant source identified at Umiat. Petroleum products are complex mixtures of more than 1,200 different hydrocarbons ranging from short-chain aliphatics to complex long-chain compounds. The physical properties of petroleum fuels vary according to refining processes, the origin of the crude oil, and the constituents and their percentages. Based on their molecular structure and solubility in water, most constituents of petroleum can be divided into one of the following groups:

- Those that preferentially adsorb to soil particles;
- Those that volatilize rapidly;
- Those that tend to migrate through soil to groundwater as a solute; and
- Those for which multiple pathways exist.

The major constituents and additives to regular unleaded gasoline, leaded gasoline, aviation fuel (jet A), and diesel fuel No. 2 are presented in Table E-2. Table E-3 presents the hazardous constituents of regular unleaded gasoline, leaded gasoline, JP-4, and DFA according to Material Safety Data Sheets (MSDSs) provided by MAPCO Alaska Petroleum,

Inc. Table E-4 presents the estimated relative environmental partitioning of selected common petroleum constituents.

The transport of a petroleum product in the environment is largely determined by the physical and chemical properties of the individual constituents of the product. In general, soils with high organic content tend to adsorb petroleum hydrocarbons. Low-molecular weight constituents are not bound as strongly and will volatilize or leach out before the higher molecular weight constituents.

The aromatic constituents of petroleum products have densities of less than one. Consequently, a fresh petroleum spill that infiltrates soil to groundwater will accumulate at the water table. In this case, the most frequent migration mechanisms would be groundwater flow in the water table aquifer and vapor transport to vadose zone soils. As the petroleum mixes with groundwater, the aromatic petroleum constituents can become dissolved in the groundwater and natural degradation will begin to occur. At this point, vertical and horizontal groundwater gradients will influence the migration of the dissolved petroleum constituents. Long-chain hydrocarbons, such as bunker C-range organic compounds, will be the most prevalent form of the petroleum mixture as the residence time of the original product in the subsurface increases. These degraded petroleum fractions can be detected at locations far removed from the original spill location (Nyer 1992; Kostecki and Calabrese 1989).

Polynuclear Aromatic Hydrocarbons (PAHs)

Benzo(a)pyrene (BAP) was detected during the RI. Table E-5 presents the physical and chemical properties of the organic chemical of potential concern. BAP will volatilize from soil and water to a limited extent (Lyman et al. 1982) and have a strong tendency to adsorb to soil particles in soils with high organic content. This PAH has low solubility in water and is primarily found sorbed to suspended particles or settled in the bottom of the water column. BAP will undergo biodegradation in soil and aquatic systems.

Polychlorinated Biphenyls (PCBs)

PCBs are a group of chlorinated aromatic hydrocarbons with 209 possible structures, dependent on the number and position of chlorine atoms. PCBs are stable compounds wich resist breakdown from high temperatures and aging. They are not considered volitale since they have low vapor pressures. Because of their high lipophilicity and low water solubility PCBs are primarely associated with organic matter. PCBs are persistant in the environment exhibiting relatively low biodegradation rates.

Chlorinated Pesticides

DDT, and its metabolites DDD, and DDE were detected during the Umiat RI investigation and are associated with the application for mosquito control. These compounds are nonvolatile but may be transported as dusts. They are stable compounds exhibiting low biodegradation rates. They are fairly immoble being primarily associated with organic matterdue to low water solubility and high lipophilicity. They have been shown to be degrade under alkaline conditions. (AgroChemicals Desk Reference Environmental Data, J.H. Montgomery, 1993, Lewis Publishers, Boca Raton)

Dioxins/Furans (PCDDs/PCDFs)

PCDDs and PCDFs were detected during the Umiat RI investigation and are associated with the transformer waste oils spilled or burned on site. They are primarily associated with organic matter because of their high lipophilicity and low water solubility. PCDDs/PCDFs show little vertical migration in soil due to low water solubility and vapor pressure (Palarusky et al. 1986). Solvents such as waste oil or diesel fuel, and surfactants enhance their mobility in soils (Puri et al. 1989). PCDDs/PCDFs are extremely stable compounds under most environmental conditions and have exhibited strong resistance to microbial degradation in soils (Freeman and Schory 1984). Several studies have reported that photolysis is a primary mechanism of degradation.

Inorganic Elements

Many inorganic elements were detected in various media at Umiat. Based on site-specific knowledge, however, chromium, mercury, and silver are the only elements suspected of being released to the environment from previous operations at Umiat. The mobility of inorganics is greatly affected by the oxidation-reduction potential, pH, particle-size distribution, and the concentration of other inorganics and organics in the surrounding environment.

Chromium

Chromium (Cr) occurs in two oxidation states in aqueous systems: Cr^{+3} and Cr^{+6}. Cr^{+6} is more toxic than Cr^{+3}. Trivalent chromium (Cr^{+3}) reacts with hydroxide ions in water to form insoluble chromium hydroxide, $Cr(OH)_3$, which is rapidly removed from water by precipitation and sorption to soils or sediments (EPA 1984). Hexavalent chromium (Cr^{+6}) forms soluble chromate and dichromate anions, which are not strongly sorbed to soils or sediments, and are mobile in the environment (EPA 1984). Cr^{+6} and Cr^{+3} can be converted

in soils or surface water under conditions that change the redox potential of the system to solubilize or precipitate chromium (EPA 1979).

Chromium does not appear to undergo biological transformation reactions such as methylation, but Cr^{+6} can be chemically reduced to Cr^{+3} upon contact with plant or animal tissue (E & E 1994).

Mercury

Mercury (Hg) can be found in three oxidation states: Hg^0, Hg^{+1}, and Hg^{+2}. Hg^0 is a liquid at room temperature and forms amalgams with many metals. These amalgams are liquid when the concentration of the other metal is small, but they solidify as the other metal concentration increases. Mercury forms approximately 68 known inorganic compounds and 42 organic derivatives (CRC 1983). Organic mercury compounds tend to be more soluble and mobile than inorganic mercury compounds (Manahan 1994). Inorganic mercury can be converted in the environment to methylmercury by bacteria (Manahan 1994). Mercury may volatilize, however, the vapor pressure is somewhat irregular (Clayton et al. 1981).

Silver

Silver is a white, lustrous metal, which is very ductile and malleable, and it is the best conductor of heat and electricity. Silver can be found in three oxidation states: Ag^0, Ag^{+1}, and Ag^{+2}. The majority of silver is found as Ag^{+1}. Silver is insoluble in water and soluble in nitric acid. Silver tends to be immobilized in the presence of iron and manganese complexes, and organic matter (Boyle 1968). Silver may form complex ions with chlorides, and sulfates; forms soluble organic compounds; and adsorb onto humic complexes and suspended particles (Boyle 1968). Biotransformation is not a significant process because silver inhibits bacterial biodegrative enzymes (Domsch 1984).

Aluminum

Aluminum is the most abundent metal and third most abundent element found in nature. it is trivalent and amphoteric. Monomeric aluminum compounds are considered reactive or labile compounds, whereas, polymeric aluminum species react more slowly in the environment (UPHS 1990). The concentration of dissolved aluminum in water varies with pH levels and the hummic content of water. At lower pH levels aluminum concentrations significantly increase. However, high concentrations of aluminum have been observed in lakes with high humic content (Brusewitz 1994).

US Public Health Service, Toxicological Profile for Aluminum and Compounds, Oct 1990.
Brusewits, S. 1984 Aluminum Vol. 203 Stockholm Sweden: University of Stockholm, Institute of theoretical Physics 138.

Thallium

Thallium is a nonvolatile heavy metal. It exists primarily as Tl^{+1} but may be Tl^{+3} in very oxidizing water. Thallium complexes tend to be soluble in water, however it may be adsorbed by clays in solution (UPHS 1990).

US Public Health Service, Toxicological Profile for Thallium, Oct 1990.

Antimony

Antimony (Sb) exists in oxidation states +3, +5, and -3; however, the -3 state is not stable in oxygenated water. Antimony is included in alloys in the metals industry, and antimony oxides were probably present in grid plates found in batteries. Antimony is also included as a hardening agent in bullet "jackets."

In aquatic systems, very few of the antimony oxides occur in the dissolved state. Those that do dissolve are present as various hydrolysis products such as $Sb(OH)_3$ and $HSbO_2$. Antimony is predominantly associated with suspended particulates, which sorb onto sediments over time. The rate of removal from the water column is dependent on such factors such as salinity, changes in pH, and amount of current or turbulence present in the water systems. Bioaccumulation of antimony species other than metallic antimony was shown to be insignificant for most aquatic species.

In soil, antimony oxides (tri-, tetra-, and peta-) are expected to be persistent due to their low water solubility, high stability, and low vapor pressure.

Arsenic

Arsenic (As) is a nonmetallic element with stable oxidation states that include both anionic and cationic forms. Sorption to hydrous iron oxides or coprecipitation tends to reduce the mobility of arsenic in the environment.

Arsenic has four stable oxidation states: 5+, 3+, 0, and 3-. As5+ and As3+ are the most common oxidation states in aqueous environments. As5+ and As3+ are readily converted by biological and chemical redox reactions. Arsenates (As5+), predominate in most soils, while arsenite (As3+) dominate in reducing environments such as in sediments

and subsurface soils. As3+ species are generally more mobile than As5+ in the subsurface. Arsenic may leach into groundwater, especially from soils with low sorptive capacity (EPA 1984a). Arsenic also has been used as a component of pesticides. The primary processes limiting the mobility of arsenic in soils are precipitation as metal salts, coprecipitation with iron or manganese oxides, substitution for phosphorus in soil minerals, and adsorption to amorphous metal oxides. Bioaccumulation factors for arsenic in aquatic organisms are very high and reportedly range from 5,000 to 6,000. They are highest at the lower trophic levels (EPA 1979).

Barium

The solubility of barium carbonate is similar to that of calcite. A likely control over the concentration of barium in natural water is the solubility of barite (BaSO4), which is a fairly common mineral. Another factor that seems likely to influence the concentration of barium in natural waters is adsorption by metal oxides or hydroxides (Hem 1989). Little information is known about the transport of barium in soils. However, one adsorption experiment found that no significant adsorption occurred (Roy *et al.* 1987).

Beryllium

Beryllium oxide and hydroxides have very low solubilities as compared to the more soluble sulfate and carbonate compounds. Beryllium can form anionic fluoride complexes that increase its aqueous mobility (Hem 1989). Adsorption data is limited on beryllium. However, based on its geochemical similarity to aluminum, beryllium is expected to form some insoluble complexes under high pH conditions and at low pH conditions sorbs onto clay minerals (EPA 1979).

Chromium

Chromium (Cr) occurs in two oxidation states in aqueous systems: Cr3+ and Cr6+. Cr6+ is more toxic than Cr3+. Trivalent chromium (Cr3+) reacts with hydroxide ions in water to form insoluble chromium hydroxide, $Cr(OH)_3$, which is rapidly removed from water by precipitation and sorption to soils or sediments (EPA 1984b). Hexavalent chromium (Cr6+) forms soluble chromate and dichromate anions, which are not strongly sorbed to soils or sediments, and are therefore mobile in the environment (EPA 1984b). Cr6+ and Cr3+ can be converted in soils or surface water under conditions that change the redox potential of the system (EPA 1979).

Chromium can be transferred up the food chain, but does not appear to be magnified at higher trophic levels in a food chain (EPA 1984b). Chromium does not appear to undergo biological transformation reactions such as methylation, but Cr6+ can be chemically reduced to Cr3+ upon contact with plant or animal tissue. Ultramafic rocks are higher in chromium than other rocks. Chromium is used in electroplating processes.

Copper

Copper (Cu) can be found in three oxidation states: Cu0, Cu1+, and Cu2+. Of these three, only the Cu2+ oxidation state is found in aquatic systems. Copper can also form complexes with cyanide, amino acids, and humic substances. In the absence of organic complexing agents, hydrolysis and precipitation of copper oxide dominate copper's chemistry in aqueous environments.

The interactions of copper with organic materials in natural waters have been studied extensively. Organocupric interactions result in the increased solubility of some copper-containing minerals and the subsequent transport of the organocupric complex (Rashid and Leonard 1973). Hydrous metal oxides can sorb copper and render it immobile (Jenne 1968). This sorption process occurs in competition with binding of other metals, and competitive adsorption could result in the release of copper. Copper as cupric oxide has a molecular weight of 79.5 g/mole and is practically insoluble in water and organic solvents (*Farm Chemicals Handbook* 1988). Copper is used extensively for water pipes and plumbing fixtures, as an additive to water supply reservoirs to suppress algal growth, and in agricultural pesticide sprays.

Lead

The movement of lead in aquatic environments is influenced by lead speciation. In water with high concentrations of dissolved organics, complexation is an important mechanism for retaining lead in solution. In waters without substantial dissolved organics, lead can become sorbed to suspended particulates and eventually settle out.

The sorption process exerts dominant effects on the distribution of lead in aquatic and terrestrial environments. Sorption to inorganic solids, organic materials, hydrous iron, and manganese oxides controls the mobility of lead in soils and sediments.

The dominant sorption mechanisms are dependent on geological setting, pH, and Eh (EPA 1986).

Bioaccumulation of lead has been demonstrated for a variety of organisms, with bioconcentration factors typically ranging from 42 to 1,700 (EPA 1986). Lead, historically used in lead pipes, occurs as sulfuric ore bodies. It also is used as an additive to gasoline.

Table E-1

CHEMICAL CONTAMINANTS[a]
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Fuel
Gasoline
Diesel
Base, Neutral, Acid Extractable Compounds (BNAs)
benzo (A) Anthracene
benzo (A) Pyrene
benzo (b) fluoranthene
indeno (1,2,3-cd) Pyrene
Inorganic Elements
Chromium
Mercury
Silver
Dioxins/Furans

[a] The list of contaminants presented in this table is referenced in the contaminants list provided in the Approach Document for the Baseline Human Health Risk Assessment (E & E 1995). The Approach Document list has been condensed on the basis of attributability to OU-A contaminant sources.

Table E-2

COMPOSITION OF FUELS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Regular Unleaded Gasoline	Volume %	Leaded Gasoline	Volume %
Normal/Iso Hydrocarbons (58%)		**Normal/Iso Hydrocarbons (59%)**	
Isopentane	9-11	Isopentane	9-11
n-Butane	4-5	n-Butane	4-5
n-Pentane	2.6-2.7	n-Pentane	2.6-2.7
Isobutane	0.7-1	Isobutane	0.1
Propane	0.07-0.08	Propane	0.07-0.08
2-Methylpentane	—	2-Methylpentane	—
Hexane	—	Hexane	—
Methylhexanes	—	Methylhexanes	—
Heptane	—	Heptane	—
Methylheptanes	—	Methylheptanes	—
Methyloctanes	—	Decane	—
Decane	—	Undecane	—
Undecane	—	**Aromatic Hydrocarbons (26%)**	
Aromatic Hydrocarbons (32%)		Xylenes	6-7
Xylenes	6-7	Toluene	6-7
Toluene	6-7	Ethylbenzene	5
Ethylbenzene	5	Benzene	2-5
Benzene	2-5	1,3,5-Trimethylbenzene	1.3
1,3,5-Trimethylbenzene	1.3	1,2,3-Trimethylbenzene	0.73
1,2,3-Trimethylbenzene	0.73	Naphthalene	0.08
n-Propylbenzene	0.6	n-Butylbenzene	0.2-0.5
Naphthalene	0.2-0.5	Methylnaphthalenes	—
n-Butylbenzene	0.08	Benzo(b)fluoranthene	3.9 (mg/L)
Methylnaphthalenes	—	Fluoranthene	1.84 (mg/L)
Benzo(b)fluoranthene	3.9 (mg/L)	Anthracene	1.55 (mg/L)
Fluoranthene	1.84 (mg/L)	Benzo(e)pyrene	0.3 (mg/L)
Anthracene	1.84 (mg/L)	**Olefins (5%)**	
Anthracene	1.55 (mg/L)	2-Butene	0.06-0.17
Benzo(e)pyrene	0.3 (mg)	3-Methyl 1-butene	0.06-0.08
Olefins (5%)		**Cyclic Hydrocarbons (5%)**	
3-Methyl 1-butene	0.06-0.08	Cyclopentane	—
2-Butene	0.16-0.17	Cydohexane	—
Cyclic Hydrocarbons (5%)		Methylcyclopentane	—
Cyclopentane	—	Methylcyclohexane	—
Cydohexane	—	**Additives**	

Key at end of table.

Table E-2

COMPOSITION OF FUELS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Regular Unleaded Gasoline	Volume %	Leaded Gasoline	Volume %
Methylcyclopentane	—	Tetraethyl lead	600 (mg/L)
Methylcyclohexane	—	Tetramethyl lead	5 (mg/L)
Additives		Dichloroethane	210 (mg/L)
Ethyl Alcohol (octane booster)	Up to 5	Dibromoethane (EDB)	190 (mg/L)
Methyl t-butyl ether (octane booster)	Up to 12	2,6-di-t-butyl-4-methylphenol (anti-oxidant)	—
Methyl alcohol (fuel line anti-icer)	0.2		
Tricresyl phosphate (combustion chamber deposit modifier)	Up to 0.2 (mg/L)		
2,6 Di-t-butyl-4-methylphenol (anti-oxidant)	—		

Key at end of table.

Table E-2

COMPOSITION OF FUELS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Aviation Fuel (Jet A)	Volume %	Diesel Fuel No. 2	Volume %
Normal/Iso Hydrocarbons (59%)		**Cyclic Hydrocarbons (0.93%)**	
Undecane	36	Cyclopentane	0.59
Decane	16.5	Tetramethylcyclopentane	0.01
3-Methyloctane	2.5	Propylcyclohexane	0.07
Dodecane	0.7	Ethylcyclohexane	0.04
Tridecane	0.5	1,1,3-Trimethylcyclohexane	0.03
2,6,10-Trimethyldodecane	0.45	**Additives**	
2-Methylbutane	0.2	Dibromoethane (EDB)	0.05
2-Methylnonane	0.2	**Normal/Iso Hydrocarbons (75%)**	
2-Methylbutane	0.26	Predominantly C_{10} to C_{16}	
3-Methyldecane	0.14	**Aromatic Hydrocarbons (15%)**	
4-Methylnonane	0.22	Phenanthrene	0.26-0.3
Aromatic Hydrocarbons (35%)		Naphthalene	0.14-0.11
1,2,4,5-Tetramethylbenzene	9	Fluorene	0.07-0.1
1,2,3-Trimethylbenzene	6.6	Anthracene	0.013-0.02
1,2-Dimethyl-3-propylbenzene	5.4	1,2,3,4-Tetrahydroquinoline	—
Propylbenzene	3-5	2,6-Dimethylquinoline	—
1-Methyl-4-propylbenzene	3.3	1-Methylnaphthalene	—
Buytlbenzene	2	2,3,6-Trimethylnaphthalene	—
2-Methylnaphthalene	—	2,3,5-Trimethylnaphthalene	—
Methylindane	0.3	1,3,5-Trimethylbenzene	—
Naphthalene	0.14	n-Propylbenzene	Trace
2-Methylnaphthalene	0.34	Ethylbenzene	Trace
1,2-Diethylbenzene	0.24	Xylenes	Trace
1,4-Dimethyl-2-ethylbenzene	0.2	Toluene	Trace
1,3-Dimethylnaphthalene	0.15	Benzene	Trace
Xylenes	.07	**Additives**	
Ethylbenzene	0.02	N,N-Disalicylidene diamine (metal deactivator)	—
Benzene	0.02	Alkyl Nitrate (cetane improver)	0.2
Toluene	Trace	2,6-Di-t-butyl-4-methylphenol (anti-oxidant)	—
Olefins (0%)		Tetroethyl lead	600 (mg/L)
Aviation Fuel (JP-4)			
n-Butane	0.12	2,5-Dimethylheptane	0.52
Isobutane	0.66	Unidentified	0.98

Key at end of table.

Table E-2

COMPOSITION OF FUELS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Aviation Fuel (Jet A)	Volume %	Diesel Fuel No. 2	Volume %
n-Pentane	1.06	Ethylbenzene	0.37
2,2-Dimethylbutane	0.10	m-Xylene	0.96
2-Methylpentane	1.28	p-Xylene	0.35
3-Methylpentane	0.89	3,4-Dimethylheptane	0.43
n-Hexane	2.21	4-Ethylheptane	0.18
Methylcyclopentane	1.16	4-Methyloctane	0.86
2,2-Dimethylpentane	0.25	2-Methyloctane	0.88
Benzene	0.50	3-Methyloctane	0.79
Cyclohexane	1.24	o-Xylene	1.01
2-Methylhexane	2.35	1-Methyl-4-ethylcyclohexane	0.48
3-Methylhexane	1.97	n-Nonane	2.25
trans-1,3-Dimethylcyclopentane	0.36	Isopropylbenzene	0.30
cis-1,3-Dimethylcyclopentane	0.34	n-Propylbenzene	0.71
cis-1,2-bimethylcyclopentane	0.54	1-Methyl-3-ethylbenzene	0.49
n-Heptane	3.67	1-Methyl-4-ethylbenzene	0.43
Methylcyclohexane	2.27	1,3,5-Trimethylbenzene	0.42
2,2,3,3-Tetramethylbutane	0.24	1-Methyl-2-ethylbenzene	0.23
Ethylcyclopentane	0.26	1,2,4-Trimethylbenzene	1.01
2,5-Dimethylhexane	0.37	n-Decane	2.16
2,4-Dimethylhexane	0.58	n-Butylcyclohexane	0.70
1,2,4-Trimethylcyclopentane	0.25	1,3-Diethylbenzene	0.46
3,3-Dimethylhexane	0.26	1-Methyl-4-propylbenzene	0.40
1,2,3-Trimethylcyclopentane	0.25	1,3-Dimethyl-5-ethylbenzene	0.61
Toluene	1.33	1-Methyl-2-i-propylbenzene	0.29
2,2-Dimethylhexane	0.71	1,4-Dimethyl-2-ethylbenzene	0.70
2-Methylheptane	2.70	1,2-Dimethyl-4-ethylbenzene	0.77
4-Methylheptane	0.92	n-Undecane	2.32
cis-1,3-Dimethylcyclohexane	0.42	1,2,3,4-Tetramethylbenzene	0.75
3-Methylheptane	3.04	Naphthalene	0.50
1-Methyl-3-ethylcyclohexane	0.17	2-Methylundecane	0.64
1-Methyl-2-ethylcyclohexane	0.39	n-Dodecane	2.00
Dimethylcyclohexane	0.43	2,6-Dimethylundecane	0.71
n-Octane	3.80	Unidentified	0.68
1,3,5-Trimethylcyclohexane	0.99	2-Methylnaphthalene	0.56

Key at end of table.

Table E-2

COMPOSITION OF FUELS
FORMER UMIAT AIR FORCE STATION
UMIAT, ALASKA

Aviation Fuel (Jet A)	Volume %	Diesel Fuel No. 2	Volume %
1,1,3-Trimethylcyclohexane	0.48	1-Methylnaphthalene	0.78
		n-Tridecane	1.52
		2,6-Dimethylnaphthalene	0.25
		n-Tetradecane	

Key:

— = Hydrocarbon is not present.

Source: Watts 1989.

Table E-3

HAZARDOUS CONSTITUENTS OF MAPCO REFINERY FUEL BY AVERAGE WEIGHT (%) FORMER UMIAT AIR FORCE STATION UMIAT, ALASKA

Constituent	Unleaded Gasoline (MUR)	Leaded Gasoline (MOGAS)	Jet Fuel (JP-4)	Arctic Grade Fuel Oil (DFA)
Benzene	3.63	3.63	0.78	0.24
Cumene (isopropylbenzene)	0.62	0.70	—	0.04
Cyclohexane	2.07	2.07	<4.0	—
Ethylbenzene	1.70	1.80	0.85	0.09
1,2,4-Trimethylbenzene	3.58	4.20	0.81	0.27
Toluene	6.95	6.95	3.33	0.50
Mixed xylenes	9.04	9.85	2.60	0.53
Tetra ethyl lead	—	0.007	—	—
Diethylene glycol monomethyl ether	—	—	0.17	—
Naphthalene	—	—	—	0.34

Source: Mapco 1993a.

Table E-4

ESTIMATED RELATIVE ENVIRONMENTAL PARTITIONING OF SELECTED PETROLEUM CONSTITUENTS FORMER UMIAT FORCE STATION UMIAT, ALASKA

Petroleum Constituents	Percent Adsorbed to Soil Particles	Percent Volatilized	Percent Solubilized in Groundwater and Soil Moisture
Alkanes			
(n)Heptane	0.1	99.8	0.1
(n)Hexane	0.1	99.8	0.1
(n)Pentane	0.1	99.8	0.1
Aromatics			
Benzene	3	62	35
Ethylbenzene	21	59	20
Naphthalene	61	8	31
Toluene	3	77	20
O-Xylene	15	54	31

Source: Adapted from Kostecki and Calabrese 1989.

Table E-5

PHYSICAL AND CHEMICAL PROPERTIES OF PRIMARY ORGANIC CHEMICALS OF POTENTIAL CONCERN FORMER UMIAT AIR FORCE STATION UMIAT, ALASKA

Chemical Name	CAS Number	Mole Weight (g/mole)	Physical State at 20°C	Water Solubility (mg/L)	Liquid Density (g/mL)	Vapor Pressure (mm Hg)	Henry's Law Constant (ahm-m^3/mol)	K_{oc} (mL/g)	Log K_{oc}	BCF
Aromatic Hydrocarbons										
Ethylbenzene	100-41-4	106.2	Liquid	1.61 E+02	0.86	9.53 E+00	8.44 E-03	1.10 E+03	3.15	37.5
Toluene	108-88-3	92.1	Liquid	5.35 E+02	0.87	28.1	5.94 E-03	300	2.73	26
Xylenes	1330-20-7	106.2	Liquid	1.60 E+02	0.86	10	6.82 E-03	240	3.20	70
Dioxins/Furans										
2,3,7,8-TCDD	1746-02-6	322.0	Solid	2.00 E-04	1.83	1.70 E-06	3.60 E-03	3.30 E+06	6.20	5.00 E+03
Organochlorine Pesticides										
DDT	50-29-3	354.5	Solid	5.00 E-03	2.50 E-05	2.50 E-05	5.13 E-04	2.43 E+05	6.36	5.40 E+04
DDE	72-55-9	319.03	Soid	4.00 E-02	--	6.49 E-06	2.34 E-05	2.43 E+05	5.77	1.57 E+04
DDD	72-54-8	320.05	Solid	20-90 µg/L	1.476	4.68×10^{-6}	2.16×10^{-5}	2.40×10^{5}	5.38	6.38×10^{4}
Polynuclear Aromatic Hydrocarbons										
Benzo(a)pyrene	50-32-8	252.32	Solid	390 E-03	1.35	5.60 E-09	2.40 E-06	1.00 E-06	6.00	5.00 E+03
Polychlorinated Biphenyls										
Aroclor 1254	1336-36-3	--	Liquid	54 µg/L	1.47-1.49	$4-5\times10^{-4}$	--	--	--	--

Key:

- = No available data.
g/mL = Grams per liter.
mg/L = Milligrams per liter.
mL/g = Milliliters per gram.
mmHg = Millimeters of mercury.
VOCs = Volatile organic compounds.