Final
Phase II Remedial Investigation
Northeast Cape, St. Lawrence Island, Alaska

Volume 1: Report Body

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Delivery Order No. 0017
and
Contract No. DACA85-98-D-0007
Delivery Order No. 5
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LIST OF ACRONYMS

^0C	Degrees Celsius
^0F	Degrees Fahrenheit
AAC	Alaska Administrative Code
AC&W	Aircraft Control and Warning
ACHP	Advisory Council on Historic Preservation
ACM	asbestos containing materials
AC&WS	Aircraft Control and Warning Station
ADEC	Alaska Department of Environmental Conservation
Air Force	United States Air Force
Alaska District	United States Army Engineer District, Alaska District
ANCSA	Alaska Native Claims Settlement Act
ARAR	applicable or relevant and appropriate requirements
AS	Alaska statute
AST	aboveground storage tank
BD/DR	building demolition and debris removal
BM	benchmark
BTEX	benzene toluene ethylbenzene xylenes
C&D	construction and demolition debris
CDAP	Chemical Data Acquisition Plan
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CON/HTRW	containerized hazardous toxic and radioactive waste
COPEC	chemicals of potential ecological concern
CQAR	Chemical Quality Assurance Report
DERP	Defense Environmental Restoration Program
DNR	Department of Natural Resources
DOD	United States Department of Defense
DOT	Department of Transportation
DRO	diesel range organics
DS-2	Decontamination Agent Number 2
E&E	Ecology and Environment, Inc.
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
FR	Federal Register
FUDS	Formerly Used Defense Sites
gpm	gallons per minute
GPS	geographical positioning system
GRO	gasoline range organics
IDW	investigative-derived wastes
mg/g	milligrams per gram
mg/Kg	milligrams per kilogram
mg/L	milligrams per liter
MK	Morrison Knudsen
mR/h	millirads per hour
MSL	mean sea level

MW	monitoring well
NA	not applicable or not analyzed
NAVY	United States Department of the Navy
ND	not detected
NES	Northwest EnviroService, Inc.
NHPA	National Historic Preservation Act of 1966
NOAA	National Oceanographic and Atmospheric Administration
NPDL	North Pacific Division Laboratory
NR	not regulated
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
pH	hydrogen ion activity
PL	public law
PLO	Public Land Order
POL	petroleum, oil, and lubricants
ppm	parts per million
QA	quality Assurance
QA/QC	quality assurance/quality control
QC	quality control
RAAM	Remedial Action Alternatives Technical Memorandum
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI	Remedial Investigation and Feasibility Study
RRO	residual range organics
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Office
SQUIRT	Screening Quick Reference Tables
STB	super tropical bleach
SVOC	semivolatile organic compounds
TCLP	toxicity characteristic leachate procedure
TRPH	total recoverable petroleum hydrocarbons
TSCA	Toxic Substance Control Act
µmho	(micro ohms)$^{-1}$
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compound

EXECUTIVE SUMMARY

The U.S. Government established an Air Force military installation on St. Lawrence Island in 1952. Since that time the installation was used as a radar surveillance station. Over the years of operation, the installation or parts of it were operated by the U.S. Air Force and/or U.S. Navy. In 1969, most military operations ceased and personnel were demobilized from the installation. All military operations were shut down in 1972. This report presents the results of the Phase II Remedial Investigation (RI) performed at the Northeast Cape installation on St. Lawrence Island, Alaska during July and August of 1996. The Northeast Cape installation is located on St. Lawrence Island in the Bering Sea, near territorial waters of Russia, approximately 135 air miles southwest of Nome, Alaska. The Phase II RI was performed as part of the U.S. Army Engineer District, Alaska District (Alaska District) Defense Environmental Restoration Program (DERP) (Contract No. DACA85-93-D-0011, Delivery Order No. 0017 and Contract No. DACA85-98-D-0007, Delivery Order No. 5). Twenty-nine sites at the installation were identified as part of the Phase II RI effort. Table ES-1 itemizes by site those tasks which were completed during the Phase II RI.

The 1996 Phase II RI accomplished several tasks that advanced remedial efforts at the site toward closure. Other activities performed during the field work were designed to address specific community concerns or to fill data gaps associated with Containerized Hazardous Toxic and Radioactive Waste (CON/HTRW) and Removal and Building Demolition and Debris Removal (BD/DR) actions. Significant conclusions of the Phase II RI are:

- There is no evidence of elevated radiation levels at Northeast Cape.
- The fuel line leak (Site 8) cited as a concern by local residents was investigated and found to be localized.
- Evidence of an asbestos hazard was not found in privately-owned housing at the site as a result of use of salvaged military building materials by current residents.
- The fill pad on which the main operations complex is located contains approximately 140,000 cubic yards of potentially usable fill material.
- The borrow area at the site contains at least 50,000 cubic yards of fill material that could be utilized without blasting or additional environmental damage. However, this area should be the subject of a subsurface investigation if a landfill is planned at this location.
- Warning signs are now posted on all military-era buildings at Northeast Cape with known or suspected asbestos containing material (ACM).
- Petroleum constituents, such as gasoline range organics (GRO) and benzene, in the subsurface water at the site appear to be attenuating with time. Diesel range organics (DRO) in some cases have increased and in other cases have decreased in the four years between sampling events.

TABLE ES-1
SUMMARY OF PHASE II RI ACTIVITIES

		1996 Phase II RI Activities													1998 Phase II RI Activities									1999 Planned Phase II RI Activities
Site	**Description**	**Site Reconnaissance**	**Soil Sampling**	**Surface Water Sampling**	**Sediment Sampling**	**Biological Sampling**	**Storage Tank (AST or UST) Inventory and Sampling**	**Mechanics' Work Pit**	**Flooded Subterranean Structure Water Sampling and Discharge**	**Radiological Survey**	**Stream Flow Measurements**	**Posting of Potential Asbestos Hazards**	**Cable and Wire Hazard Mitigation**	**Assess Prospective C&D Monofill Sites and Borrow Areas**	**Site Reconnaissance**	**Soil Sampling**	**Surface Water Sampling**	**Sediment Sampling**	**Groundwater Sampling**	**Site Control and Survey**	**CON/HTRW Inventory Update**	**Building Demolition and Debris Inventory Update**	**Hazardous Waste Disposal**	**Biological Sampling**
All	Installation-Wide Activities													X						X	X	X		
Site 1	Burn Site Southeast of Landing Strip																							
Site 2	Airport Terminal and Landing Strip	X								X		X				X								
Site 3	Fuel Line Corridor and Pumphouse																		X					
Site 4	Subsistence Fishing and Hunting Camp	X					X			X									X					
Site 5	Cargo Beach									X														
Site 6	Cargo Beach Road Drum Field									X						X								
Site 7	Cargo Beach Road Landfill									X						X			X					
Site 8	POL Spill Site	X																						
Site 9	Housing and Operations Landfill									X						X			X					
Site 10	Buried Drum Field	X	X							X						X			X					
Site 11	Fuel Storage Tank Area	X																	X					
Site 12	Gasoline Tank Area																							
Site 13	Heat and Electrical Power Building	X					X			X		X				X			X					
Site 14	Emergency Power/Operations Building	X					X		X	X		X				X								
Site 15	Buried Fuel Line Spill Area	X																	X					

TABLE ES-1 (continued)
SUMMARY OF PHASE II RI ACTIVITIES

		1996 Phase II RI Activities													1998 Phase II RI Activities									1999 Planned Phase II RI Activities
Site	**Description**	**Site Reconnaissance**	**Soil Sampling**	**Surface Water Sampling**	**Sediment Sampling**	**Biological Sampling**	**Storage Tank (AST or UST) Inventory and Sampling**	**Mechanics' Work Pit**	**Flooded Subterranean Structure Water Sampling and Discharge**	**Radiological Survey**	**Stream Flow Measurements**	**Posting of Potential Asbestos Hazards**	**Cable and Wire Hazard Mitigation**	**Assess Prospective C&D Monofill Sites and Borrow Areas**	**Site Reconnaissance**	**Soil Sampling**	**Surface Water Sampling**	**Sediment Sampling**	**Groundwater Sampling**	**Site Control and Survey**	**CON/HTRW Inventory Update**	**Building Demolition and Debris Inventory Update**	**Hazardous Waste Disposal**	**Biological Sampling**
Site 16	Paint and Dope Storage Building	X					X			X		X							X					
Site 17	General Supply Warehouse and Mess Hall Warehouse	X								X		X												
Site 18	Housing Facilities and Squad Headquarters	X							X	X		X											X	
Site 19	Auto Maintenance and Storage Facilities	X						X		X		X							X					
Site 20	Air Force Aircraft Control Warning Building									X		X												
Site 21	Wastewater Treatment Facility	X								X		X												
Site 22	Water Wells and Water Supply Building	X								X		X												
Site 23	Power and Communication Line Corridors																							
Site 24	Receiver Building Area																							
Site 25	Direction Finder Area															X								
Site 26	Former Construction Camp Area																							
Site 27	Diesel Fuel Pump Island	X	X																X					
Site 28	Drainage Basin Area	X	X	X	X	X							X			X	X	X						X
Site 29	Suqi River	X	X	X	X	X										X	X	X						X
Site 30	Background Areas																X	X						X

- Total recoverable petroleum hydrocarbons (TRPH), residual range organics (RRO) and DRO were detected in background samples at levels often comparable to or exceeding selected regulatory criteria. A strategic or analytical procedure to identify and eliminate the contribution of background or site-specific interference is an important element of any Remedial Action Plan.

- As discussed in this report, TRPH exceeds the sum of DRO and GRO by a factor of five to ten in many instances (RRO samples were not collected in the past). Interpretation and use of the 1994 TRPH data will impact the extent of remediation.

As documented in the Final Work Plan (Montgomery Watson, 1998), biological sampling will be performed at the installation in July 1999 to document the environmental health of the Drainage Basin and the Suqi River. This information will be used to evaluate the impact of existing contamination and recommend appropriate remedial action.

Based on the results of the Phase II RI no further action was identified as the recommended remedial action at one site. CON/HTRW and/or BD/DR alone were identified as the recommended remedial actions for 10 sites. Of the remaining 18 sites, isolated areas of petroleum hydrocarbon contamination were identified in the gravel pads at eleven sites. Nine sites were identified where petroleum constituents in subsurface water exceeded the Alaska State Ground Water Cleanup Standard (18 AAC 75). Eight sites were identified where the concentration of petroleum constituents in tundra soils and/or surface water exceeded the Selected Alaska State Cleanup Standards.

Background concentrations of TRPH and DRO in soil are unexpectedly high, non-reproducible and exceed the proposed regulatory criteria for the site. In many cases, the sum of RRO, DRO and GRO detected using the State of Alaska laboratory methods (AK 103, AK 102, and AK 101) is far less than TRPH detected using the older EPA 418.1 method. This suggests that site-specific phenomenon are influencing detection and analysis of hydrocarbons. Arsenic in the background soil sample was detected at the proposed cleanup criteria.

Recommendations for remediation include:

- Removal and disposal/recycle of CON/HTRW.

- Implementation of BD/DR

- Excavation and off-site disposal of polychlorinated biphenyls (PCB)-contaminated soils

- Excavation or remediation of isolated areas of high levels of petroleum contamination in the gravel pads

- Amendment and revegetation of petroleum-impacted areas of tundra

Table ES-2 summarizes the recommendations and conclusions of the Phase II RI.

TABLE ES-2
SUMMARY OF CONTAMINATED ENVIRONMENTAL MEDIA AND DEBRIS

Site	Site Description	CON/ HTRW	BD/ DR	Buried Waste	Gravel Pad/Soil	Subsurface Water	Tundra Soil and/or Surface Water	No Action
1	Burn Site Southeast of the Landing Strip							✔
2	Airport Terminal and Landing Strip	✔	✔					
3	Fuel Line Corridor and Pumphouse	✔	✔		DRO	DRO		
4	Subsistence Hunting and Fishing Camp	✔	✔			DRO	DRO	
5	Cargo Beach	✔	✔		As			
6	Cargo Beach Road Drumfield	✔	✔		RRO, DRO	DRO	DRO	
7	Cargo Beach Road Landfill	✔	✔	Landfil l			DRO, As, Be, Cd, Cr, Ni, Hg, Zn	
8	POL Spill Site	✔					DRO	
9	Housing and Operations Landfill	✔	✔	Landfil l		DRO	DRO, As, Be, Cr, Sb	
10	Buried Drum Field		✔	Buried Drums	DRO	DRO		
11	Fuel Storage Tank Area	✔	✔		DRO	DRO, benzene, methylene chloride		
12	Gasoline Tank Area	✔			DRO, GRO			
13	Heat and Electrical Power Building	✔	✔		DRO, PCB	DRO, GRO		
14	Emergency Power/Operations Building	✔	✔		PCB			
15	Buried Fuel Line Spill Area	✔			DRO *(RRO)*[a]	RRO, DRO		
16	Paint and Dope Storage Building	✔	✔		As, Cd, Cr, Sb, Pb, Zn, PCB	Bis-(2 ethylhexyl)p hthalate		
17	General Supply Warehouse and Mess Hall Warehouse	✔	✔		PCB			
18	Housing Facilities and Squad Headquarters	✔	✔					
19	Auto Maintenance and Storage Facilities	✔	✔		DRO, GRO, As, Cr	DRO, GRO		

TABLE ES-2 (continued)
SUMMARY OF CONTAMINATED ENVIRONMENTAL MEDIA AND DEBRIS

Site	Site Description	CON/ HTRW	BD/ DR	Buried Waste	Gravel Pad/Soil	Subsurface Water	Tundra Soil and/or Surface Water	No Action
20	Air Force Aircraft Control Warning Building	✔	✔					
21	Wastewater Treatment Facility	✔	✔				DRO, As, Cd, Cr, Hg, Sb, PCB	
22	Water Wells and Water Supply Building	✔	✔		DRO, Sb, Pb			
23	Power and Communication Lines Corridors	✔	✔				PCB	
24	Receiver Building Area		✔	Buried Drums	DRO, Cr, Pb, cis-1,3-Dichlora ethane	DRO	DRO	
25	Direction Finder Area	✔	✔				DRO, Zn	
26	Former Construction Camp Area		✔					
27	Diesel Fuel Pump Island	✔	✔	Buried Drums	DRO, GRO, benzene, As	DRO		
28	Drainage Basin Area		✔			DRO	DRO, PCB, PAH, Cr, Pb, Zn, methylene chloride	
29	Suqi River		✔				DRO, PAH	

a Analyte is included based on potential for overlapping contaminant plumes from adjacent sites or environmental media.

1. INTRODUCTION

The Alaska District retained Montgomery Watson to perform a Phase II RI at Northeast Cape, St. Lawrence Island, Alaska. These activities were authorized under Contract No. DACA85-93-D-0011, Delivery Order No. 0017 and Contract No. DACA85-98-D-0007, Delivery Order No. 5.

The Phase II RI is intended to supplement and complete environmental information in the Phase I RI performed at Northeast Cape in 1994 (Montgomery Watson, 1995a). The Phase II RI fieldwork was performed during two separate site visits, the first in August, 1996 and the second in September, 1998. A final phase of data collection is planned for July, 1999 and will involve collection of biological samples.

This Phase II RI has been prepared according to the guidelines of the United States Department of Defense (DOD) DERP for Formerly Used Defense sites (FUDS). It is a comprehensive collection of information collected in previous studies and current information on the environmental status of the former military installation at Northeast Cape. The report consists of six sections that describe RI activities, analytical results, data interpretation, and recommendations for remedial action. These sections are:

1. Introduction
2. Investigation Approach and Procedures
3. Hazard Mitigation Incidental to Investigation
4. Remedial Planning
5. Site Investigation and Remediation Summaries
6. Remedial Action
7. Conclusions and Recommendations

Section 1 (Introduction) contains information on project objectives, site background information, site characteristics and regulatory setting. Section 2 (Investigation Approach and Procedures) describes investigation methods and procedures. Section 3 (Hazard Mitigation Incidental to Investigation) describes the activities performed during the investigation to mitigate potentially hazardous situations. Section 4 (Remedial Planning) documents information collected during the investigation for remediation planning efforts. Section 5 (Site Investigation and Remediation Summaries) integrates findings of this study with previous studies, and discusses recommendations for remediation. Section 6 (Conclusions and Recommendations) summarizes report conclusions and recommendations.

1.1 PROJECT OBJECTIVES

The goal of the Phase II RI is to collect the additional data necessary to evaluate the extent of contamination and make remedial action decisions. The following project objectives are identified to meet this goal:

- Further characterize the extent of contamination at selected project sites

- Mitigate hazards due to ACM, discarded wire and cable, and hazardous waste
- Collect data necessary for closure of individual sites or planning remedial activities

1.2 PROJECT DESCRIPTION

The Phase II RI activities were planned to collect the data necessary to meet the project objectives. The 1996 Phase II RI field activities included the following tasks:

- Perform site reconnaissance
- Collect surface soil, surface water, and sediment samples
- Collect biological samples (e.g., benthic, phytoplankton, and zooplankton)
- Inventory tanks and sample any liquids and/or sludges in above-ground storage tanks (ASTs), the auto mechanic work pit, and underground storage tanks (USTs) to characterize for eventual waste disposal
- Sample water in flooded subterranean structures to characterize the liquids prior to discharge during this investigation
- Perform a radiological survey to investigate the potential for elevated levels of radiation at the site
- Characterize the quantity of water in the Suqi River and selected adjacent streams
- Post warning signs throughout the site where friable ACM is present or suspected
- Cut, collect, and store grounded communication antenna wires, support, and power cables which present a physical hazard
- Assess potential for using the Main Complex Area gravel pad and/or Former Borrow Area as a construction and demolition debris (C&D) monofill and/or source of monofill cover material

The 1998 Phase II RI field activities included the following tasks:

- Perform site reconnaissance
- Collect soil, subsurface water, surface water, and sediment samples
- Find or install two permanent control monuments and survey the site
- Update the CON/HTRW inventory

- Update the building and demolition debris inventory

- Dispose of containers of Decontamination Agent Number 2 (DS-2) and Super Tropical Bleach (STB) hazardous wastes

In July, 1999, additional biological samples will be collected to assess ecological health in parts of the installation. The planned activities are described in the Final Work Plan, (Montgomery Watson, 1998). Results of this study will appear as an addendum to this report.

1.3 PROJECT BACKGROUND

1.3.1 Location

The Northeast Cape installation is on St. Lawrence Island in the Bering Sea, near territorial waters of Russia, approximately 135 air miles southwest of Nome, Alaska (Figure 1-1). The island is accessible by boat, regularly scheduled commercial airlines (to Gambell and Savoonga) and chartered air flights out of the community of Nome, Alaska. The Northeast Cape Installation is approximately nine miles west of the northeastern cape of St. Lawrence Island, between Kitnagak Bay to the northeast and Kangighsak Point to the northwest (Figure 1-2). The Kinipaghulghat Mountains bound the southern portion of the site. The location of the site is 63 degrees, 20 minutes north latitude, by 168 degrees, 59 minutes west longitude, in Township 25 South, Range 54 West, Kateel River Meridian.

1.3.2 Site Description

The Northeast Cape installation encompasses approximately four square miles of the island, and extends from the base of the Kinipaghulghat Mountains, at an elevation of approximately 100 feet above mean sea level (MSL) to the Bering Sea. The land surface gently slopes from the mountains to the sea with few abrupt changes in elevation.

The installation (Figure 1-3) consisted of a Main Complex Area, radar antennas, an airport runway and terminal building area, a bulk fuel receiving and storage area near the beach, direction finder and receiver buildings, and a White Alice site. During the remedial investigations, approximately 25 structures in various states of decline were present throughout the site. Adverse weather conditions, such as high winds and blown snow, have damaged most of the buildings.

As is typical construction practice in the region, gravel from a local borrow pit was excavated and used to construct gravel pads on the tundra. Buildings and other structures were constructed on the gravel pads. The surrounding terrain is tundra and shallow ponds overlying permafrost.

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MONTGOMERY WATSON

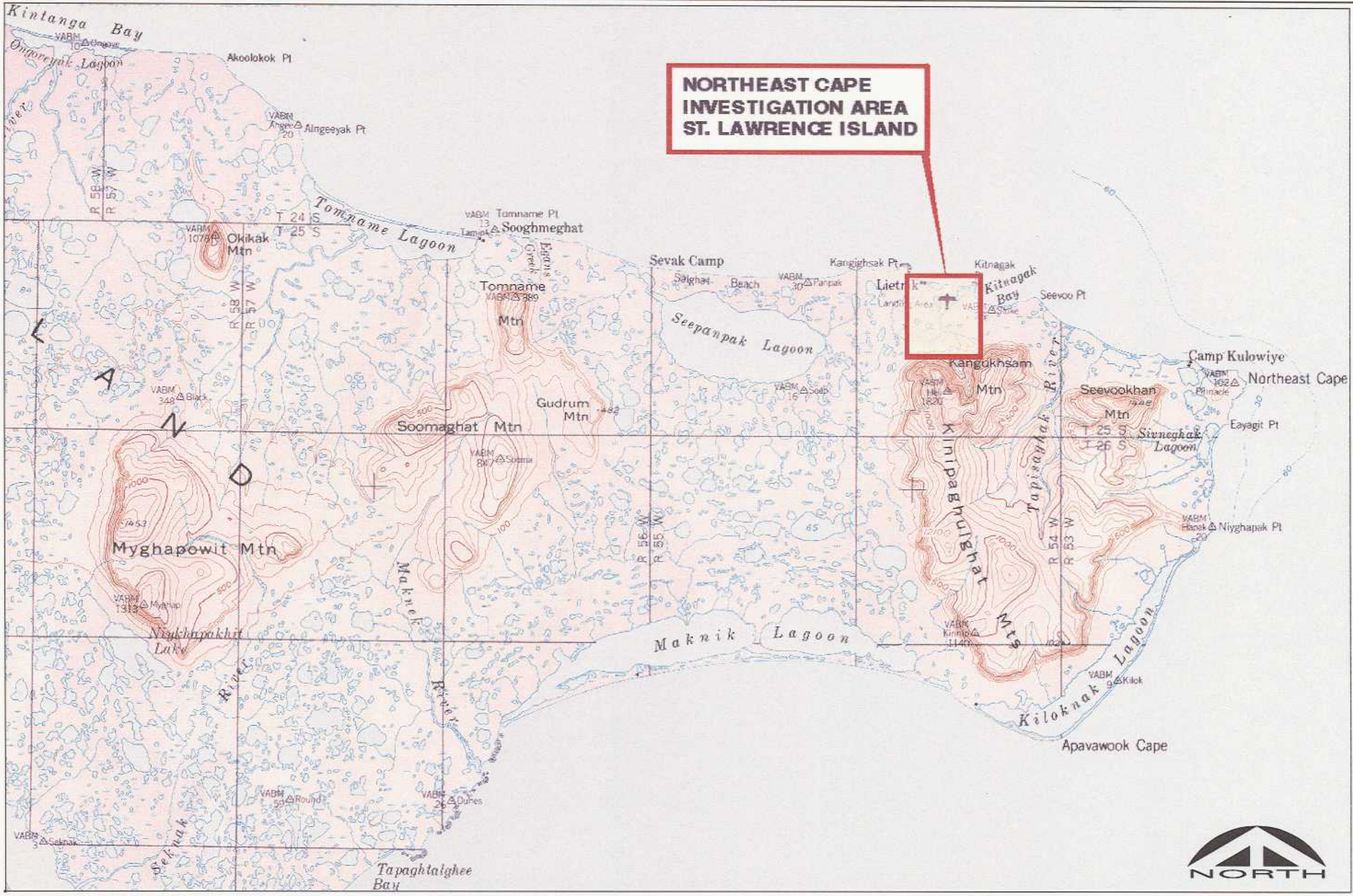
Anchorage, Alaska

SOURCE: U.S. Geological Survey
Reston, Virginia 22092, 1976
St. Lawrence, Alaska
N6265 – W16830 /60x210
Surveyed 1948, Compiled 1957
Minor Revisions 1974
Scale 1:250,000 Contour Interval 100'

FIGURE 1-1

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

VICINITY MAP
NORTHEAST CAPE



MONTGOMERY WATSON
Anchorage, Alaska

SOURCE: U.S. Geological Survey
Reston, Virginia 22092, 1976
St. Lawrence, Alaska
N6265 – W16830 /60x210
Surveyed 1948, Compiled 1957
Minor Revisions 1974
Scale 1:250,000, Contour Interval =100 Ft., Varies

FIGURE 1–2

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

LOCATION MAP
NORTHEAST CAPE INVESTIGATION AREA

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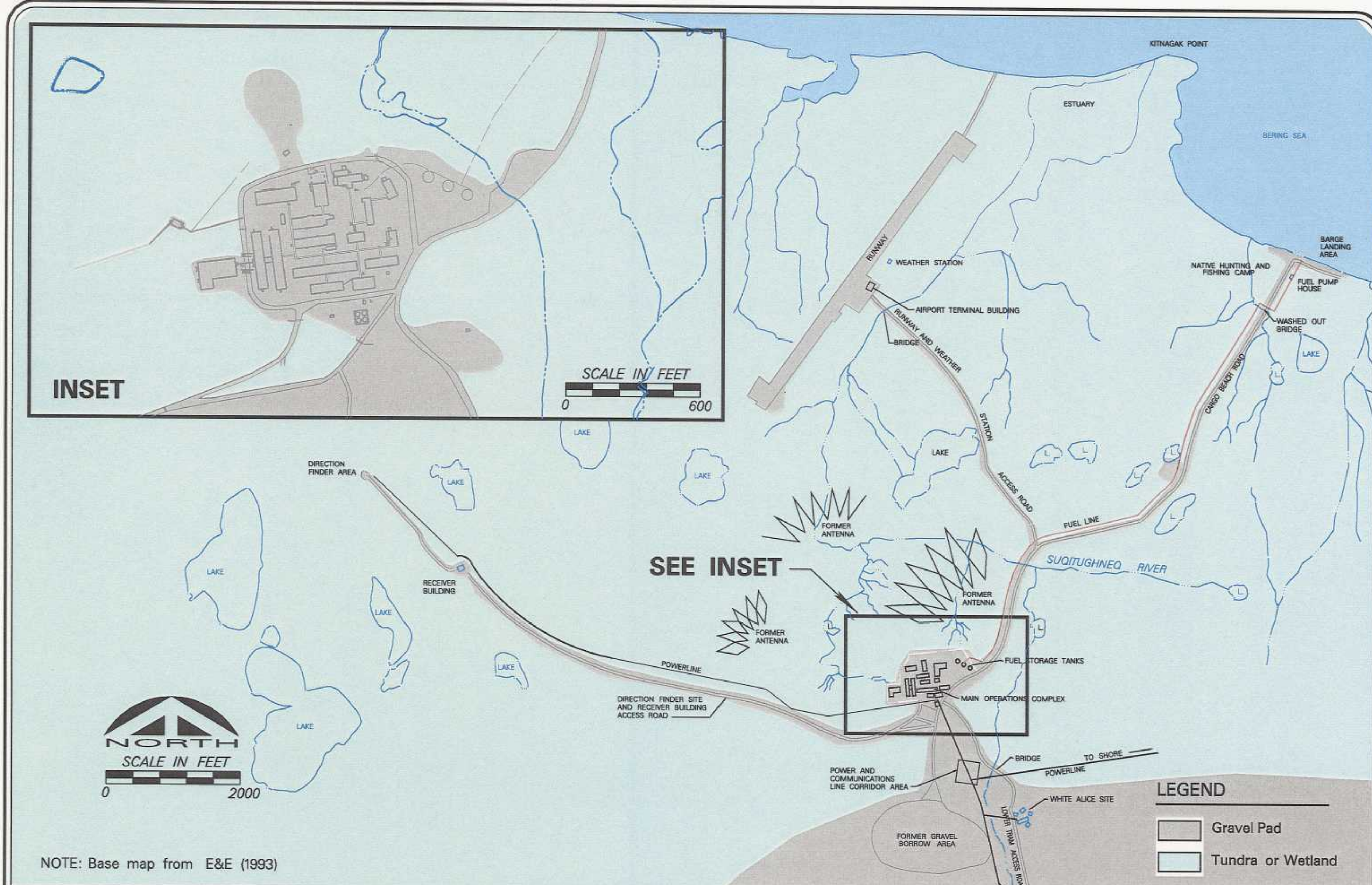

MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 1-3
U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA
INSTALLATION MAP

A subsistence hunting and fish camp is located near the former bulk fuel receiving and storage area. In the past, surface water near the runway and the Main Operations Complex was used seasonally as a drinking water source by subsistence gatherers.

In the Chemical Data Acquisition Plan (CDAP) completed in 1993 (E&E, 1993), Ecology and Environment (E&E) identified 27 distinct sites at the installation for investigation. These sites are shown on Figure 1-4 and listed below.

Site Number	Description
1	Burn Site Southeast of the Landing Strip
2	Airport Terminal and Landing Strip
3	Fuel Line Corridor and Pumphouse
4	Subsistence Hunting and Fishing Camp
5	Cargo Beach
6	Cargo Beach Road Drumfield
7	Cargo Beach Road Landfill
8	Petroleum, Oil and Lubricants (POL) Spill Site
9	Housing and Operations Landfill
10	Buried Drum Field
11	Fuel Storage Tank Area
12	Gasoline Tank Area
13	Heat and Electrical Power Building
14	Emergency Power/Operations Building
15	Buried Fuel Line Spill Area
16	Paint and Dope Storage Building
17	General Supply Warehouse and Mess Hall Warehouse
18	Housing Facilities and Squad Headquarters
19	Auto Maintenance and Storage Facilities
20	Aircraft Control and Warning (AC&W) Building
21	Wastewater Treatment Facility
22	Water Wells and Water Supply Building
23	Power and Communication Line Corridors
24	Receiver Building Area
25	Direction Finder Area
26	Former Construction Camp Area
27	Diesel Fuel Pump Island

Since the CDAP was completed, subsequent studies by Montgomery Watson have identified three additional sites, which were investigated in the Phase II RI. These sites are:

Site Number	Description
28	Drainage Basin
29	Suqi River
30	Background Sampling Areas and Reference Creek

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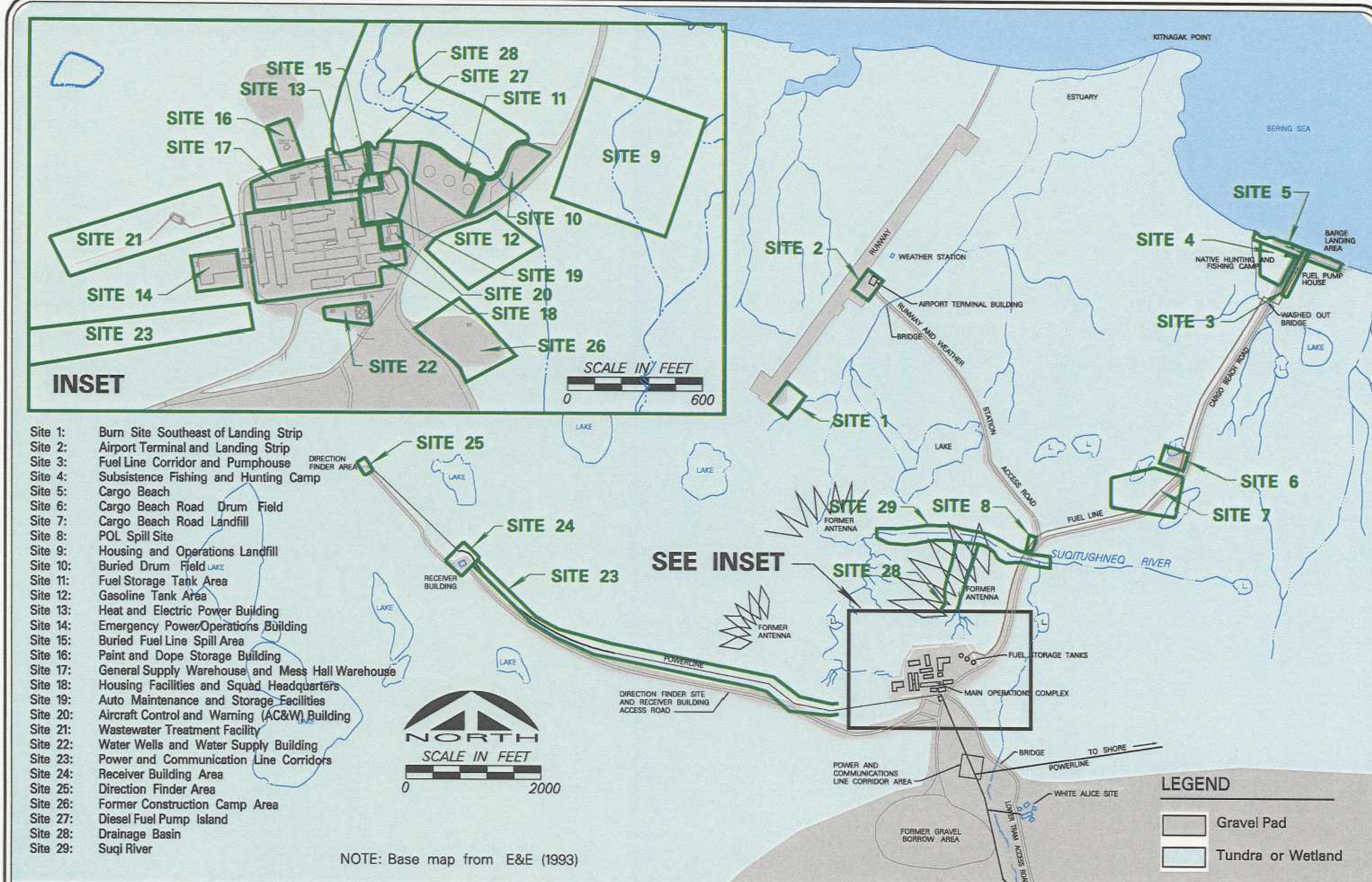


MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 1-4

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE LOCATION MAP

In this report, the boundaries of some sites were modified to reflect our current knowledge of the site and extent of potential contamination.

1.3.3 History

St. Lawrence Island was established as a reindeer reserve by Executive Order on January 7, 1903. The Northeast Cape installation was acquired by the United States Air Force (Air Force) on January 16, 1952, under Public Land Order (PLO) 790, which removed 21,013 acres from the reindeer reservation to be used for a military installation. In 1952, the Aircraft Control and Warning Station (AC&WS) was formally activated by the assignment of the 712th AC&WS Air Force Squadron and the 6980th Security Squadron. The original site was designed to support 212 personnel. Throughout its existence, Northeast Cape served as a surveillance station providing radar coverage for the Alaskan Air Command and later, for the North American Air Defense Command, as part of an Alaska-wide system constructed to reduce a potential vulnerability to bomber attack across polar regions.

In 1954, the Air Force began construction of a White Alice radio relay, a communication system utilizing tropospheric scatter for transmission of information detected by the AC&WS Radar Facility. In 1958, 16,213 acres were restored to the reindeer reservation under PLO 1602, while 4,800 acres remained as an active military installation.

In June 1969, the radar operations ceased and most military personnel were demobilized from the site. Most of the facilities were left intact with minimal removal of equipment due to the high cost of transport from the site.

The White Alice station area remained in operation with minimal military staff until 1972. All lands were then withdrawn from the military under PLO 5187 for classification under Section 17(d)(1) of the Alaska Native Claims Settlement Act (ANCSA) of 1971, which entitled local community village corporations to select and receive tracts of federal land. Interim Conveyance No. 203 (June 1979) conveyed unsurveyed lands of St. Lawrence Island to Sivuqaq, Inc. and Savoonga Native Corporation. Excepted from transfer was surveyed land, easements, and land use permits effective prior to conveyance.

In 1982, the White Alice operations area was transferred to the United States Department of the Navy (Navy). The White Alice operations are not a part of this contract and are being addressed by the Navy via their Comprehensive Long-Term Environmental Action Navy (CLEAN) program. Therefore, the White Alice site is not within the scope of this Phase II RI).

1.3.4 Previous Investigations and Actions

In 1985, URS Corporation conducted an environmental assessment of the Northeast Cape Installation under the DERP. The assessment consisted of a file search and preliminary reconnaissance of the installation, which included an inventory of materials left by the military and collection of a limited number of soil and water samples (URS, 1985).

In 1991 and 1992, E&E conducted additional site reconnaissance and interviewed personnel who had resided at Northeast Cape when it was an active installation. In 1993, E&E prepared a CDAP to further investigate areas of concern. In 1994, Montgomery Watson, under Contract No. DACA85-93-D-0011, Delivery Order No. 0003, performed a Phase I RI in accordance with the CDAP. The results of the Phase I RI, chemical sampling and analysis and quality assurance/quality control (QA/QC) activities were presented in the Phase I RI report, (Montgomery Watson, 1995a).

Concurrent with the RI conducted by Montgomery Watson, Northwest EnviroService, Inc. (NES), under contract to the Alaska District, removed all electrical transformers and their contents from the Northeast Cape installation.

In 1995 and 1996 respectively, a Remedial Action Alternatives Technical Memorandum (RAAM) and an Engineering Evaluation/Cost Analysis (EE/CA) were completed by Montgomery Watson to evaluate and recommend future actions at Northeast Cape, with respect to BD/DR and CON/HTRW removal, respectively (Montgomery Watson, 1995b, 1996b).

In 1996, Montgomery Watson performed a Phase II RI that included collection of additional soil, water and biological samples, characterization of liquids in storage tanks and subterranean structures, a radiological survey, and posting of potential asbestos hazards.

In 1997, mitigation of physical hazards caused by grounded wire and cable on the tundra was completed.

Results of the 1996 Phase II RI and a human health and ecological risk assessment were documented in a draft Phase II RI report (Montgomery Watson, 1996c). Due to unresolved technical questions, additional data collection was performed in September 1998 prior to finalizing the draft Phase II RI.

1.4 REGULATORY SETTING

1.4.1 Authority for Cleanup

This work is being performed under the DERP-FUDS. Authority for DERP-FUDS is derived from the following legislation:

- The Comprehensive Environmental Restoration Compensation, and Liability Act of 1980 (CERCLA), Public Law (PL) 96-510, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, PL-99-499 (codified as 42 USC 9601-9675)

- Environmental Restoration Program, 10 USC 2701-2707

To qualify for these programs, a site must have been formerly owned by, leased to, possessed by or otherwise have been under the jurisdiction of the Secretary of Defense at the time of activities which resulted in hazards. DERP funds are authorized for DOD remediation of those hazards.

Section 121 of CERCLA (as amended by SARA) includes provisions impacting selection of remedial actions for an RI; specifics on the applicability of federal, state and local permits to cleanup actions; and providing for state involvement in development and selection of remedial actions. Generally, site cleanup provisions establish a preference for those response actions that are cost effective and which result in permanent, long-term solutions to risks posed by site contaminants. Under Section 121(e)(1), no federal, state or local permits are required for those portions of the removal/remediation action conducted entirely on-site. However, Section 121(e)(2) guarantees the state's right to enforce any federal or state standard, criteria, etc. Section 121(f) guarantees state involvement in the RI process. Typically, state regulations are identified as applicable or Relevant and Appropriate Requirements (ARARS).

This RI for Northeast Cape follows the CERCLA process. In accordance with the CERCLA process, the Alaska State Oil and Other Hazardous Substance Pollution Control Regulations (18 AAC 75) that govern the cleanup of contaminated sites in Alaska, were identified as ARAR for Northeast Cape.

1.4.2 Proposed Cleanup Criteria

<u>Soil and Groundwater Action Levels</u>. Over the course of the investigation at Northeast Cape, Alaska state cleanup regulations (18 AAC 75) have undergone significant review and revision. In 1996 when the draft RI for Northeast Cape was prepared, Alaska did not have numerical standard for substances other than petroleum. For petroleum, the numerical standards in the Interim Guidance for Non-UST Contaminated Soil Cleanup Levels (ADEC, 1991) represented the current Alaska Department of Environmental Conservation (ADEC) cleanup criteria for petroleum hydrocarbons from sources other than USTs. At the time, ADEC cleanup standards for petroleum in soil were based on the ADEC soil matrix, which set cleanup criteria based on:

- Depth to groundwater
- Soil type
- Precipitation
- Distance to drinking water wells
- Quantity of contaminated soil

Past studies at the site used, ADEC soil matrix levels were the criteria used to judge petroleum cleanup. Cleanup criteria for other hazardous substances in soil and groundwater contamination and approval of site-specific cleanup criteria was left to the discretion of the individual regulator. EPA Region III Risk-based Concentrations (RBC), which are referenced by EPA Region X were used as screening criteria for other substances. Prior studies used these criteria to make recommendations for site-specific cleanup. Table 1-1 presents the current EPA Region III RBC.

In 1997 and 1998, ADEC conducted an extensive effort to update the cleanup criteria for petroleum hydrocarbons as well as numerous other constituents. Initial draft regulations were published in May 1998. Additional revisions were issued internally in ADEC on July 2, 1998 and available to the public in August 1998. In January 1999, ADEC promulgated the final version of the Amendments to the Oil and Other Hazardous Substance Pollution Control Regulations (18 AAC 75).

TABLE 1-1
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Soil Residential mg/kg
ACETALDEHYDE	75070		8.1E-01 C			
ACETOCHLOR	34256821	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
ACETONE	67641	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
ACETONITRILE	75058	2.2E+02 N	5.1E+01 N	8.1E+00 N	1.2E+04 N	4.7E+02 N
ACETOPHENONE	98862	4.2E-02 N	2.1E-02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
ACROLEIN	107028	4.2E-02 N	2.1E-02 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
ACRYLAMIDE	79061	1.5E-02 C	1.4E-03 C	7.0E-04 C	1.3E+00 C	1.4E-01 C
ACRYLONITRILE	107131	1.2E-01 C	2.6E-02 C	5.8E-03 C	1.1E+01 C	1.2E+00 C
ALACHLOR	15972608	8.4E-01 C	7.8E-02 C	3.9E-02 C	7.2E+01 C	8.0E+00 C
ALAR	1596845	5.5E+03 N	5.5E+02 N	2.0E+02 N	3.1E+05 N	1.2E+04 N
ALDICARB	116063	3.7E+01 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
ALDICARB SULFONE	1646884	3.7E+01 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
ALDRIN	309002	3.9E-03 C	3.7E-04 C	1.9E-04 C	3.4E-01 C	3.8E-02 C
ALUMINUM	7429905	3.7E+04 N	3.7E+00 N	1.4E+03 N	2.0E+06 N	7.8E+04 N
AMINODINITROTOLUENES		2.2E+00 N	2.2E-01 N	8.1E-02 N	1.2E+02 N	4.7E+00 N
4-AMINOPYRIDINE	504245	7.3E-01 N	7.3E-02 N	2.7E-02 N	4.1E+01 N	1.6E+00 N
AMMONIA	7664417	2.1E+02 N	1.0E+02 N			
ANILINE	62533	1.9E+00 C	1.1E+00 N	5.5E-01 C	1.0E+03 C	1.1E+02 C
ANTIMONY	7440360	1.5E+01 N	1.5E+00 N	5.4E-01 N	8.2E+02 N	3.1E+01 N
ANTIMONY PENTOXIDE	1314609	1.8E+01 N	1.8E+00 N	6.8E-01 N	1.0E+03 N	3.9E+01 N
ANTIMONY TETROXIDE	1332816	1.5E+01 N	1.5E+00 N	5.4E-01 N	8.2E+02 N	3.1E+01 N
ANTIMONY TRIOXIDE	1309644	1.5E+01 N	2.1E-01 N	5.4E-01 N	8.2E+02 N	3.1E+01 N
ARSENIC	7440382	4.5E-02 C	4.1E-04 C	2.1E-03 C	3.8E+00 C	4.3E-01 C
ARSINE	7784421	1.0E-01 N	5.1E-02 N			
ASSURE	76578148	3.3E+02 N	3.3E+01 N	1.2E+01 N	1.8E+04 N	7.0E+02 N
ATRAZINE	1912249	3.0E-01 C	2.8E-02 C	1.4E-02 C	2.6E+01 C	2.9E+00 C
AZOBENZENE	103333	6.1E-01 C	5.7E-02 C	2.9E-02 C	5.2E+01 C	5.8E+00 C
BARIUM	7440393	2.6E+03 N	5.1E-01 N	9.5E+01 N	1.4E+05 N	5.5E+03 N
BAYGON	114261	1.5E+02 N	1.5E+01 N	5.4E+00 N	8.2E+03 N	3.1E+02 N
BAYTHROID	68359375	9.1E+02 N	9.1E+01 N	3.4E+01 N	5.1E+04 N	2.0E+03 N
BENTAZON	25057890	1.1E+03 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
BENZALDEHYDE	100527	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
BENZENE	71432	3.6E-01 C	2.2E-01 C	1.1E-01 C	2.0E+02 C	2.2E+01 C
BENZENETHIOL	108985	6.1E-02 N	3.7E-02 N	1.4E-02 N	2.0E+01 N	7.8E-01 N
BENZIDINE	92875	2.9E-04 C	2.7E-05 C	1.4E-05 C	2.5E-02 C	2.8E-03 C
BENZOIC ACID	65850	1.5E+05 N	1.5E+04 N	5.4E+03 N	8.2E+06 N	3.1E+05 N
BENZYL ALCOHOL	100516	1.1E+04 N	1.1E+03 N	4.1E+02 N	6.1E+05 N	2.3E+04 N
BENZYL CHLORIDE	100447	6.2E-02 C	3.7E-02 C	1.9E-02 C	3.4E+01 C	3.8E+00 C
BERYLLIUM	7440417	7.3E+01 N	7.5E-04 C	2.7E+00 N	4.1E+03 N	1.6E+02 N
BIPHENYL	92524	3.0E+02 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
BIS(2-CHLOROETHYL)ETHER	111444	6.1E-02 C	5.7E-03 C	2.9E-03 C	5.2E+00 C	5.8E-01 C
BIS(2-CHLOROISOPROPYL)ETHER	108601	2.6E-01 C	1.8E-01 C	4.5E-02 C	8.2E+01 C	9.1E+00 C
**BIS(CHLOROMETHYL)ETHER	542881	4.8E-05 C	2.8E-05 C	1.4E-05 C	2.6E-02 C	2.9E-03 C
**BIS(2-ETHYLHEXYL)PHTHALATE	117817	4.8E+00 C	4.5E-01 C	2.3E-01 C	4.1E+02 C	4.6E+01 C
**BORON	7440428	3.3E+03 N	2.1E+01 N	1.2E+02 N	1.8E+05 N	7.0E+03 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
BROMODICHLOROMETHANE	75274	1.7E-01 C	1.0E-01 C	5.1E-02 C	9.2E+01 C	1.0E+01 C
**BROMOETHENE	593602	1.1E-01 C	5.7E-02 C			
BROMOFORM	75252	2.3E+00 C	1.6E+00 C	4.0E-01 C	7.2E+02 C	8.1E+01 C
BROMOMETHANE	74839	8.5E+00 N	5.1E+00 N	1.9E+00 N	2.9E+03 N	1.1E+02 N
BROMOPHOS	2104963	3.0E+01 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
1,3-BUTADIENE	106990	7.0E-03 C	3.5E-03 C			
1-BUTANOL	71363	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
BUTYLBENZYLPHTHALATE	85687	7.3E+03 N	7.3E+02 N	2.7E+02 N	4.1E+05 N	1.6E+04 N
BUTYLATE	2008415	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
N-BUTYLBENZENE	104518	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
SEC-BUTYLBENZENE	135988	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
TERT-BUTYLBENZENE	98066	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
CADMIUM-WATER	7440439	1.8E+01 N	9.9E-04 C	6.8E-01 N	1.0E+03 N	3.9E+01 N
CADMIUM-FOOD	7440439	3.7E+01 N	9.9E-04 C	1.4E+00 N	2.0E+03 N	7.8E+01 N
CAPROLACTAM	105602	1.8E+04 N	1.8E+03 N	6.8E+02 N	1.0E+06 N	3.9E+04 N
CARBARYL	63252	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
CARBON DISULFIDE	75150	1.0E+03 N	7.3E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
CARBON TETRACHLORIDE	56235	1.6E-01 C	1.2E-01 C	2.4E-02 C	4.4E+01 C	4.9E+00 C
CARBOSULFAN	55285148	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
CHLORAL	75876	1.2E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
CHLORANIL	118752	1.7E-01 C	1.6E-02 C	7.9E-03 C	1.4E+01 C	1.6E+00 C
CHLORDANE	57749	1.9E-01 C	1.8E-02 C	9.0E-03 C	1.6E+01 C	1.8E+00 C
CHLORINE	7782505	6.1E+02 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
CHLORINE DIOXIDE	10049044	4.2E-01 N	2.1E-01 N			
CHLOROACETIC ACID	79118	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
4-CHLOROANILINE	106478	1.5E+02 N	1.5E+01 N	5.4E+00 N	8.2E+03 N	3.1E+02 N
CHLOROBENZENE	108907	3.5E+01 N	1.8E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
CHLOROBENZILATE	510156	2.5E-01 C	2.3E-02 C	1.2E-02 C	2.1E+01 C	2.4E+00 C
P-CHLOROBENZOIC ACID	74113	7.3E+03 N	7.3E+02 N	2.7E+02 N	4.1E+05 N	1.6E+04 N
2-CHLORO-1,3-BUTADIENE	126998	1.4E+01 N	7.3E+00 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
1-CHLOROBUTANE	109693	2.4E+03 N	1.5E+03 N	5.4E+02 N	8.2E+05 N	3.1E+04 N
1-CHLORO-1,1-DIFLUOROETHANE	75683	1.0E+05 N	5.1E+04 N			
CHLORODIFLUOROMETHANE	75456	1.0E+05 N	5.1E+04 N			
CHLOROETHANE	75003	3.6E+00 C	2.2E+00 C	1.1E+00 C	2.0E+03 C	2.2E+02 C
CHLOROFORM	67663	1.5E-01 C	7.7E-02 C	5.2E-01 C	9.4E+02 C	1.0E+02 C
CHLOROMETHANE	74873	1.5E+00 C	1.0E+00 C	2.4E-01 C	4.4E+02 C	4.9E+01 C
4-CHLORO-2-METHYLANILINE	95692	1.2E-01 C	1.1E-02 C	5.4E-03 C	9.9E+00 C	1.1E+00 C
BETA-CHLORONAPHTHALENE	91587	4.9E+02 N	2.9E+02 N	1.1E+02 N	1.6E+05 N	6.3E+03 N
O-CHLORONITROBENZENE	88733	4.2E-01 C	2.5E-01 C	1.3E-01 C	2.3E+02 C	2.6E+01 C
P-CHLORONITROBENZENE	100005	5.9E-01 C	3.5E-01 C	1.8E-01 C	3.2E+02 C	3.5E+01 C
2-CHLOROPHENOL	95578	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
2-CHLOROPROPANE	75296	2.1E+02 N	1.1E+02 N			
O-CHLOROTOLUENE	95498	1.2E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
CHLORPYRIFOS	2921882	1.1E+02 N	1.1E+01 N	4.1E+00 N	6.1E+03 N	2.3E+02 N
CHLORPYRIFOS-METHYL	5598130	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
**CHROMIUM III	16065831	5.5E+04 N	5.5E+03 N	2.0E+03 N	3.1E+06 N	1.2E+05 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
**CHROMIUM VI	18540299	1.1E+02 N	1.5E-04 C	4.1E+00 N	6.1E+03 N	2.3E+02 N
COBALT	7440484	2.2E+03 N	2.2E+02 N	8.1E+01 N	1.2E+05 N	4.7E+03 N
COKE OVEN EMISSIONS (COAL TAR)	8007452	5.7E-03 C	2.8E-03 C			
COPPER	7440508	1.5E+03 N	1.5E+02 N	5.4E+01 N	8.2E+04 N	3.1E+03 N
CROTONALDEHYDE	123739	3.5E-02 C	3.3E-03 C	1.7E-03 C	3.0E+00 C	3.4E-01 C
CUMENE	98828	6.6E+02 N	4.0E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
CYANIDE (FREE)	57125	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
CALCIUM CYANIDE	592018	1.5E+03 N	1.5E+02 N	5.4E+01 N	8.2E+04 N	3.1E+03 N
COPPER CYANIDE	544923	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
CYANAZINE	21725462	8.0E-02 C	7.5E-03 C	3.8E-03 C	6.8E+00 C	7.6E-01 C
CYANOGEN	460195	2.4E+02 N	1.5E+02 N	5.4E+01 N	8.2E+04 N	3.1E+03 N
CYANOGEN BROMIDE	506683	3.3E+03 N	3.3E+02 N	1.2E+02 N	1.8E+05 N	7.0E+03 N
CYANOGEN CHLORIDE	506774	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
HYDROGEN CYANIDE	74908	6.2E+00 N	3.1E+00 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
POTASSIUM CYANIDE	151508	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
POTASSIUM SILVER CYANIDE	506616	7.3E+03 N	7.3E+02 N	2.7E+02 N	4.1E+05 N	1.6E+04 N
SILVER CYANIDE	506649	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
SODIUM CYANIDE	143339	1.5E+03 N	1.5E+02 N	5.4E+01 N	8.2E+04 N	3.1E+03 N
THIOCYANATE		3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
ZINC CYANIDE	557211	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
CYCLOHEXANONE	108941	1.8E+05 N	1.8E+04 N	6.8E+03 N	1.0E+07 N	3.9E+05 N
CYHALOTHRIN/KARATE	68085858	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
CYPERMETHRIN	52315078	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
DACTHAL	1861321	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
DALAPON	75990	1.1E+03 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
DDD	72548	2.8E-01 C	2.6E-02 C	1.3E-02 C	2.4E+01 C	2.7E+00 C
DDE	72559	2.0E-01 C	1.8E-02 C	9.3E-03 C	1.7E+01 C	1.9E+00 C
DDT	50293	2.0E-01 C	1.8E-02 C	9.3E-03 C	1.7E+01 C	1.9E+00 C
DIAZINON	333415	3.3E+01 N	3.3E+00 N	1.2E+00 N	1.8E+03 N	7.0E+01 N
DIBENZOFURAN	132649	2.4E+01 N	1.5E+01 N	5.4E+00 N	8.2E+03 N	3.1E+02 N
1,4-DIBROMOBENZENE	106376	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
DIBROMOCHLOROMETHANE	124481	1.3E-01 C	7.5E-02 C	3.8E-02 C	6.8E+01 C	7.6E+00 C
1,2-DIBROMO-3-CHLOROPROPANE	96128	4.7E-02 C	2.1E-01 N	2.3E-03 C	4.1E+00 C	4.6E-01 C
1,2-DIBROMOETHANE	106934	7.5E-04 C	8.2E-03 C	3.7E-05 C	6.7E-02 C	7.5E-03 C
DIBUTYLPHTHALATE	84742	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
DICAMBA	1918009	1.1E+03 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
1,2-DICHLOROBENZENE	95501	6.4E+01 N	3.3E+01 N	1.2E+02 N	1.8E+05 N	7.0E+03 N
1,3-DICHLOROBENZENE	541731	1.4E+01 N	7.3E+00 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
1,4-DICHLOROBENZENE	106467	4.7E-01 C	2.8E-01 C	1.3E-01 C	2.4E+02 C	2.7E+01 C
3,3'-DICHLOROBENZIDINE	91941	1.5E-01 C	1.4E-02 C	7.0E-03 C	1.3E+01 C	1.4E+00 C
1,4-DICHLORO-2-BUTENE	764410	1.3E-03 C	6.7E-04 C			
DICHLORODIFLUOROMETHANE	75718	3.5E+02 N	1.8E+02 N	2.7E+02 N	4.1E+05 N	1.6E+04 N
1,1-DICHLOROETHANE	75343	8.0E+02 N	5.1E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
1,2-DICHLOROETHANE	107062	1.2E-01 C	6.9E-02 C	3.5E-02 C	6.3E+01 C	7.0E+00 C
1,1-DICHLOROETHENE	75354	4.4E-02 C	3.6E-02 C	5.3E-03 C	9.5E+00 C	1.1E+00 C
CIS-1,2-DICHLOROETHENE	156592	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
TRANS-1,2-DICHLOROETHENE	156605	1.2E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
TOTAL 1,2-DICHLOROETHENE	540590	5.5E+01 N	3.3E+01 N	1.2E+01 N	1.8E+04 N	7.0E+02 N
2,4-DICHLOROPHENOL	120832	1.1E+02 N	1.1E+01 N	4.1E+00 N	6.1E+03 N	2.3E+02 N
2,4-D	94757	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
4-(2,4-DICHLOROPHENOXY)BUTYRIC ACID	94826	2.9E+02 N	2.9E+01 N	1.1E+01 N	1.6E+04 N	6.3E+02 N
1,2-DICHLOROPROPANE	78875	1.6E-01 C	9.2E-02 C	4.6E-02 C	8.4E+01 C	9.4E+00 C
2,3-DICHLOROPROPANOL	616239	1.1E+02 N	1.1E+01 N	4.1E+00 N	6.1E+03 N	2.3E+02 N
1,3-DICHLOROPROPENE	542756	7.7E-02 C	4.8E-02 C	1.8E-02 C	3.2E+01 C	3.5E+00 C
DICHLORVOS	62737	2.3E-01 C	2.2E-02 C	1.1E-02 C	2.0E+01 C	2.2E+00 C
DICOFOL	115322	1.5E-01 C	1.4E-02 C	7.2E-03 C	1.3E+01 C	1.5E+00 C
DICYCLOPENTADIENE	77736	4.4E-01 N	2.2E-01 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
DIELDRIN	60571	4.2E-03 C	3.9E-04 C	2.0E-04 C	3.6E-01 C	4.0E-02 C
DIESEL EMISSIONS			5.1E+00 N			
DIETHYLPHTHALATE	84662	2.9E+04 N	2.9E+03 N	1.1E+03 N	1.6E+06 N	6.3E+04 N
DIETHYLENE GLYCOL, MONOBUTYL ETHER	112345		2.1E+01 N			
DIETHYLENE GLYCOL, MONOETHYL ETHER	111900	7.3E+04 N	7.3E+03 N	2.7E+03 N	4.1E+06 N	1.6E+05 N
DI(2-ETHYLHEXYL)ADIPATE	103231	5.6E+01 C	5.2E+00 C	2.6E+00 C	4.8E+03 C	5.3E+02 C
DIETHYLSTILBESTROL	56531	1.4E-05 C	1.3E-06 C	6.7E-07 C	1.2E-03 C	1.4E-04 C
DIFENZOQUAT (AVENGE)	43222486	2.9E+03 N	2.9E+02 N	1.1E+02 N	1.6E+05 N	6.3E+03 N
1,1-DIFLUOROETHANE	75376	8.0E+04 N	4.0E+04 N			
DIISOPROPYL METHYLPHOSPHONATE (DIMP)	1445756	2.9E+03 N	2.9E+02 N	1.1E+02 N	1.6E+05 N	6.3E+03 N
3,3'-DIMETHOXYBENZIDINE	119904	4.8E+00 C	4.5E-01 C	2.3E-01 C	4.1E+02 C	4.6E+01 C
DIMETHYLAMINE	124403		2.1E-02 N			
2,4-DIMETHYLANILINE HYDROCHLORIDE	21436964	1.2E-01 C	1.1E-02 C	5.4E-03 C	9.9E+00 C	1.1E+00 C
2,4-DIMETHYLANILINE	95681	8.9E-02 C	8.3E-03 C	4.2E-03 C	7.6E+00 C	8.5E-01 C
N,N-DIMETHYLANILINE	121697	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
3,3'-DIMETHYLBENZIDINE	119937	7.3E-03 C	6.8E-04 C	3.4E-04 C	6.2E-01 C	6.9E-02 C
1,1-DIMETHYLHYDRAZINE	57147	2.6E-02 C	1.8E-03 C	1.2E-03 C	2.2E+00 C	2.5E-01 C
1,2-DIMETHYLHYDRAZINE	540738	1.8E-03 C	1.7E-04 C	8.5E-05 C	1.5E-01 C	1.7E-02 C
2,4-DIMETHYLPHENOL	105679	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
2,6-DIMETHYLPHENOL	576261	2.2E+01 N	2.2E+00 N	8.1E-01 N	1.2E+03 N	4.7E+01 N
3,4-DIMETHYLPHENOL	95658	3.7E+01 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
DIMETHYLPHTHALATE	131113	3.7E+05 N	3.7E+04 N	1.4E+04 N	2.0E+07 N	7.8E+05 N
1,2-DINITROBENZENE	528290	1.5E+01 N	1.5E+00 N	5.4E-01 N	8.2E+02 N	3.1E+01 N
1,3-DINITROBENZENE	99650	3.7E+00 N	3.7E-01 N	1.4E-01 N	2.0E+02 N	7.8E+00 N
1,4-DINITROBENZENE	100254	1.5E+01 N	1.5E+00 N	5.4E-01 N	8.2E+02 N	3.1E+01 N
4,6-DINITRO-O-CYCLOHEXYL PHENOL	131895	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
4,6-DINITRO-2-METHYLPHENOL	534521	3.7E+00 N	3.7E-01 N	1.4E-01 N	2.0E+02 N	7.8E+00 N
2,4-DINITROPHENOL	51285	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
DINITROTOLUENE MIX		9.8E-02 C	9.2E-03 C	4.6E-03 C	8.4E+00 C	9.4E-01 C
2,4-DINITROTOLUENE	121142	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
2,6-DINITROTOLUENE	606202	3.7E+01 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
DINOSEB	88857	6.1E+00 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
DIOCTYLPHTHALATE	117840	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
1,4-DIOXANE	123911	6.1E+00 C	5.7E-01 C	2.9E-01 C	5.2E+02 C	5.8E+01 C
DIPHENYLAMINE	122394	9.1E+02 N	9.1E+01 N	3.4E+01 N	5.1E+04 N	2.0E+03 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
1,2-DIPHENYLHYDRAZINE	122667	8.4E-02 C	7.8E-03 C	3.9E-03 C	7.2E+00 C	8.0E-01 C
DIQUAT	85007	8.0E+01 N	8.0E+00 N	3.0E+00 N	4.5E+03 N	1.7E+02 N
DISULFOTON	298044	2.4E-01 N	1.5E-01 N	5.4E-02 N	8.2E+01 N	3.1E+00 N
1,4-DITHIANE	505293	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
DIURON	330541	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
ENDOSULFAN	115297	2.2E+02 N	2.2E+01 N	8.1E+00 N	1.2E+04 N	4.7E+02 N
ENDRIN	72208	1.1E+01 N	1.1E+00 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
EPICHLOROHYDRIN	106898	6.8E+00 C	1.0E+00 N	3.2E-01 C !	5.8E+02 C !	6.5E+01 C !
ETHION	563122	1.8E+01 N	1.8E+00 N	6.8E-01 N	1.0E+03 N	3.9E+01 N
2-ETHOXYETHANOL	110805	1.5E+04 N	2.1E+02 N	5.4E+02 N	8.2E+05 N	3.1E+04 N
ETHYL ACETATE	141786	5.5E+03 N	3.3E+03 N	1.2E+03 N	1.8E+06 N	7.0E+04 N
ETHYLBENZENE	100414	1.3E+03 N	1.1E+03 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
ETHYLENE DIAMINE	107153	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
ETHYLENE GLYCOL	107211	7.3E+04 N	7.3E+03 N	2.7E+03 N	4.1E+06 N	1.6E+05 N
ETHYLENE GLYCOL, MONOBUTYL ETHER	111762		2.1E+01 N			
ETHYLENE OXIDE	75218	6.7E-02 C	1.8E-02 C	3.2E-03 C	5.7E+00 C	6.4E-01 C
ETHYLENE THIOUREA	96457	6.1E-01 C !	5.7E-02 C !	2.9E-02 C !	5.2E+01 C !	5.8E+00 C !
ETHYL ETHER	60297	1.2E+03 N	7.3E+02 N	2.7E+02 N	4.1E+05 N	1.6E+04 N
ETHYL METHACRYLATE	97632	5.5E+02 N	3.3E+02 N	1.2E+02 N	1.8E+05 N	7.0E+03 N
FENAMIPHOS	22224926	9.1E+00 N	9.1E-01 N	3.4E-01 N	5.1E+02 N	2.0E+01 N
FLUOMETURON	2164172	4.7E+02 N	4.7E+01 N	1.8E+01 N	2.7E+04 N	1.0E+03 N
FLUORINE	7782414	2.2E+03 N	2.2E+02 N	8.1E+01 N	1.2E+05 N	4.7E+03 N
FOMESAFEN	72178020	3.5E-01 C	3.3E-02 C	1.7E-02 C	3.0E+01 C	3.4E+00 C
FONOFOS	944229	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
FORMALDEHYDE	50000	7.3E+03 N	1.4E-01 C	2.7E+02 N	4.1E+05 N	1.6E+04 N
FORMIC ACID	64186	7.3E+04 N	7.3E+03 N	2.7E+03 N	4.1E+06 N	1.6E+05 N
FURAN	110009	6.1E+00 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
FURAZOLIDONE	67458	1.8E-02 C	1.6E-03 C	8.3E-04 C	1.5E+00 C	1.7E-01 C
FURFURAL	98011	1.1E+02 N	3.7E+01 N	4.1E+00 N	6.1E+03 N	2.3E+02 N
GLYCIDALDEHYDE	765344	1.5E+01 N	1.1E+00 N	5.4E-01 N	8.2E+02 N	3.1E+01 N
GLYPHOSATE	1071836	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
HEPTACHLOR	76448	2.3E-03 C	1.4E-03 C	7.0E-04 C	1.3E+00 C	1.4E-01 C
HEPTACHLOR EPOXIDE	1024573	1.2E-03 C	6.9E-04 C	3.5E-04 C	6.3E-01 C	7.0E-02 C
HEXABROMOBENZENE	87821	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
HEXACHLOROBENZENE	118741	6.6E-03 C	3.9E-03 C	2.0E-03 C	3.6E+00 C	4.0E-01 C
HEXACHLOROBUTADIENE	87683	1.4E-01 C !	8.0E-02 C !	4.0E-02 C !	7.3E+01 C !	8.2E+00 C !
ALPHA-HCH	319846	1.1E-02 C	9.9E-04 C	5.0E-04 C	9.1E-01 C	1.0E-01 C
BETA-HCH	319857	3.7E-02 C	3.5E-03 C	1.8E-03 C	3.2E+00 C	3.5E-01 C
GAMMA-HCH (LINDANE)	58899	5.2E-02 C	4.8E-03 C	2.4E-03 C	4.4E+00 C	4.9E-01 C
TECHNICAL HCH	608731	3.7E-02 C	3.5E-03 C	1.8E-03 C	3.2E+00 C	3.5E-01 C
HEXACHLOROCYCLOPENTADIENE	77474	1.5E-01 N	7.3E-02 N	9.5E+00 N	1.4E+04 N	5.5E+02 N
HEXACHLORODIBENZODIOXIN MIX	19408743	1.1E-05 C	1.4E-06 C	5.1E-07 C	9.2E-04 C	1.0E-04 C
HEXACHLOROETHANE	67721	7.5E-01 C !	4.5E-01 C !	2.3E-01 C !	4.1E+02 C !	4.6E+01 C !
HEXACHLOROPHENE	70304	1.1E+01 N	1.1E+00 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
1,6-HEXAMETHYLENE DIISOCYANATE	822060		1.1E-02 N			
HEXANE	110543	3.5E+02 N	2.1E+02 N	8.1E+01 N	1.2E+05 N	4.7E+03 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
2-HEXANONE	591786	1.5E+03 N	5.1E+00 N	5.4E+01 N	8.2E+04 N	3.1E+03 N
HEXAZINONE	51235042	1.2E+03 N	1.2E+02 N	4.5E+01 N	6.7E+04 N	2.6E+03 N
HMX	2691410	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
HYDRAZINE	302012	2.2E-02 C	3.7E-04 C	1.1E-03 C	1.9E+00 C	2.1E-01 C
HYDROGEN CHLORIDE	7647010		2.1E+01 N			
HYDROGEN SULFIDE	7783064	1.1E+02 N	1.0E+00 N	4.1E+00 N	6.1E+03 N	2.3E+02 N
HYDROQUINONE	123319	1.5E+03 N	1.5E+02 N	5.4E+01 N	8.2E+04 N	3.1E+03 N
IRON	7439896	1.1E+04 N	1.1E+03 N	4.1E+02 N	6.1E+05 N	2.3E+04 N
ISOBUTANOL	78831	1.8E+03 N	1.1E+03 N	4.1E+02 N	6.1E+05 N	2.3E+04 N
ISOPHORONE	78591	7.0E+01 C	6.6E+00 C	3.3E+00 C	6.0E+03 C	6.7E+02 C
ISOPROPALIN	33820530	5.5E+02 N	5.5E+01 N	2.0E+01 N	3.1E+04 N	1.2E+03 N
ISOPROPYL METHYL PHOSPHONIC ACID	1832548	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
TETRAETHYLLEAD	78002	6.1E-04 N	3.7E-04 N	1.4E-04 N	2.0E-01 N	7.8E-03 N
LITHIUM	7439932	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
MALATHION	121755	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
MALEIC ANHYDRIDE	108316	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
MANGANESE-NONFOOD	7439965	7.3E+02 N	5.2E-02 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
MANGANESE-FOOD	7439965	5.1E+03 N	5.2E-02 N	1.9E+02 N	2.9E+05 N	1.1E+04 N
MEPHOSFOLAN	950107	3.3E+00 N	3.3E-01 N	1.2E-01 N	1.8E+02 N	7.0E+00 N
MEPIQUAT CHLORIDE	24307264	1.1E+03 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
MERCURIC CHLORIDE	7487947	1.1E+01 N	1.1E+00 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
MERCURY (INORGANIC)	7439976		3.1E-01 N			
METHYLMERCURY	22967926	3.7E+00 N	3.7E-01 N	1.4E-01 N	2.0E+02 N	7.8E+00 N
METHACRYLONITRILE	126987	1.0E+00 N	7.3E-01 N	1.4E-01 N	2.0E+02 N	7.8E+00 N
METHANOL	67561	1.8E+04 N	1.8E+03 N	6.8E+02 N	1.0E+06 N	3.9E+04 N
METHIDATHION	950378	3.7E+01 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
METHOXYCHLOR	72435	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
METHYL ACETATE	79209	6.1E+03 N	3.7E+03 N	1.4E+03 N	2.0E+06 N	7.8E+04 N
METHYL ACRYLATE	96333	1.8E+02 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
2-METHYLANILINE	95534	2.8E-01 C	2.6E-02 C	1.3E-02 C	2.4E+01 C	2.7E+00 C
4-(2-METHYL-4-CHLOROPHENOXY) BUTYRIC ACID	94815	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
2-METHYL-4-CHLOROPHENOXYACETIC ACID (MCPA)	94746	1.8E+01 N	1.8E+00 N	6.8E-01 N	1.0E+03 N	3.9E+01 N
2-(2-METHYL-4-CHLOROPHENOXY)PROPIONIC ACID (MCPP)	93652	3.7E+01 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
METHYLCYCLOHEXANE	108872	6.3E+03 N	3.1E+03 N			
METHYLENE BROMIDE	74953	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
METHYLENE CHLORIDE	75092	4.1E+00 C	3.8E+00 C	4.2E-01 C	7.6E+02 C	8.5E+01 C
4,4'-METHYLENE BIS(2-CHLOROANILINE)	101144	5.2E-01 C	4.8E-02 C	2.4E-02 C	4.4E+01 C	4.9E+00 C
4,4'-METHYLENE BIS(N,N'-DIMETHYL)ANILINE	101611	1.5E+00 C	1.4E-01 C	6.9E-02 C	1.2E+02 C	1.4E+01 C
4,4'-METHYLENEDIPHENYL ISOCYANATE	101688		6.2E-01 N			
METHYL ETHYL KETONE (2-BUTANONE)	78933	1.9E+03 N	1.0E+03 N	8.1E+02 N	1.2E+06 N	4.7E+04 N
METHYL HYDRAZINE	60344	6.1E-02 C	5.7E-03 C	2.9E-03 C	5.2E+00 C	5.8E-01 C
METHYL ISOBUTYL KETONE (4-METHYL-2 PENTANONE)	108101	2.9E+03 N	7.3E+01 N	1.1E+02 N	1.6E+05 N	6.3E+03 N
METHYL METHACRYLATE	80626	1.4E+03 N	7.3E+02 N	1.9E+03 N	2.9E+06 N	1.1E+05 N
2-METHYL-5-NITROANILINE	99558	2.0E+00 C	1.9E-01 C	9.6E-02 C	1.7E+02 C	1.9E+01 C
METHYL PARATHION	298000	9.1E+00 N	9.1E-01 N	3.4E-01 N	5.1E+02 N	2.0E+01 N
2-METHYLPHENOL	95487	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
3-METHYLPHENOL	108394	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
4-METHYLPHENOL	106445	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
METHYLSTYRENE MIX	25013154	5.5E+01 N	3.7E+01 N	8.1E+00 N	1.2E+04 N	4.7E+02 N
ALPHA-METHYLSTYRENE	98839	4.3E+02 N	2.6E+02 N	9.5E+01 N	1.4E+05 N	5.5E+03 N
METHYL TERT-BUTYL ETHER	1634044	6.3E+03 N	3.1E+03 N			
METOLACHLOR (DUAL)	51218452	5.5E+03 N	5.5E+02 N	2.0E+02 N	3.1E+05 N	1.2E+04 N
MIREX	2385855	1.2E+00 N	7.3E-01 N	2.7E-01 N	4.1E+02 N	1.6E+01 N
MOLYBDENUM	7439987	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
MONOCHLORAMINE	10599903	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
NALED	300765	7.3E+01 N	7.3E+00 N	2.7E+00 N	4.1E+03 N	1.6E+02 N
NICKEL REFINERY DUST			7.5E-03 C			
NICKEL	7440020	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
NITRATE	14797558	5.8E+04 N	5.8E+03 N	2.2E+03 N	3.3E+06 N	1.3E+05 N
NITRIC OXIDE	10102439	6.1E+02 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
NITRITE	14797650	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
2-NITROANILINE	88744		2.1E-01 N			
**NITROBENZENE	98953	3.5E+00 N	2.2E+00 N	6.8E-01 N	1.0E+03 N	3.9E+01 N
NITROFURANTOIN	67209	2.6E+03 N	2.6E+02 N	9.5E+01 N	1.4E+05 N	5.5E+03 N
NITROFURAZONE	59870	4.5E-02 C	4.2E-03 C	2.1E-03 C	3.8E+00 C	4.3E-01 C
NITROGEN DIOXIDE	10102440	6.1E+03 N	3.7E+03 N	1.4E+03 N	2.0E+06 N	7.8E+04 N
**NITROGLYCERIN	55630	4.8E+00 C	4.5E-01 C	2.3E-01 C	4.1E+02 C	4.6E+01 C
4-NITROPHENOL	100027	2.9E+02 N	2.9E+01 N	1.1E+01 N	1.6E+04 N	6.3E+02 N
**2-NITROPROPANE	79469	1.3E-03 C	6.7E-04 C			
N-NITROSO-DI-N-BUTYLAMINE	924163	*1.2E-02 C*	*1.1E-03 C*	*5.8E-04 C*	*1.1E+00 C*	*1.2E-01 C*
N-NITROSODIETHANOLAMINE	1116547	2.4E-02 C	2.2E-03 C	1.1E-03 C	2.0E+00 C	2.3E-01 C
N-NITROSODIETHYLAMINE	55185	4.5E-04 C	4.2E-05 C	2.1E-05 C	3.8E-02 C	4.3E-03 C
N-NITROSODIMETHYLAMINE	62759	1.3E-03 C	1.2E-04 C	6.2E-05 C	1.1E-01 C	1.3E-02 C
N-NITROSODIPHENYLAMINE	86306	1.4E+01 C	1.3E+00 C	6.4E-01 C	1.2E+03 C	1.3E+02 C
N-NITROSODIPROPYLAMINE	621647	9.6E-03 C	8.9E-04 C	4.5E-04 C	8.2E-01 C	9.1E-02 C
N-NITROSO-N-ETHYLUREA	759739	4.8E-04 C	4.5E-05 C	2.3E-05 C	4.1E-02 C	4.6E-03 C
N-NITROSO-N-METHYLETHYLAMINE	10595956	3.0E-03 C	2.8E-04 C	1.4E-04 C	2.6E-01 C	2.9E-02 C
N-NITROSOPYRROLIDINE	930552	3.2E-02 C	3.0E-03 C	1.5E-03 C	2.7E+00 C	3.0E-01 C
M-NITROTOLUENE	99081	1.2E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
O-NITROTOLUENE	88722	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
P-NITROTOLUENE	99990	6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
**NUSTAR	85509199	2.6E+00 N	2.6E+00 N	9.5E-01 N	1.4E+03 N	5.5E+01 N
ORYZALIN	19044883	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
OXADIAZON	19666309	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
OXAMYL	23135220	9.1E+02 N	9.1E+01 N	3.4E+01 N	5.1E+04 N	2.0E+03 N
OXYFLUORFEN	42874033	1.1E+02 N	1.1E+01 N	4.1E+00 N	6.1E+03 N	2.3E+02 N
PARAQUAT DICHLORIDE	1910425	1.6E+02 N	1.6E+01 N	6.1E+00 N	9.2E+03 N	3.5E+02 N
PARATHION	56382	2.2E+02 N	2.2E+01 N	8.1E+00 N	1.2E+04 N	4.7E+02 N
PENTACHLOROBENZENE	608935	4.9E+00 N	2.9E+00 N	1.1E+00 N	1.6E+03 N	6.3E+01 N
PENTACHLORONITROBENZENE	82688	4.1E-02 C	2.4E-02 C	1.2E-02 C	2.2E+01 C	2.5E+00 C
PENTACHLOROPHENOL	87865	5.6E-01 C	5.2E-02 C	2.6E-02 C	4.8E+01 C	5.3E+00 C
PERMETHRIN	52645531	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
PHENOL	108952	2.2E+04 N	2.2E+03 N	8.1E+02 N	1.2E+06 N	4.7E+04 N
M-PHENYLENEDIAMINE	108452	2.2E+02 N	2.2E+01 N	8.1E+00 N	1.2E+04 N	4.7E+02 N
O-PHENYLENEDIAMINE	95545	1.4E+00 C	1.3E-01 C	6.7E-02 C	1.2E+02 C	1.4E+01 C
P-PHENYLENEDIAMINE	106503	6.9E+03 N	6.9E+02 N	2.6E+02 N	3.9E+05 N	1.5E+04 N
2-PHENYLPHENOL	90437	3.5E+03 C	3.3E+00 C	1.7E+00 C	3.0E+03 C	3.4E+02 C
PHOSPHINE	7803512	1.1E+01 N	3.1E-01 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
PHOSPHORIC ACID	7664382		1.1E+01 N			
PHOSPHORUS (WHITE)	7723140	7.3E-01 N	7.3E-02 N	2.7E-02 N	4.1E+01 N	1.6E+00 N
P-PHTHALIC ACID	100210	3.7E+04 N	3.7E+03 N	1.4E+03 N	2.0E+06 N	7.8E+04 N
PHTHALIC ANHYDRIDE	85449	7.3E+04 N	1.3E+02 N	2.7E+03 N	4.1E+06 N	1.6E+05 N
POLYBROMINATED BIPHENYLS		7.5E-03 C	7.0E-04 C	3.5E-04 C	6.4E-01 C	7.2E-02 C*
POLYCHLORINATED BIPHENYLS	1336363	3.3E-02 C	3.1E-03 C	1.6E-03 C	2.9E+00 C	3.2E-01 C
AROCLOR-1016	12674112	9.6E-01 C*	8.9E-02 C*	4.5E-02 C*	8.2E+01 C*	5.5E+00 N
AROCLOR-1221	11104282	3.3E-02 C	3.1E-03 C	1.6E-03 C	2.9E+00 C	3.2E-01 C
AROCLOR-1232	11141165	3.3E-02 C	3.1E-03 C	1.6E-03 C	2.9E+00 C	3.2E-01 C
AROCLOR-1242	53469219	3.3E-02 C	3.1E-03 C	1.6E-03 C	2.9E+00 C	3.2E-01 C
AROCLOR-1248	12672296	3.3E-02 C	3.1E-03 C	1.6E-03 C	2.9E+00 C	3.2E-01 C
AROCLOR-1254	11097691	3.3E-02 C	3.1E-03 C	1.6E-03 C	2.9E+00 C	3.2E-01 C*
AROCLOR-1260	11096825	3.3E-02 C	3.1E-03 C	1.6E-03 C	2.9E+00 C	3.2E-01 C
POLYCHLORINATED TERPHENYLS	61788338	1.5E-02 C	1.4E-03 C	7.0E-04 C	1.3E+00 C	1.4E-01 C
POLYNUCLEAR AROMATIC HYDROCARBONS						
ACENAPHTHENE	83329	2.2E+03 N	2.2E+02 N	8.1E+01 N	1.2E+05 N	4.7E+03 N
ANTHRACENE	120127	1.1E+04 N	1.1E+03 N	4.1E+02 N	6.1E+05 N	2.3E+04 N
BENZ[A]ANTHRACENE	56553	9.2E-02 C	8.6E-03 C	4.3E-03 C	7.8E+00 C	8.7E-01 C
BENZO[B]FLUORANTHENE	205992	9.2E-02 C	8.6E-03 C	4.3E-03 C	7.8E+00 C	8.7E-01 C
BENZO[K]FLUORANTHENE	207089	9.2E-01 C	8.6E-02 C	4.3E-02 C	7.8E+01 C	8.7E+00 C
BENZO[A]PYRENE	50328	9.2E-03 C	2.0E-03 C	4.3E-04 C	7.8E-01 C	8.7E-02 C
CARBAZOLE	86748	3.3E+00 C	3.1E-01 C	1.6E-01 C	2.9E+02 C	3.2E+01 C
CHRYSENE	218019	9.2E+00 C	8.6E-01 C	4.3E-01 C	7.8E+02 C	8.7E+01 C
DIBENZ[A,H]ANTHRACENE	53703	9.2E-03 C	8.6E-04 C	4.3E-04 C	7.8E-01 C	8.7E-02 C
**DIBENZOFURAN	132649	2.4E+01 N	1.5E+01 N	5.4E+00 N	8.2E+03 N	3.1E+02 N
FLUORANTHENE	206440	1.5E+03 N	1.5E+02 N	5.4E+01 N	8.2E+04 N	3.1E+03 N
FLUORENE	86737	1.5E+03 N	1.5E+02 N	5.4E+01 N	8.2E+04 N	3.1E+03 N
INDENO[1,2,3-C,D]PYRENE	193395	9.2E-02 C	8.6E-03 C	4.3E-03 C	7.8E+00 C	8.7E-01 C
**2-METHYLNAPHTHALENE	91576	1.2E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
***NAPHTHALENE*	91203	7.3E+02 N	3.3E+00 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
PYRENE	129000	1.1E+03 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
PROMETON	1610180	5.5E+02 N	5.5E+01 N	2.0E+01 N	3.1E+04 N	1.2E+03 N
PROMETRYN	7287196	1.5E+02 N	1.5E+01 N	5.4E+00 N	8.2E+03 N	3.1E+02 N
PROPACHLOR	1918167	4.7E+02 N	4.7E+01 N	1.8E+01 N	2.7E+04 N	1.0E+03 N
PROPANIL	709988	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
PROPARGITE	2312358	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
N-PROPYLBENZENE		6.1E+01 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
PROPYLENE GLYCOL	57556	7.3E+05 N	7.3E+04 N	2.7E+04 N	4.1E+07 N	1.6E+06 N
PROPYLENE GLYCOL, MONOETHYL ETHER	52125538	2.6E+04 N	2.6E+03 N	9.5E+02 N	1.4E+06 N	5.5E+04 N
PROPYLENE GLYCOL, MONOMETHYL ETHER	107982	2.6E+04 N	2.1E+03 N	9.5E+02 N	1.4E+06 N	5.5E+04 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
PURSUIT	81335775	9.1E+03 N	9.1E+02 N	3.4E+02 N	5.1E+05 N	2.0E+04 N
PYRIDINE	110861	3.7E+01 N	3.7E+00 N	1.4E+00 N	2.0E+03 N	7.8E+01 N
QUINOLINE	91225	5.6E-03 C	5.2E-04 C	2.6E-04 C	4.8E-01 C	5.3E-02 C
RDX	121824	6.1E-01 C	5.7E-02 C	2.9E-02 C	5.2E+01 C	5.8E+00 C
RESMETHRIN	10453868	1.1E+03 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
**RONNEL	299843	3.0E+02 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
ROTENONE	83794	1.5E+02 N	1.5E+01 N	5.4E+00 N	8.2E+03 N	3.1E+02 N
SELENIOUS ACID	7783008	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
SELENIUM	7782492	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
SILVER	7440224	1.8E+02 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
SIMAZINE	122349	5.6E-01 C	5.2E-02 C	2.6E-02 C	4.8E+01 C	5.3E+00 C
SODIUM AZIDE	26628228	1.5E+02 N	1.5E+01 N	5.4E+00 N	8.2E+03 N	3.1E+02 N
SODIUM DIETHYLDITHIOCARBAMATE	148185	2.5E-01 C	2.3E-02 C	1.2E-02 C	2.1E+01 C	2.4E+00 C
STRONTIUM, STABLE	7440246	2.2E+04 N	2.2E+03 N	8.1E+02 N	1.2E+06 N	4.7E+04 N
STRYCHNINE	57249	1.1E+01 N	1.1E+00 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
STYRENE	100425	1.6E+03 N	1.0E+03 N	2.7E+02 N	4.1E+05 N	1.6E+04 N
2,3,7,8-TETRACHLORODIBENZODIOXIN	*1746016*	*4.5E-07 C*	*4.2E-08 C*	*2.1E-08 C*	*3.8E-05 C*	*4.3E-06 C*
1,2,4,5-TETRACHLOROBENZENE	95943	1.8E+00 N	1.1E+00 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
1,1,1,2-TETRACHLOROETHANE	630206	4.1E-01 C	2.4E-01 C	1.2E-01 C	2.2E+02 C	2.5E+01 C
**1,1,2,2-TETRACHLOROETHANE	79345	5.3E-02 C	3.1E-02 C	1.6E-02 C	2.9E+01 C	3.2E+00 C
TETRACHLOROETHENE	127184	1.1E+00 C	3.1E+00 C	6.1E-02 C	1.1E+02 C	1.2E+01 C
2,3,4,6-TETRACHLOROPHENOL	58902	1.1E+03 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
P,A,A,A-TETRACHLOROTOLUENE	5216251	5.3E-04 C	3.1E-04 C	1.6E-04 C	2.9E-01 C	3.2E-02 C
1,1,1,2-TETRAFLUOROETHANE	811972	1.7E+05 N	8.4E+04 N			
TETRYL	479458	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
THALLIC OXIDE	1314325	2.6E+00 N	2.6E-01 N	9.5E-02 N	1.4E+02 N	5.5E+00 N
THALLIUM	7440280	2.6E+00 N	2.6E-01 N	9.5E-02 N	1.4E+02 N	5.5E+00 N
THALLIUM ACETATE	563688	3.3E+00 N	3.3E-01 N	1.2E-01 N	1.8E+02 N	7.0E+00 N
THALLIUM CARBONATE	*6533739*	*2.9E+00 N*	*2.9E-01 N*	*1.1E-01 N*	*1.6E+02 N*	*6.3E+00 N*
THALLIUM CHLORIDE	7791120	2.9E+00 N	2.9E-01 N	1.1E-01 N	1.6E+02 N	6.3E+00 N
THALLIUM NITRATE	10102451	3.3E+00 N	3.3E-01 N	1.2E-01 N	1.8E+02 N	7.0E+00 N
THALLIUM SULFATE (2:1)	7446186	2.9E+00 N	2.9E-01 N	1.1E-01 N	1.6E+02 N	6.3E+00 N
THIOBENCARB	28249776	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
TIN	7440315	2.2E+04 N	2.2E+03 N	8.1E+02 N	1.2E+06 N	4.7E+04 N
TITANIUM	7440326	1.5E+05 N	3.1E+01 N	5.4E+03 N	8.2E+06 N	3.1E+05 N
TITANIUM DIOXIDE	13463677	1.5E+05 N	3.1E+01 N	5.4E+03 N	8.2E+06 N	3.1E+05 N
TOLUENE	108883	7.5E+02 N	4.2E+02 N	2.7E+02 N	4.1E+05 N	1.6E+04 N
TOLUENE-2,4-DIAMINE	95807	2.1E-02 C	2.0E-03 C	9.9E-04 C	1.8E+00 C	2.0E-01 C
TOLUENE-2,5-DIAMINE	95705	2.2E+04 N	2.2E+03 N	8.1E+02 N	1.2E+06 N	4.7E+04 N
TOLUENE-2,6-DIAMINE	823405	7.3E+03 N	7.3E+02 N	2.7E+02 N	4.1E+05 N	1.6E+04 N
P-TOLUIDINE	106490	3.5E-01 C	3.3E-02 C	1.7E-02 C	3.0E+01 C	3.4E+00 C
**TOXAPHENE	8001352	9.6E-03 C	5.7E-03 C	2.9E-03 C	5.2E+00 C	5.8E-01 C
1,2,4-TRIBROMOBENZENE	615543	3.0E+01 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
TRIBUTYLTIN OXIDE	56359	1.1E+01 N	1.1E+00 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
2,4,6-TRICHLOROANILINE	634935	2.0E+00 C	1.8E-01 C	9.3E-02 C	1.7E+02 C	1.9E+01 C
1,2,4-TRICHLOROBENZENE	120821	1.9E+02 N	2.1E+02 N	1.4E+01 N	2.0E+04 N	7.8E+02 N

TABLE 1-1 (continued)
EPA REGION III RISK-BASED CONCENTRATIONS
(JANUARY 1999)

Chemical	CAS	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg
1,1,1-TRICHLOROETHANE	71556	5.4E+02 N	1.0E+03 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
1,1,2-TRICHLOROETHANE	79005	1.9E-01 C	1.1E-01 C	5.5E-02 C	1.0E+02 C	1.1E+01 C
TRICHLOROETHENE	79016	1.6E+00 C	1.0E+00 C	2.9E-01 C	5.2E+02 C	5.8E+01 C [1]
TRICHLOROFLUOROMETHANE	75694	1.3E+03 N	7.3E+02 N	4.1E+02 N	6.1E+05 N	2.3E+04 N
2,4,5-TRICHLOROPHENOL	95954	3.7E+03 N	3.7E+02 N	1.4E+02 N	2.0E+05 N	7.8E+03 N
2,4,6-TRICHLOROPHENOL	88062	6.1E+00 C	6.3E-01 C	2.9E-01 C	5.2E+02 C	5.8E+01 C
2,4,5-T	93765	3.7E+02 N	3.7E+01 N	1.4E+01 N	2.0E+04 N	7.8E+02 N
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID	93721	2.9E+02 N	2.9E+01 N	1.1E+01 N	1.6E+04 N	6.3E+02 N
1,1,2-TRICHLOROPROPANE	598776	3.0E+01 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
1,2,3-TRICHLOROPROPANE	96184	1.5E-03 C	8.9E-04 C	4.5E-04 C	8.2E-01 C	9.1E-02 C
1,2,3-TRICHLOROPROPENE	96195	3.0E+01 N	1.8E+01 N	6.8E+00 N	1.0E+04 N	3.9E+02 N
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76131	5.9E+04 N	3.1E+04 N	4.1E+04 N	6.1E+07 N	2.3E+06 N
1,2,4-TRIMETHYLBENZENE	95636	1.2E+01 N	6.2E+00 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
1,3,5-TRIMETHYLBENZENE	108678	1.2E+01 N	6.2E+00 N	6.8E+01 N	1.0E+05 N	3.9E+03 N
TRIMETHYL PHOSPHATE	512561	1.8E+00 C	1.7E-01 C	8.5E-02 C	1.5E+02 C	1.7E+01 C
1,3,5-TRINITROBENZENE	99354	1.1E+03 N	1.1E+02 N	4.1E+01 N	6.1E+04 N	2.3E+03 N
2,4,6-TRINITROTOLUENE	118967	2.2E+00 C [1]	2.1E-01 C [1]	1.1E-01 C [1]	1.9E+02 C [1]	2.1E+01 C [1]
URANIUM (SOLUBLE SALTS)		1.1E+02 N	1.1E+01 N	4.1E+00 N	6.1E+03 N	2.3E+02 N
VANADIUM	7440622	2.6E+02 N	2.6E+01 N	9.5E+00 N	1.4E+04 N	5.5E+02 N
VANADIUM PENTOXIDE	1314621	3.3E+02 N	3.3E+01 N	1.2E+01 N	1.8E+04 N	7.0E+02 N
VANADIUM SULFATE	16785812	7.3E+02 N	7.3E+01 N	2.7E+01 N	4.1E+04 N	1.6E+03 N
VINCLOZOLIN	50471448	9.1E+02 N	9.1E+01 N	3.4E+01 N	5.1E+04 N	2.0E+03 N
VINYL ACETATE	108054	4.1E+02 N	2.1E+02 N	1.4E+03 N	2.0E+06 N	7.8E+04 N
VINYL CHLORIDE	75014	1.9E-02 C	2.1E-02 C	1.7E-03 C	3.0E+00 C	3.4E-01 C
WARFARIN	81812	1.1E+01 N	1.1E+00 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
M-XYLENE	108383	1.2E+04 N	7.3E+03 N	2.7E+03 N	4.1E+06 N	1.6E+05 N
O-XYLENE	95476	1.2E+04 N	7.3E+03 N	2.7E+03 N	4.1E+06 N	1.6E+05 N
P-XYLENE	106423					
XYLENES	1330207	1.2E+04 N	7.3E+03 N	2.7E+03 N	4.1E+06 N	1.6E+05 N
ZINC	7440666	1.1E+04 N	1.1E+03 N	4.1E+02 N	6.1E+05 N	2.3E+04 N
ZINC PHOSPHIDE	1314847	1.1E+01 N	1.1E+00 N	4.1E-01 N	6.1E+02 N	2.3E+01 N
ZINEB	12122677	1.8E+03 N	1.8E+02 N	6.8E+01 N	1.0E+05 N	3.9E+03 N

Key:

Sources:
I = IRIS
H = HEAST
A = HEAST Alternate
W = Withdrawn from IRIS or HEAST
E = EPA-NCEA provisional value
O = other

Basis: Risk-based concentrations
C = Carcinogenic effects
N = Noncarcinogenic effects
[1] = RBC at HI of 0.1 < RBC-c

The January 1999 revisions to 18 AAC 75 provides four options for setting soil cleanup criteria:

- Method 1 is the ADEC matrix criteria that have been used in the past for petroleum contamination. The revised regulation add criteria to polynuclear aromatic hydrocarbons (PAH) and revise BTEX criteria. The ADEC matrix criteria are presented in Table 1-2.

- Method 2 sets numerical cleanup criteria for ranges of petroleum constituents (RRO, DRO and GRO), individual petroleum constituents (e.g., benzene, toluene, ethylbenzene and xylenes (BTEX) and PAH) and other common contaminants (e.g., solvents, metals) in soil and water. The criteria are set for three different geographical zones (i.e., arctic, over 40 inches rainfall per year and under 40 inches per year) and three exposure pathways (i.e., inhalation, ingestion, and migration to groundwater). Northeast Cape falls in the zone under 40 inches of precipitation. The cleanup criteria for constituents in soil and water, under 40 inches rainfall zone, are presented in Table 1-3. The under-40-inches-rainfall-per-year zone cleanup criteria for constituents in soil are presented in Table 1-3. Method 2 requires calculation of cumulative risk for chemicals detected at concentrations 1/10th of the cleanup table levels.

- Method 3 provides a method to modify the cleanup criteria in Method 2 using site-specific factors such as total organic carbon, grain size and bulk soil density. This method requires calculation of cumulative risk for chemicals detected at 1/10th the cleanup table level.

- Method 4 provides a method for performing a site-specific risk assessment.

Groundwater cleanup criteria are identified in 18 AAC 75.345, Table C and are shown in Table 1-4 of this report. At this time, ADEC considers groundwater to be a potential drinking water source. This document uses a combination of ADEC Method 1, 2 and 3 as cleanup criteria. For sites where contaminant levels fall below the ADEC matrix levels, Method 1 criteria are used to support a recommendation for no further action. For sites where petroleum levels exceed the ADEC matrix levels, Method 2 criteria are used. If Method 2 criteria are exceeded, site-specific information is used to develop cleanup criteria in accordance with Method 3 procedures, and these site-specific criteria are used to assess the need for cleanup.

The revised 18 AAC 75 regulations refer to site-specific cleanup levels for PCB, dioxin and lead. Site-specific levels for these three constituents are discussed and proposed below.

The 18 AAC 75 regulations state that PCB cleanup standards are determined on a site-specific basis under the U.S. Environmental Protection Agency (EPA) Spill Cleanup Policy (40 CFR 761.120- 40 CFR 761.135) or by a site-specific risk assessment. The EPA Spill Cleanup Policy is applicable to recent PCB releases. On June 29, 1998, EPA released a final rule significantly amending PCB regulations. Consistent with the EPA Spill Cleanup Policy, this rule, effective August 28, 1998, creates a new section in the Toxic Substance Control Act (TSCA) regulations that specifies disposal requirements for remediation wastes (40 CFR 761.61). Remediation wastes are defined under the regulation to include soil, rags, sediments, and debris contaminated by a spill of PCB. The rule allows for a choice between three remediation waste disposal approaches:

TABLE 1-2
PROPOSED SOIL CLEANUP CRITERIA, ADEC METHOD 1

		Points	Sites 9-22, 27, 28, 29	Sites 1-8, 23-26
1.	**Depth to Subsurface Water**			
	<5 feet	(10)		
	5 - 15 feet	(8)	8	8
	15 - 25 feet	(6)		
	25 - 50 feet	(4)		
	>50 feet	(1)		
2.	**Mean Annual Precipitation**			
	>40 inches	(10)		
	25 - 40 inches	(5)		
	15 - 25 inches	(3)	3	3
	<15 inches	(1)		
3.	**Soil Type**			
	clean, coarse-grained soils	(10)		
	coarse-grained soils with fines	(8)	8	8
	fine-grained soils (low organic carbon)	(3)		
	fine-grained soils (high organic carbon)	(1)		
4.	**Potential Receptors**			
	public well within 1,000 feet, or private well(s) within 500 feet	(15)	15	
	municipal/private well within 1/2 mile	(12)		
	municipal/private well within 1 mile	(8)		
	no known well within 1/2 mile	(6)		
	no known well within 1 mile	(4)		4
	non-potable groundwater	(1)		
5.	**Volume of Contaminated Soil**			
	>500 cubic yards	(10)	10	
	100 - 500 cubic yards	(8)		
	25 - 100 cubic yards	(5)		
	>De Minimis - 25 cubic yards	(2)		2
	De Minimis	(0)		
	Matrix Score		44	25
	Matrix Level		A	C
	ADEC Site Cleanup Level Estimate (mg/Kg)	**RRO**	2,000	2,000
		DRO	100	1,000
		GRO	50	500

Cleanup Level Estimate in mg/Kg

Matrix Score		Diesel: Diesel-Range Petroleum Hydrocarbons	Gasoline/Unknown: Gasoline-Range Petroleum Hydrocarbons
Level A	>40	100	50
Level B	27-40	200	100
Level C	21-26	1,000	500
Level D	<20	2,000	1,000

RRO = 2,000 mg/Kg

Source: 18 AAC 75 (revised January 22, 1999)

TABLE 1-3
PROPOSED SOIL CLEANUP CRITERIA, ADEC METHOD 2

Constituent	Under 40 inches rainfall per year			
	Inhalation mg/kg	Ingestion mg/kg	Migration to Groundwater mg/kg	Limiting Level mg/kg
Residual Range Organics (RRO)	22,000	10,000	11,000	10,000
Diesel Range Organics (DRO)	12,500	10,250	250	250
Gasoline Range Organics (GRO)	1,400	1,400	300	300
1,1,1-Trichloroethane	460		1.0	1.0
1,1,2,2-Tetrachloroethane	5	42	0.02	0.02
1,1,2-Trichloroethane	10	150	0.02	0.02
1,1-Dichloroethane	890	10,000	12	12
1,1-Dichloroethene	0.9	14	0.03	0.03
1,2,4-Trichlorobenzene	570	1,000	2	2
1,2-Dichlorobenzene	110	9,100	7	7
1,2-Dichloroethane	5	91	0.02	0.02
1,2-Dichloropropane	17	120	0.02	0.02
1,3-Dichloropropane	2	30	0.02	0.02
1,4-Dichlorobenzene	8,000	350	0.8	0.8
2,4,5-Trichlorophenol		10,000	90	90
2,4,6-Trichlorophenol	1,500	750	0.6	0.6
2,4-Dichlorophenol		300	0.5	0.5
2,4-Dimethylphenol		2,000	4	4
2,4-Dinitrophenol		200	0.2	0.2
2,4-Dinitrotoluene		12	0.3	0.3
2,6-Dinitrotoluene		12	0.1	0.1
2-Chlorophenol		510	1.0	1.0
2-Methylphenol (o-cresol)		5,100	7	7
3,3-Dichlorobenzidine		18	0.02	0.02
Acenaphthene		6,100	210	210
Acetone		10,000	10	10
Aldrin	24	0.5	1.6	0.5
Anthracene		30,000	4,300	4,300
Antimony		41	0.02	0.02
Arsenic		5	0.1	0.1
Barium		7,100	5	5
Benzene	9	290	0.02	0.02
Benzo(a)anthracene		11	6	6
Benzo(a)pyrene		1	3	1
Benzo(b)fluoranthene		11	20	11
Benzo(k)fluoranthene		110	200	110
Benzoic acid		410,000	390	390
Beryllium		1.9	0.01	0.01
Bis(2-chlorethyl)ether	3	8	0.002	0.002
Bis(2-ethylhexyl)phthalate		590	1,200	590
Bromodichloromethane		130	0.4	0.4
Bromoform	500	1,050	0.4	0.4
Butanol		10000	10	10

TABLE 1-3 (continued)
PROPOSED SOIL CLEANUP CRITERIA, ADEC METHOD 2

Constituent	Under 40 inches rainfall per year			
	Inhalation mg/kg	Ingestion mg/kg	Migration to Groundwater mg/kg	Limiting Level mg/kg
Butyl benzyl phthalate		20,000	5,600	5,600
Cadmium		100	0.01	0.01
Carbazole		420	2.0	2.0
Carbon disulfide	120	10,000	17	17
Carbon tetrachloride	3	64	0.03	0.03
Chlordane	140	6	3	3
Chlorobenzene	110	2,000	0.6	0.6
Chlorodibromomethane		100	0.2	0.2
Chloroform	3	1,400	0.3	0.3
Chromium		510	0.3	0.3
Chromium +3		100,000	4,400	4,400
Chromium, Hexavalent		510	0.5	0.5
Chrysene		1,100	620	620
Cyanide		2,000	2	2
DDD		35	47	35
DDE		24	150	24
DDT	5,300	24	88	24
Di-n-butyl phthalate		10,000	1,700	1,700
Di-n-octyl phthalate		2,000	810,000	2,000
Dibenzo(a,h)anthracene		1	6	1
Dieldrin	8	0.5	0.02	0.02
Diethyl phthalate		81,000	90	90
Dimethyl phthalate		10,000,000	1,400	1,400
Endosulfan		610	7	7
Endrin		30	0.3	0.3
Ethylbenzene	89	10,000	6	6
Fluoranthene		4,100	2,100	2,100
Fluorene		4,100	270	270
Heptachlor	0.8	2	8	0.8
Heptachlor epoxide	33	0.9	0.2	0.2
Hexachlorobenzene	7	5	1.0	1.0
Hexachlorobutadiene	55	110	8	8
Hexachlorocyclopentadiene	7	710	130	7
Hexachloroethane	390	590	2	2
Indeno(1,2,3-cd)pyrene		11	54	11
Isophorone		8,700	3	3
Lead		400		400 [a]
Lindane		6	0.003	0.003
Mercury	18		0.006	0.006
Methoxychlor		510	52	52

TABLE 1-3 (continued)
PROPOSED SOIL CLEANUP CRITERIA, ADEC METHOD 2

Constituent	Under 40 inches rainfall per year			
	Inhalation mg/kg	Ingestion mg/kg	Migration to Groundwater mg/kg	Limiting Level mg/kg
Methyl bromide	14	140	0.2	0.2
Methylene chloride	180	1,100	0.02	0.02
Naphthalene		4,100	43	43
Nickel		2000	2	2
Nitrobenzene	90	51	0.06	0.06
Pentachlorophenol		35	0.01	0.01
Phenol		60,800	67	67
Pyrene		3,000	1,500	1,500
Selenium		*510*	*0.1*	*0.1*
Silver		510	0.5	0.5
Styrene	280	20,300	1.0	1.0
Tetrachloroethylene	80	160	0.03	0.03
Toluene	180	20,300	5	5
Toxaphene	620	8	4	4
Tribromomethane	500	1,050	0.4	0.4
Trichloroethylene	43	750	0.02	0.02
Vanadium		710	0.7	0.7
Vinyl Acetate	1,500	101,000	100	100
Vinyl chloride	0.5	4	0.009	0.009
Xylenes	81	203,000	78	78
Zinc		30,000	30	30
alpha-Hexachlorocyclohexane	6	1.3	0.003	0.003
beta-Hexachlorocyclohexane	43	5	0.009	0.009
cis-1,2-Dichloroethene		1,000	0.2	0.2
gamma-Hexachlorocyclohexane		6	0.003	0.003
n-Nitrosodi-n-propylamine		1.2	0.0004	0.0004
n-Nitrosodiphenylamine		1,700	3	3
p-Chloroaniline		410	0.5	0.5
trans-1,2-Dichloroethene		2,000	0.4	0.4

Key:
Blank space indicates that there is no criteria.
[a] Residential soil
Source: 18AAC75

Site-specific criteria

Constituent	Residential mg/Kg	Commercial/Industrial mg/Kg
Dioxin	0.001	--
Lead	400	1,000
PCB (ADEC surface soil)	1	10
PCB (ADEC subsurface soil)	10	25
PCB (Federal)	25 (low occupancy)	

TABLE 1-4
PROPOSED GROUNDWATER AND SURFACE WATER CLEANUP CRITERIA

Constituent	Groundwater 18AAC75[a] mg/L	Surface Water 18AAC70[b] mg/L
1,1,1,2-Tetrachloroethane	0.004	
1,1,1-Trichloroethane	0.2	0.200
1,1,2-Trichloroethane	0.005	9.400
1,1-Dichloroethane	3.7	
1,1-Dichloroethene	0.007	0.007
1,2,4-Trichlorobenzene	0.07	
1,2-Dichlorobenzene	0.6	0.763
1,2-Dichloroethane	0.005	0.005
1,2-Dichloropropane	0.005	
1,3-Dichloropropene	0.005	
1,3-Hexachlorobutadiene	0.01	
1,4-Dichlorobenzene	0.075	0.075
2,4,5-Trichlorophenol	3.7	
2,4,6-Trichlorophenol	0.08	0.970
2,4-Dichlorophenol	0.1	0.365
2,4-Dimethylphenol	0.7	2.12
2,4-Dinitrophenol	0.07	
2,4-Dinitrotoluene	0.07	0.230
2,6-Dinitrotoluene	0.04	
2-Chlorophenol	0.2	2
3,3-Dichlorobenzidine	0.002	
Acenaphthene	2.2	0.520
Acetone	3.7	
Aldrin	0.00005	0.003
Anthracene	11	0.010[d]
Antimony	0.006	1.6
Arsenic	0.05	0.050
Barium	2	1
Benzene	0.005	0.005
Benzo(a)anthracene	0.001	0.010[d]
Benzo(a)pyrene	0.0002	0.010[d]
Benzo(b)fluoranthene	0.001	0.010[d]
Benzo(k)fluoranthene	0.01	0.010[d]
Benzoic acid	146	
Beryllium	0.004	0.0053
Bis(2-chloroethyl)ether	0.0008	
Bis(2-ethylhexyl)phthalate	0.006	
Bromodichloromethane	0.1	
Bromoform	0.1	
Butanol	3.7	
Butyl benzyl phthalate	7.3	
Cadmium	0.005	0.0066[c]

TABLE 1-4 (continued)
PROPOSED GROUNDWATER AND SURFACE WATER CLEANUP CRITERIA

Constituent	Groundwater 18AAC75[a] mg/L	Surface Water 18AAC70[b] mg/L
Carbazole	0.04	
Carbon disulfide	3.7	
Carbon tetrachloride	0.005	0.005
Chlordane	0.002	0.0000043
Chlorobenzene	0.1	0.050
Chlorodibromomethane	0.06	
Chloroethene	0.002	
Chloroform	0.1	1.24
Chromium	0.1	
Chromium +3	36.5	0.12[c]
Chromium, Hexavalent	0.1	0.011
Chrysene	0.1	0.010[d]
Copper	1.3	0.00065[c]
Cyanide	0.2	0.0052
DDD	0.004	0.0006
DDE	0.003	1.05
DDT	0.003	0.000001
Di-n-butyl phthalate	3.7	
Di-n-octyl phthalate	0.7	
Dibenzo(a,h)anthracene	0.0001	0.010[d]
Dieldrin	0.00005	0.0000019
Diesel Range Organics	1.5	
Diethyl phthalate	29	
Dioxin	0.00000003	0.00000001
Endosulfan	0.2	0.000056
Endrin	0.002	0.0000023
Ethylbenzene	0.7	32
Fluoranthene	1.5	3.98
Fluorene	1.5	0.010[d]
Gasoline Range Organics	1.3	
Heptachlor	0.0004	0.0000038
Heptachlor Epoxide	0.0002	
Hexachlorobenzene	0.001	
Hexachlorocyclopentadiene	0.05	0.0052
Hexachloroethane	0.06	0.54
Indeno(1,2,3-cd)pyrene	0.001	0.010[d]
Isophorone	0.9	117
Lead	0.015	0.0013[c]
Lindane	0.0002	0.00008
Mercury	0.002	0.000012
Methoxychlor	0.04	0.00003
Methyl bromide	0.05	
Methylene chloride	0.005	

TABLE 1-4 (continued)
PROPOSED GROUNDWATER AND SURFACE WATER CLEANUP CRITERIA

Constituent	Groundwater 18AAC75[a] mg/L	Surface Water 18AAC70[b] mg/L
Methylphenol (o-cresol)	1.8	
Naphthalene	1.5	0.620
Nickel	0.7	0.056
Nitrobenzene	0.02	27
Pentachlorophenol	0.001	0.0032
Phenol	22	2.56
Polychlorinated biphenyls (PCBs)	0.0005	0.000014
Pyrene	1.1	0.010[d]
Residual Range Organics	1.1	
Selenium	0.05	
Silver	0.2	0.00012
Styrene	0.1	
Tetrachloroethylene	0.005	0.840
Thallium	0.002	0.040
Toluene	1	0.010[d]
Total aqueous hydrocarbons (TaqH)		0.015
Total aromatic hydrocarbons (TAH)		0.010
Toxaphene	0.003	0.000013
Tribromomethane	0.1	
Trichloroethylene	0.005	0.005
Vanadium	0.3	
Vinyl Acetate	37	
Vinyl chloride	0.002	0.002
Xylenes	10	0.010[d]
Zinc	11	0.047
alpha-Hexachlorocyclohexane	0.0001	
beta-Hexachlorocyclohexane	0.0005	
cis-1,2-Dichloroethene	0.07	
gamma-Hexachlorocyclohexane	0.0002	
n-Nitrosodi-n-propylamine	0.0001	
n-Nitrosodiphenylamine	0.2	
p-Chloroaniline	0.1	
trans-1,2-Dichloroethene	0.1	

Key:

[a] 18 AAC 75

[b] 18 AAC 70, Freshwater Criteria

[c] At 50 mg/L $CaCO_3$

[d] Total aromatic hydrocarbons

Notes: TaqH = BTEX and PAH

TAH = BTEX

Self-implementing disposal requires 30-day advance notification to EPA of the cleanup. Self-implementing disposal criteria are based on two exposure scenarios, high-occupancy and low-occupancy, and up to four remediation options. The high-occupancy scenario assumes an unprotected individual occupies the area for more than 335 hours per year. The low-occupancy area assumes the area is occupied less than 335 hours per year. The low-occupancy criteria were selected for Northeast Cape because the area is covered by snow or ice most of the year (eliminating the exposure pathway) and traversed infrequently by local residents during the time the ground is exposed.

Remediation options and cleanup criteria for the low-occupancy scenario are shown in Table 1-5 below.

TABLE 1-5
PCB REMEDIATION WASTE CLEANUP CRITERIA
SELF-IMPLEMENTING DISPOSAL

Low-Occupancy

Cleanup/Disposal Method	Bulk PCB Remediation Waste Cleanup Level
Remove and dispose or decontaminate all wastes at concentrations greater than 25 ppm PCB	Less than or equal to 25 ppm PCB
On-site solvent extraction of PCB from remediation waste	Less than or equal to 25 ppm PCB
Secure site with fencing posted with a PCB warning sign	Less than or equal to 50 ppm PCB
Cap wastes on-site 10-inch thick soil cap for soils >1 but <10 ppm PCB. Alternative is a 6-inch concrete or asphalt cap meeting the design and monitoring requirements in Toxic Substance Control Act (TSCA) and Resource Conservation and Recovery Act (RCRA).	Less than or equal to 100 ppm PCB

In addition to the on-site cleanup options listed above, bulk PCB remediation wastes with less than 50 ppm PCB can be sent to a state-permitted lined, Class I non-hazardous waste landfill without the notification and manifesting requirements of Subpart K. However, the landfill permit may restrict the concentrations of PCB further and/or the landfill may choose to reject the waste.

The State of Alaska PCB cleanup criteria (18 AAC 75.341(c)) are more stringent than federal standards. State of Alaska cleanup levels for unrestricted land use are less than 1 mg/Kg in surface soil (top two feet) and less than 10 mg/Kg for subsurface soil. For industrial or commercial land use, the levels are 10 mg/Kg in surface soil and less than 25 mg/Kg in subsurface soil. Assumptions based on limited future land use require landowner consent and may require institutional controls (18 AAC 75.340(e)(3)).

In this report, State of Alaska criteria of 1 mg/Kg PCB in soil are used to identify potential contaminants of potential concern in soil. The Feasibility Study and/or future reports will identify proposed cleanup levels.

The 18 AAC 75 regulations state that dioxin cleanup standards are determined on a site-specific basis. In the past, ADEC has used EPA's Nation Dioxin Study (EPA/440/4-87-003) as precedent for developing site-specific cleanup levels for dioxins within the State of Alaska (ADEC, 1994). This document proposes a cleanup goal of 1 micrograms per kilogram (μg/Kg) of 2,3,7,8-TCDD in soil except in areas used to graze livestock. Site-specific factors could be used to further refine this number.

The 18 AAC 75 regulations state that lead cleanup standards be determined on a site-specific basis based on land use. The residential cleanup standard is 400 milligrams per kilogram (mg/Kg) lead in soil, while the industrial or commercial standard is 1,000 mg/Kg. On a site-specific basis, approved exposure models can be used to evaluate exposure. Alternative cleanup standards can also be proposed based on the speciation of lead present at the site. The site-specific level proposed for this site is 400 mg/Kg (i.e., residential use). Although residential use is not anticipated and is very conservative for this site, lead is not a major contaminant at the installation, and the conservative benchmark is not anticipated to result in additional remediation.

Water and gravel and/or tundra samples were collected from ephemeral ponds at many sites. These samples have always been referred to as surface water and sediment samples. However, the surface water at Sites 1 through 27 consist only of ephemeral ponds or puddles that dry up and reappear at other locations over the course of the short summer season. Due to their transient nature, they do not support fish. Therefore, the "sediments" are more accurately evaluated as soils. In this report, soil cleanup criteria are used to evaluate "sediments" collected from ephemeral ponds and puddles.

Sediments collected at Site 28, the Drainage Basin; Site 29, Suqi River; and Site 30, Background (Reference Creek) are properly referred to as sediments, because they are part of permanent drainage and could potentially support fish. No numerical sediment criteria are identified for the site at this time. Criteria will be developed in conjunction with the biological sampling planned for July 1999. The Screening Quick Reference Tables (SQUIRT) published by the National Oceanographic and Atmospheric Organization (NOAA) are used to provide some insight into which chemicals may be contaminants of concern at Site 28 and 29.

Tundra. Generalized numerical cleanup levels for contamination in tundra are not provided in the January 1999 revision of the regulations. Tundra cleanup levels are determined on a site-specific basis. Cleanup decisions are based on the potential adverse impact to the environment as a result of remedial activity. Factors that contribute to a decision on cleanup levels include whether there is permafrost below the tundra, thickness of permafrost, whether groundwater is present, whether downgradient surface water receptors are being impacted and whether the contamination is migrating through surface or subsurface soil. ADEC recognizes that excavation of tundra is typically undesirable because of the impact on permafrost and because tundra typically does not regrow after excavation.

1.4.3 Waste Disposal

Prior to disposal, wastes are characterized as hazardous or non-hazardous wastes in accordance with the Resource Conservation and Recovery Act (RCRA) regulations (40 CFR 261). Discarded commercial chemical products, off-specification products, container residues, and spill residues listed in 40 CFR 261.33 are designated as hazardous wastes. Wastes from non-specific and specific sources and listed in 40 CFR 261.31 and 40 CFR 261.32 are designated as hazardous wastes. A combination of generator knowledge and analytical testing is used to determine if the wastes exhibit any of the four hazardous waste characteristics: ignitability, reactivity, corrosivity or toxicity. If so, the waste is designated as a hazardous waste and the appropriate waste codes are assigned. If the waste is not a listed or is not a characteristic hazardous waste, it is designated as a solid waste.

Hazardous wastes are managed in accordance with RCRA and the applicable Department of Transportation (DOT) (49 CFR 170-179) requirements for packaging, labeling, marking, placarding and transportation.

Waste water, such as water accumulated in tanks or subterranean structures, is compared to the groundwater criteria in 18 AAC 75 and the freshwater surface water criteria in 18 AAC 70. The disposal recommendation for water meeting both these criteria is direct discharge to the ground.

1.5 SITE CHARACTERISTICS

1.5.1 Climate

St. Lawrence Island has a cool, moist, subarctic maritime climate with some continental influences during winter when much of the Bering Sea is capped with pack ice. Winds and fog are common; precipitation occurs approximately 300 days per year as light rain, mist or snow. Annual snowfall is about 80 inches per year. Annual precipitation is about 16 inches per year, and more than half falls as light rain between June and September. Summer temperatures average between 48° Fahrenheit (F) and 34° F, with a record high of 65°F. Winter temperatures range from –2°F to 10°F, with an extreme low of -30°F (URS, 1985). Freeze-up normally occurs in October or November, and break-up normally occurs in June.

The wind is generally in a northerly to northeasterly direction from September to June, and southwesterly in July and August. Winds exceeding 10 knots occur 70 percent of the time, and average 20 knots in winter months. The average wind speed is 18 miles per hour (USKH, 1993). Gusts in the Northeast Cape area have been measured as high as 110 miles per hour.

1.5.2 Topography

The installation acreage consists mainly of flat coastal plains, which gradually turn into rolling tundra towards the base of the Kinipaghulghat Mountains, which rise abruptly to a maximum elevation of approximately 1,800 feet above sea level about two miles south of the site. The majority of the former installation acreage is at an elevation of 20 to 80 feet above MSL.

1.5.3 Geology

St. Lawrence Island consists of isolated bedrock highlands of igneous, metamorphic, and older sedimentary rocks surrounded by unconsolidated surficial deposits overlying a relatively shallow erosional bedrock surface. In the immediate vicinity of this investigation area, shallow unconsolidated surficial materials overlie quartz monzonitic rocks of the Kinipaghulghat Pluton (Patton and Csejtey, 1980). The pluton forms the mountainous area south of the site, which includes Kangukhsam Mountain. Immediately south of the site, an unnamed drainage in the Kinipaghulghat Pluton has created an erosional valley and alluvial fan of unconsolidated sediments. The primary areas of this investigation are located on this alluvial fan, which progrades north from the mountain front toward the Bering Sea. Granitic bedrock materials are exposed at the coast north of the site at Kitnagak Bay, suggesting that quartz monzonitic bedrock underlies the unconsolidated materials at a relatively shallow depth on a wave-cut erosional platform.

The unconsolidated alluvial materials exhibit a soil profile in areas, which has not been disturbed by man. In general, native soil stratigraphy at the site is characterized by silts near the surface, overlying more sand-dominated soils at depth. The silt may contain varying quantities of clay/sand/gravel, and may vary from zero to ten feet in thickness. The silt is dark brown to dark green, and sometimes exhibits a mottled texture. In some areas, the silt exhibits an aqua green or blue color. Dark brown silts are observed in outcrop. The sand at depth contains varying degrees of silt/gravel/cobbles and may vary from two feet to greater than twenty feet in thickness. These deeper, course-grained materials are generally unsorted and are likely to be of glaciofluvial origin. The depth to bedrock at the site is unknown.

1.5.4 Hydrogeology

Because of the relatively remote and undeveloped nature of St. Lawrence Island, there is little data on the regional groundwater regime. The bedrock materials south of the site (and underlying the unconsolidated deposits) are not expected to store and transmit significant quantities of groundwater. Typically, these types of granitic rocks are generally impermeable, and transmit groundwater only through localized fractures and weathered soil zones at the surface.

The primary potential aquifer at the Northeast Cape site is unconsolidated alluvial material, which underlies all of the areas examined during this investigation. The mountainous area south of the site provides an ideal recharge area for the unconsolidated materials, providing runoff from rain and snowmelt during the summer months. Based on the topography and geology of the site, the regional groundwater flow direction is expected to be from the mountainous recharge area south of the site, flowing north and eventually discharging to the Bering Sea.

However, a key factor influencing the flow of groundwater at the site is the existence of permafrost and frozen soils, which render the unconsolidated materials effectively impermeable in areas. The United States Geological Survey (USGS) has classified St. Lawrence Island as an area of "moderately thick to thin permafrost". Although the depth of permafrost at St. Lawrence Island is unknown, the base of permafrost on the mainland at Nome (135 air miles to the northeast) is estimated to be at a depth 120 feet (Ferrians, 1965). The deeper unconsolidated deposits at the site are probably permanently frozen, and the shallow soils investigated during this investigation represent the active layer where soils are thawed only during portions of the year. Frozen soils are expected to have a profound effect in retarding groundwater flow during most of the year. Groundwater elevations have not been documented or used to confirm or refute the direction of ground water flow.

Northeast Cape apparently used groundwater as a source of water supply. There are four out-of-service production wells at the Northeast Cape installation, which are designated Wells 1 through 4 (E&E, 1993). Three wells are located within Site 22 (Water Wells and Water Supply Building) and the fourth well is located at Site 26 (Former Construction Camp). Little is known about the capacity or construction characteristics of these wells. The drilling log is available for one of the wells, indicating "coarse sand (water)" at a depth of 9 to 28 feet, underlying silty surficial deposits, and clean gravel and sand from a depth of 28 to 32 feet. The water wells at the installation were probably not very productive, given that the four wells were located in a small geographic area and a large water storage volume was required. These wells may have been subject to freezing in the winter months.

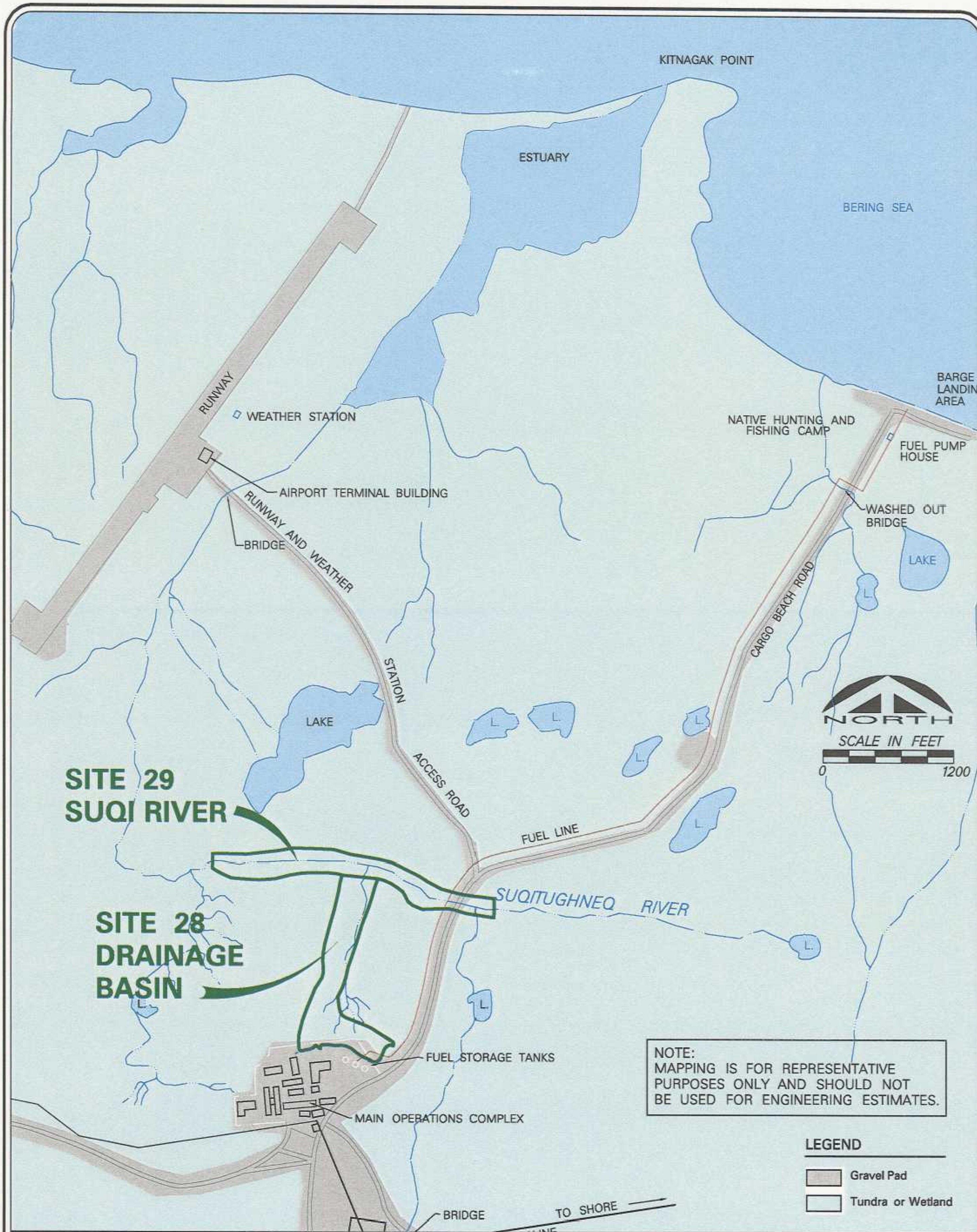
At the time the installation was in service, it appears that there was storage capacity for over 448,000 gallons of potable water (i.e., the 204,000-gallon tank at Site 13 and the four 60,000-gallon tanks at Site 22). The facilities for storing such vast quantities of water may indicate that groundwater was scarce or not available at times, perhaps over the winter.

1.5.5 Hydrology

Other than the Bering Sea north of the Northeast Cape facility, surface water in the vicinity of the study area consists of small streams, small- to moderate-sized lakes, and marshy areas. Surface water generally flows from the highland area south of the site in a northward direction. Small surface water bodies are common throughout the area. The primary stream drainage in the area is fed by runoff from the prominent drainage of a Kinipaghulghat Mountain valley south of the site. This stream drainage is fed by several smaller tributaries as it flows north to Kitnagak Point. The smaller tributaries originate from two small unnamed lakes (Figure 1-5).

In July and August of 1994, Montgomery Watson noted that surface water flow was highly dynamic, changing significantly over the course of a few days (Montgomery Watson, 1995a). For example, streamflow in the major drainage south of the site varied significantly, from several hundred gallons per minute during warm days, to no flow during relatively cold periods lasting more than a day (the runoff was primarily snowmelt from higher elevations). In other locations, small lakes and marshy areas created by recent snowmelt were observed to dry up and/or change shape over the course of a few days or weeks.

The most significant stream located in the area under investigation is the Suqi River, which receives drainage from the area east of the Cargo Beach Road and Main Operations Complex and the White Alice Site (Figure 1-4). This previously unnamed stream was identified by Marie Toolie in conversations with Montgomery Watson during the 1998 field work. Although the stream is not named on the USGS maps of the area, Mrs. Toolie cited the local name used for the stream.



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 1–5

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

OVERVIEW OF DRAINAGE BASIN

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The Suqi River is approximately 5 feet wide and 3 feet deep where it crosses the Cargo Beach Road, with a bottom of sand and gravel. Flow at this location is approximately 10 cubic feet per second. Where the Suqi River crosses Airport Road near Site 2, flow increases to approximately 12 cubic feet per second, and the stream is approximately 6 feet wide and 4 feet deep.

The Suqi River is significant because it is the drainage point for Site 9 (Housing and Operations Landfill), Sites 11 through 22 and Site 27 (Main Operations Complex). Drainage from the Main Operations Complex flows across a shallow wetlands area prior to joining the Suqi River. This drainage area has been designated Site 28 (Drainage Basin) in this report. The Suqi River has been designated as Site 29.

1.5.6 Demography and Land Use

The village of Savoonga is approximately 60 miles northwest of Northeast Cape and has a population of 514 people, as reported in the 1990 United States Census. There are currently no permanent residents at the Northeast Cape installation, but there is a small subsistence hunting and fishing village located at the site, inhabited primarily in the summer by residents of Savoonga.

1.5.7 Ecology, Wildlife and Endangered Species

The Northeast Cape area supports habitat for a variety of seabirds, waterfowl, and mammals that either breed in or migrate through the area. The ocean surrounding the Northeast Cape area is used for subsistence hunting of walrus, seal, sea birds and polar bear. Additionally, arctic fox, cross fox, and reindeer inhabit the area.

1.5.7.1 Vegetation

Vegetation in the Northeast Cape area is classified as alpine tundra. This type of vegetation is predominantly white mountain avens, mat forming herbs, grasses, and sedges. Shrubs include bearberry, dwarf birch, narrow leaf Labrador tea, willow, heaths, and cassiopes. The Northeast Cape area has many low-lying areas with lakes, bogs, and poorly drained soils. In these areas, vegetation is typically classified as wet tundra, which is dominated by heaths, sedges, mosses, lichens, and cotton grass (URS, 1985).

1.5.7.2 Birds

The only breeding seabird colony known to exist at the Northeast Cape Installation consists of 60 glaucous gulls on Seevookhan Mountain. This colony, cataloged as 93-19 by the United States Fish and Wildlife Service Catalog of Alaskan Seabird Colonies, is the most current known estimate of breeding seabirds in the area. Several other species of birds have been sighted in the vicinity of the Northeast Cape site, including common ravens, snow bunting, whistling swans, Lapland longspurs and sea gulls. No duck species have been observed in the Northeast Cape area. The areas around Northeast Cape have a very low habitat value, with relatively few birds, and the diversity of species appears low (URS, 1985).

1.5.7.3 Mammals

Large mammals are generally not abundant on St. Lawrence Island. However, polar bears can be seen on the island year round, especially when the ice pack is near shore. Grizzly bears have been reported on the island but are rarely seen. A dwindling population of several hundred reindeer can also be found on the island. Arctic fox, red fox, cross fox, and several small mammals (tundra shrew, arctic ground squirrel, the Greenland collared lemming, the red-backed vole, and the tundra vole) can also be seen on the island (URS, 1985).

Marine mammals are present in the vicinity of Northeast Cape as seasonal migrants in the offshore and near-shore marine waters, at haul-out sites, and in association with the advancing and retreating pack ice. However, there are no haul-out areas within the Northeast Cape site. During the summer, walrus, sea lions, and spotted seals may be present in offshore waters. During the ice season, ringed seals, bearded seals, walrus, and spotted seals can be found in near-shore and offshore leads and open water. Whales seen near the Northeast Cape installation include bowhead, gray, minke, killer and beluga (USKH, 1993).

1.5.7.4 Fish

There are ten primary species of fish that reside in the streams and tundra ponds of St. Lawrence Island. These include blackfish, nine-spined stickleback, grayling, Arctic char, and whitefish. Five of the six species of Pacific Salmon occur around the island. According to Savoonga inhabitants, the stream north of the main Northeast Cape facility complex (Figure 1-4) once supported large fish populations (including sockeye and silver salmon). The stream no longer supports these populations reportedly due to a large diesel oil spill emanating from the Fuel Storage Tank Area (Site 11), which entered one of the stream's tributaries. Juvenile and adult Arctic char have been observed in this stream approximately 250 feet downstream of the bridge leading from the Landing Strip to the Housing and Operations Complex (URS, 1985).

1.5.7.5 Threatened and Endangered Species

Endangered or threatened species of animals on St. Lawrence Island include the Spectacled eider (threatened), the Steller's eider (threatened), the Steller's sea lion (endangered) and the short-tailed albatross (candidate) (USFW, 1998). The prevalence of these with respect to the Northeast Cape Site is unknown. Polar bears are not an endangered or threatened species; however, they are protected under the Marine Mammal Protection Act. Alaska Natives are exempt from this act, and are allowed to hunt for polar bear for subsistence purposes or handicrafts, as long as the population is not depleted and the animals are not wasted. Vegetative species that have been proposed as threatened are the perennial plants *Rumex krausei* and *Primula tschuktschorum*.

1.5.8 Archaeological, Historical, and Cultural Resources

The Northeast Cape installation has the potential for significant archaeological, historical, and cultural resources. As such, excavation activities associated with the site should be undertaken only after the Section 106 process promulgated under the State Historic and Preservation Office (SHPO) has been completed. This process, although a federal regulation under 36 CFR 800 of the National Historic Preservation Act of 1966 (NHPA), is administered by SHPO. The process entails the identification and evaluation of potential historical properties and federal review through the Advisory Council on Historic Preservation (ACHP). Section 106 of NHPA requires that every federal agency take into account how each of its undertakings could affect historic properties. A historic property is defined as any property listed in, or eligible for, the National Register of Historic Places. The Northeast Cape site has not been placed on the National Register; however, it is eligible for consideration. Additionally, the White Alice site adjacent to the Northeast Cape site has been placed on the National Register.

If, at any time during installation activities conducted at the Northeast Cape site, there is a question as to the eligibility or identification of items or areas which may be of archaeological, cultural, or historical importance, the guidelines set forth under Section 106 should be observed. Any activities that may affect the area or item in question will cease until the nature of the area or item is discerned.

An archaeological and historical survey should be completed prior to any demolition or excavation work at the site. Some items, such as abandoned vehicles, buildings or other items associated with the military presence at Northeast Cape, may be of potential historical significance. The Alaska District should coordinate with SHPO to determine whether any items are of historical significance and should be preserved.

Also, the Alaska District should have an archaeologist on site during any construction activities to provide preconstruction briefings regarding the potential for archaeological artifacts to be found at the site.

2. INVESTIGATION APPROACH AND PROCEDURES

This section describes the scope of the 1996 RI and the 1998 RI activities, the specific methods and protocols employed to quantify and characterize the extent of contamination, QA/QC procedures, management of investigative derived wastes (IDW), and measurement of stream flow characteristics. The ultimate use of data collected, including sampling and analysis of environmental media, is:

- Identification of the potential source and migration of contamination
- Delineation of contamination
- Identification of disposal requirements for liquids in the storage tanks and subterranean building structures

2.1 SCOPE OF 1996 FIELD ACTIVITIES

The 1996 field activities were conducted July 31 through August 8, 1996. Table 2-1 summarizes the scope of the field activities during the 1996 Phase II RI. Soil, sediment, surface and groundwater samples were collected and analyzed as shown in Table 2-2. Field activities to further characterize areas of concern, identify potential obstacles to remediation, and better understand site conditions as described below:

- Surface soil, surface water, and sediment samples were collected to further delineate known areas of contamination.

- Biological sampling, including benthic, zooplankton and phytoplankton samples, were collected from the drainage basin to further characterize site conditions.

- CON/HTRW items previously identified to be either partially or completely full of liquid and/or sludge were sampled for waste characterization in order to plan future disposal.

Table 2-1 summarizes the scope of the field activities during the 1996 Phase II RI. Soil, sediment, surface and groundwater samples were collected and analyzed as shown in Table 2-2.

The analytical data produced by the project and quality assurance (QA) laboratories, and the information gathered during the Phase II RI which is pertinent to assessing the nature and extent of contamination is summarized in Section 5. The data are organized and presented by individual site. Pertinent sample results are provided for each site, with all sample results presented cumulatively in Appendix A.

2.2 SCOPE OF 1998 FIELD ACTIVITIES

The 1998 field activities were performed September 10 through September 16, 1998 and consisted of site reconnaissance, soil, groundwater, sediment and surface water sampling, and hazardous waste disposal. Table 2-1 also summarizes the scope of the field activities during the 1998 Phase II RI. Soil, sediment, surface and groundwater samples collected and analyzed are shown in Table 2-3.

TABLE 2-1
SUMMARY OF PHASE II RI ACTIVITIES

		1996 Phase II RI Activities													1998 Phase II RI Activities									1999 Planned Phase II RI Activities
Site	Description	Site Reconnaissance	Soil Sampling	Surface Water Sampling	Sediment Sampling	Biological Sampling	Storage Tank (AST or UST) Inventory and Sampling	Mechanics' Work Pit	Flooded Subterranean Structure Water Sampling and Discharge	Radiological Survey	Stream Flow Measurements	Posting of Potential Asbestos Hazards	Cable and Wire Hazard Mitigation	Assess Prospective C&D Monofill Sites and Borrow Areas	Site Reconnaissance	Soil Sampling	Surface Water Sampling	Sediment Sampling	Groundwater Sampling	Site Control and Survey	CON/HTRW Inventory Update	Building Demolition and Debris Inventory Update	Hazardous Waste Disposal	Biological Sampling
All	Installation-Wide Activities													X						X	X	X		
Site 1	Burn Site Southeast of Landing Strip																							
Site 2	Airport Terminal and Landing Strip	X								X		X				X								
Site 3	Fuel Line Corridor and Pumphouse																		X					
Site 4	Subsistence Fishing and Hunting Camp	X					X			X									X					
Site 5	Cargo Beach									X														
Site 6	Cargo Beach Road Drum Field									X						X								
Site 7	Cargo Beach Road Landfill									X						X			X					
Site 8	POL Spill Site	X																						
Site 9	Housing and Operations Landfill									X						X			X					
Site 10	Buried Drum Field	X	X							X						X			X					
Site 11	Fuel Storage Tank Area	X																	X					
Site 12	Gasoline Tank Area																							
Site 13	Heat and Electrical Power Building	X					X			X		X				X			X					
Site 14	Emergency Power/Operations Building	X					X		X	X		X				X								
Site 15	Buried Fuel Line Spill Area	X																	X					

TABLE 2-1 (continued)
SUMMARY OF PHASE II RI ACTIVITIES

		1996 Phase II RI Activities													1998 Phase II RI Activities									1999 Planned Phase II RI Activities
Site	Description	Site Reconnaissance	Soil Sampling	Surface Water Sampling	Sediment Sampling	Biological Sampling	Storage Tank (AST or UST) Inventory and Sampling	Mechanics' Work Pit	Flooded Subterranean Structure Water Sampling and Discharge	Radiological Survey	Stream Flow Measurements	Posting of Potential Asbestos Hazards	Cable and Wire Hazard Mitigation	Assess Prospective C&D Monofill Sites and Borrow Areas	Site Reconnaissance	Soil Sampling	Surface Water Sampling	Sediment Sampling	Groundwater Sampling	Site Control and Survey	CON/HTRW Inventory Update	Building Demolition and Debris Inventory Update	Hazardous Waste Disposal	Biological Sampling
Site 16	Paint and Dope Storage Building	X					X			X		X							X					
Site 17	General Supply Warehouse and Mess Hall Warehouse	X								X		X												
Site 18	Housing Facilities and Squad Headquarters	X							X	X		X											X	
Site 19	Auto Maintenance and Storage Facilities	X						X		X		X							X					
Site 20	Air Force Aircraft Control Warning Building									X		X												
Site 21	Wastewater Treatment Facility	X								X		X												
Site 22	Water Wells and Water Supply Building	X								X		X												
Site 23	Power and Communication Line Corridors																							
Site 24	Receiver Building Area																							
Site 25	Direction Finder Area															X								
Site 26	Former Construction Camp Area																							
Site 27	Diesel Fuel Pump Island	X	X																X					
Site 28	Drainage Basin Area	X	X	X	X	X							X			X	X	X						X
Site 29	Suqi River	X	X	X	X	X										X	X	X						X
Site 30	Background Areas																X	X						X

TABLE 2-3
1998 SAMPLE COLLECTION SUMMARY

Site	Description	Water													Soil and Sediment											
		Gasoline Range Organics (AK101)	Diesel Range Organics (AK102)	DRO aromatic and aliphatic fractions	Residual Range Organics (AK103)	RRO aromatic and aliphatic fractions	Polynuclear Aromatic Hydrocarbons (EPA 8270 SIM)	BTEX (EPA 8021A)	Volatile Organic Compounds (EPA 8260B)	Polychlorinated Biphenyls (EPA 8082)	Total Organic Carbon (EPA 415.1)	Lead (EPA 7421)	Manganese (6010)	Nitrate and Sulfate (EPA 300.0), Alkalinity (EPA 310)	Diesel Range Organics (AK102)	DRO aromatic and aliphatic fractions	Residual Range Organics (AK103)	RRO aromatic and aliphatic fractions	Polynuclear Aromatic Hydrocarbons (EPA 8270 SIM)	BTEX (EPA 8021A)	Polychlorinated Biphenyls (EPA 8082)	Dioxin (EPA 8290)	Total Organic Carbon (EPA 415.1)	Dry Soil Bulk Density	Soil Moisture Content
2	Airport Terminal and Landing Strip														2		2		1	2					
3	Fuel Line Corridor and Pumphouse		1				1	1																	
4	Subsistence Fishing and Hunting Camp		1				1	1																	
6	Cargo Beach Road Drum Field														2		2			1			1	1	1
7	Cargo Beach Road Landfill		1				1	1															1		
9	Housing and Operations Landfill		3				3	3							1		1		1	1			1		
10	Buried Drum Field														1	1	1	1		1			1		
11	Fuel Storage Area		2		2			2																	
13	Heat and Electric Power Building		2		2			2													3				
14	Emergency Power/Operations Building														1	1	1	1		1			1		
15	Buried Fuel Line Spill Area		1		1			1																	
16	Paint and Dope Storage Building								2			2													
19	Auto Maintenance and Storage Facilities		2		2			2																	
25	Direction Finder Area																					1			
27	Diesel Fuel Pump Area	2	2		2		2	2					1	1											
28	Drainage Basin Area		2		2			2							9	9	9	9	2	3			3		
29	Suqi River	6	6	6	6	6	6	6		6					6	6	6	6	6	4	6				
30	Background Sampling Areas	1	3	2	3	2	3	3			2			1	3	3	3	3	3	3			3	1	1
	Total of Primary Samples	9	26	8	20	8	17	26	2	6	2	2	1	2	25	20	25	20	13	16	9	1	11	2	2
	Duplicate Samples	1	3	1	3	1	1	4	1	1		1			3	2	3	2	2	2	2				
	QA Split Samples	1	3	1	3	1	1	4	1	2		1			3	2	3	2	2	3	2				
	QA Split Samples MS																								
	QA Split Samples MSD																								
	Trip Blanks	2						4	2																
	Primary Lab MS																								
	Primary Lab MSD																								
	Total Samples	13	32	10	26	10	19	38	6	9	2	4	1	2	31	24	31	24	17	21	13	1	11	2	2

2.3 SITE RECONNAISSANCE

Site reconnaissance was performed to confirm current use and site conditions. This activity was to ensure that proposed field activities are commensurate with present field conditions. The following reconnaissance activities were performed at all areas included in the Phase II site activities:

- Visual observation and documentation in field notebooks
- Photographs taken of site conditions
- Qualitative assessment of potential exposure pathways
- Documentation of any site obstacles that would impede remediation
- Estimation of media volume based on visual observation and existing laboratory data
- Identification of a potential on-site source of low-permeability geologic materials

Vegetation surveys were also conducted in the Drainage Basin north of the Main Operations Complex, and at the proposed stream diversion area. The purpose of the vegetation survey was to document the presence or absence of vegetation that would prevent dermal contact, and to evaluate potential environmental impacts of remedial activities. The vegetation survey consisted of an estimate of percent cover, vegetation pattern, and speciation or vegetation type identification. Additional biological surveys are scoped for July, 1999 in the Drainage Basin. Site photographs are provided in Appendix A.

2.4 SAMPLE COLLECTION

This section discusses sample collection procedures used during Phase II RI field investigative activities at Northeast Cape. Standard field protocols are defined further in the CDAP (E&E, 1993a), the Phase II Work Plan (Montgomery Watson, 1996a) and the Final Work Plan, 1998-1999 Phase II (Montgomery Watson, 1998). Field work included surface soil, subsurface soil, surface water, sediment, and benthic, zooplankton and phytoplankton biological sampling. Sampling tasks also included liquid and sludge sampling from storage tanks, a mechanical pit and flooded cellar holes.

2.4.1 Soil, Water and Biological Sample Collection Procedures

All samples were collected in accordance with the following Work Plans: 1996 sampling was performed in accordance with the Northeast Cape Phase II Work Plan (Montgomery Watson, 1996a) and the CDAP (E&E, 1993), 1998 sampling was performed in accordance with the Final Work Plan, 1998-1999 Phase II RI (Montgomery Watson, 1998).

Sampling methodology in the work plans included:

- Surface soil sampling and field screening
- Subsurface soil sampling
- Surface water and sediment sampling
- Groundwater sampling

- Benthic sampling from streams
- Zooplankton and phytoplankton sampling from streams

Biological sampling locations are shown on Figure 2-4. Surface and subsurface soil sampling locations, subsurface water and surface water sampling locations are shown in the site maps provided in Section 5. All laboratory results are provided in Appendix B, and biological sampling results in Appendix D.

2.4.2 CON/HTRW Sample Collection Procedures

Some structures at the Northeast Cape installation contain fluids that would eventually require disposal in order to decommission the installation. These structures were identified and the liquids contained in the structures were sampled to determine appropriate disposal methods. Liquids sumpted in identified structures included:

- Liquid and sludge sampling from storage tanks

- Water sampling of flooded subterranean structures, such as a mechanical pit, subterranean room, and underground passages between buildings

2.4.2.1 Liquid and Sludge Sampling in ASTs and USTs

During the 1996 field investigation all identified ASTs and USTs were investigated to determine if they contained liquid and/or sludge. The storage tanks are shown in Figures 2-1 and 2-2 and listed below in Table 2-4.

A sample of both liquid and sludge was collected from each storage tank that contained a liquid other than potable water, sludge or both. Liquid samples were analyzed for TRPH, BTEX and PCB to characterize wastes for future disposal. Sludges were analyzed for toxicity characteristic leachate procedure (TCLP) metals, and ethylene glycol. Results of the sampling and analyses are provided in Section 4.2, CON/HTRW Inventory.

2.4.2.2 Liquid and Sludge in Auto Mechanics' Work Pit

One water and one sludge sample were collected from the mechanics' work pit at the north end of the Auto Maintenance and Storage Facility, Building 109. The pit is approximately 28 inches wide, 24 feet long and 5 feet deep, within a volume of roughly 2,100 gallons. At the beginning of the 1994 field season, a snow drift in the building covered part of the auto mechanics' work pit. However, by the end of the 1994 field effort, the drift had melted and exposed the flooded pit. During the 1996 field season, the pit was approximately half-full of water and no snow was present. Miscellaneous debris was observed in the bottom of the pit, including three rubbish bins, tires, metal debris and insulation.

One water sample and one composite sludge sample were collected from the auto mechanics' work pit and analyzed, as shown in Table 2-5 below.

MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-1

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

AST, UST, FULL DRUMS, FLOODED SUBTERRANEAN STRUCTURES (SITES 2 THROUGH 6)

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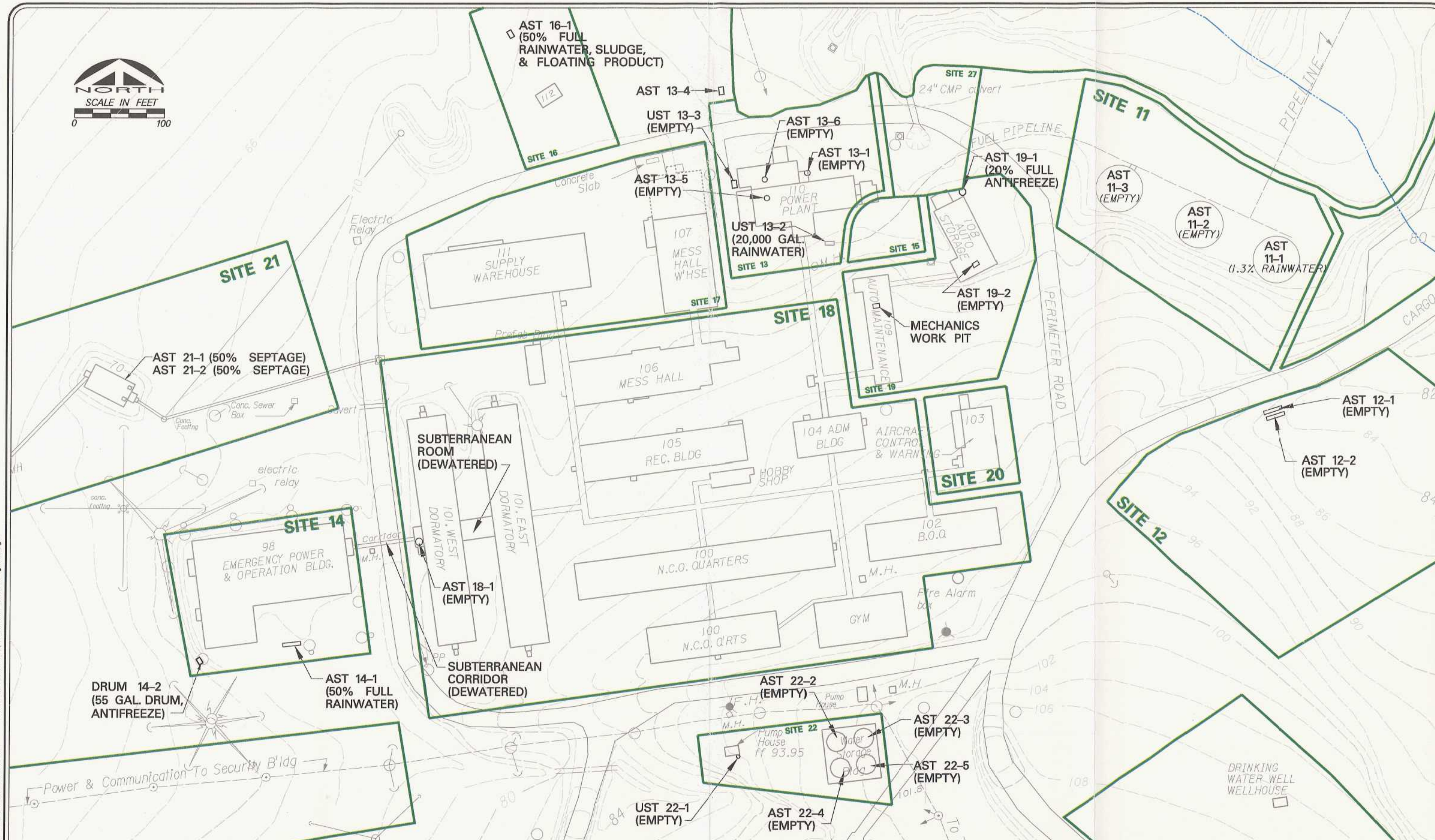
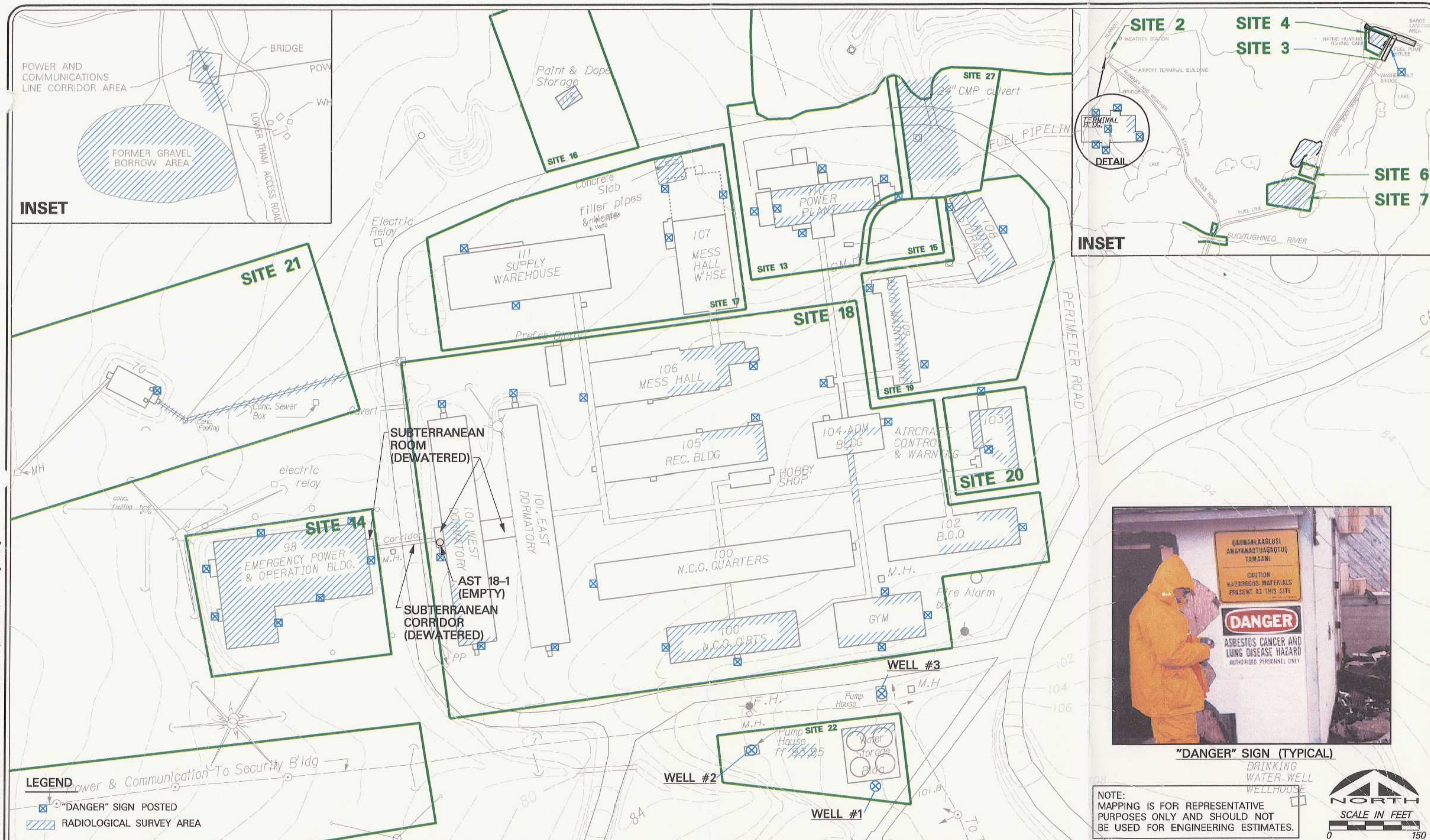


MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-2

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

AST, UST, FULL DRUMS, FLOODED SUBTERRANEAN STRUCTURES (SITES 10 THROUGH 27)



MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-3

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

RADIOLOGICAL SURVEY AND ASBESTOS – POSTING LOCATIONS

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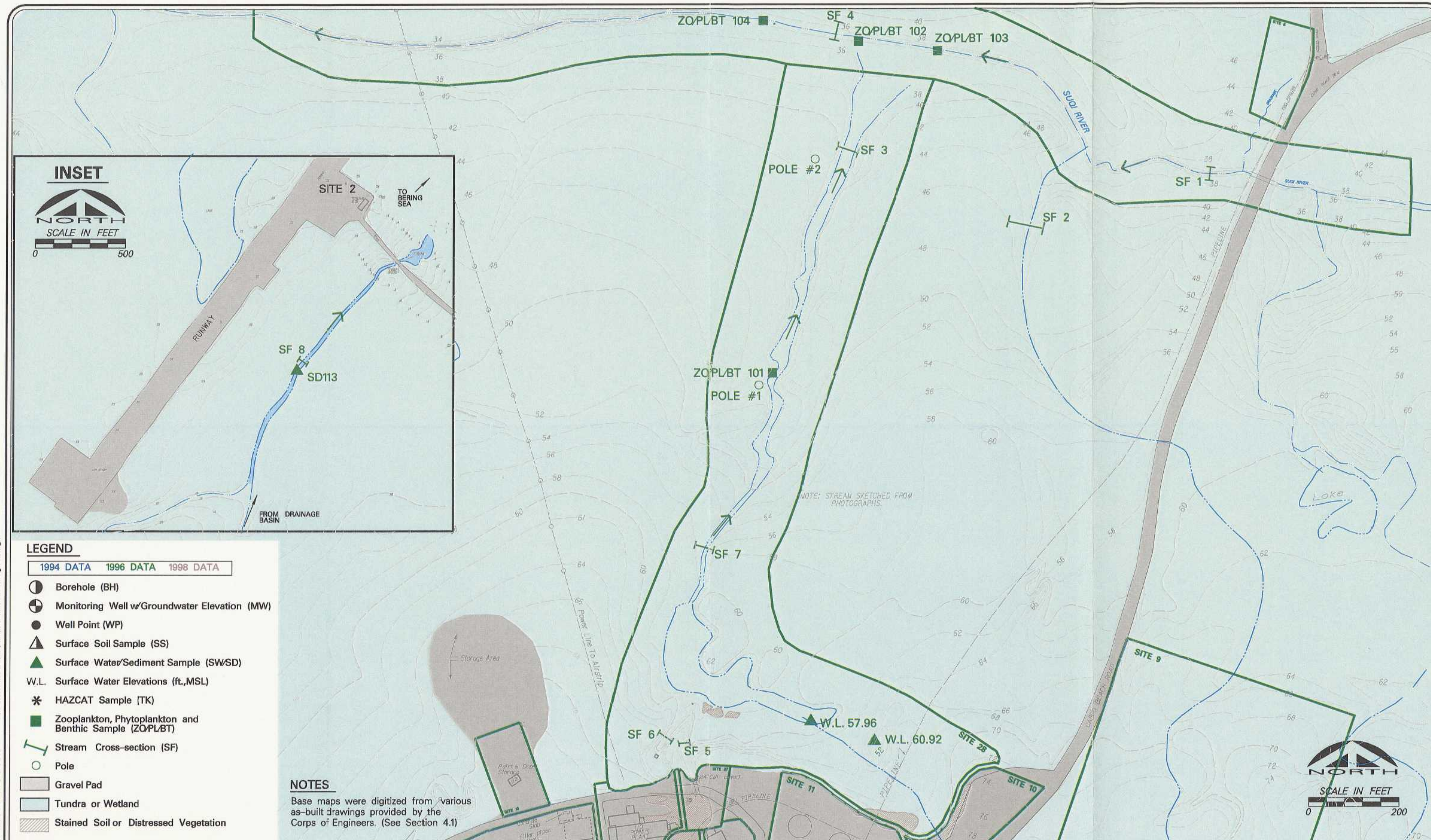

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MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-4

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

STREAM FLOW AND BIOLOGICAL SAMPLING LOCATIONS

TABLE 2-4
STORAGE TANK INVENTORY

Site	Tank Number	Past Contents	Current Contents	Size (gallons)
2	AST 2-1	Diesel	Empty	1,000
3	AST 3-1	Diesel	Empty	500
	AST 3-2	Diesel	Empty	335
4	AST 4-1	Potable water	Empty	15,000
	AST 4-2	Potable water	30% full (Potable/rain water)	400
6	AST 6-1	Potable water	Empty	500
11	AST 11-1	Diesel	1.3% full (Rainwater with sheen)	400,000
	AST 11-2	Diesel	Empty	400,000
	AST 11-3	Diesel	Empty	400,000
12	AST 12-1	Gasoline	Empty	15,000
	AST 12-2	Gasoline	Empty	30,000
13	AST 13-1	Diesel	Empty	1,000
	UST 13-2	Diesel	100% full (Rainwater with sheen)	20,000
	UST 13-3	Diesel	Empty	5,000
	AST 13-4	Diesel	Empty	5,000
	AST 13-5	Potable Water	Empty	500
	AST 13-6	Potable Water	Empty	204,000
14	AST 14-1	Fuel	50% full (Rainwater)	5,000
16	AST 16-1	Oil for roads (probably used oil)	50% full (Rainwater, sludge and floating product)	1,000
18	AST 18-1	Unknown	Empty	200
19	AST 19-1	Spent antifreeze	20% full (Spent antifreeze)	250
	AST 19-2	Potable Water	Empty	250
21	AST 21-1[a]	Septic	50% full (Septage)	Over 10,000
	AST 21-2[a]	Septic	50% full (Septage)	Over 10,000
22	UST 22-1	Diesel	Empty	500
	AST 22-2	Potable Water	Empty	60,000
	AST 22-3	Potable Water	Empty	60,000
	AST 22-4	Potable Water	Empty	60,000
	AST 22-5	Potable Water	Empty	60,000

a Concrete vault - not a metallic tank.

TABLE 2-5
SAMPLING AT AUTO MECHANICS' PIT

Site	Description	Sample Matrix	Analytes
19	Auto Maintenance and Storage Facilities	Water	TRPH, BTEX, PCB
		Sludge	TCLP metals, Fuel Identification, ethylene glycol

Results of the sampling are provided and discussed in Section 4.2, CON/HTRW Inventory.

2.4.2.3 Lead Based Paint

Core samples suspected of containing lead-based paint were collected from structures and one debris pile (Site 14; painted structural steel beams), and were analyzed for leachable lead. Results are summarized on Table 2-7, Summary of Lead-Based paint Investigation Results. One composite sample (95NE14401BD1) taken from painted structural steel beams at the Emergency Power/Operations Building Site (Site 14) exceeded the Resource Conservation and Recovery Act (RCRA) toxicity characteristic level of 5 mg/L. Based on the estimated total quantity of painted structural steel beams at Site 14, the debris pile would not exceed the toxicity characteristic. The calculations used to support this conclusion are shown on Table 2-7. The remaining 20 core samples were below the toxicity characteristic for lead. Complete information is provided in the Building Demolition and Debris Removal Technical Memorandum, Northeast Cape, Alaska (MW, 1995c).

2.4.3 Quality Assurance/Quality Control (QA/QC)

All analytical data for primary samples and QA/QC samples were reviewed for conformity with the QC criteria defined in the CDAP prepared for the 1994 RI at Northeast Cape (E&E, 1993) and the 1995 RI report (Montgomery Watson, 1995a). These two documents were prepared to establish general guidelines for QA associated with all work conducted as part of the Northeast Cape RI. ADEC, Alaska District, and the EPA quality assurance requirements were also met. Anomalies noted in the U.S. Army Corps of Engineers (USACE) Chemical Quality Assurance Report (CQAR) are presented in Appendix B. Montgomery Watson performed an independent review of the CQAR, laboratory data, and QC results. Qualifiers that were not already supplied with the data by either the project lab or QA lab were added. Data qualifiers were added in conformance with the methods described in the *National Functional Guidelines for Inorganic Data Review* (EPA, 1994a) and *National Functional Guidelines for Organic Data Review* (EPA, 1994b). Those anomalies, which required qualification, are noted in the full listing of analytical data in Appendix C.

All QC samples from 1996 fieldwork were submitted blind to the project laboratory, MultiChem Analytical Services (formerly Analytical Technologies, Inc.). The QA samples were submitted to the USACE North Pacific Division Laboratory (NPDL) in Troutdale, Oregon, for analysis.

All QC samples from 1998 field work were submitted to the project laboratory, Quanterra, Inc. The QA samples were submitted to Analytica, Inc. for analysis.

2.5 RADIOLOGICAL SURVEY

During a July, 1996 public meeting in Savoonga, several residents voiced concern regarding potential for unknown radioactive materials at the Northeast Cape Installation to be present. As part of the Phase II RI, a limited radiological survey was conducted at the sites listed below.

Site Number	Description	Area Surveyed
2	Airport Terminal and Landing Strip	Terminal and Transformer Shed, interiors
3	Fuel Line Corridor and Pumphouse	Fuel Pump, Piping
4	Subsistence Hunting and Fishing Camp	All currently used structures, interiors
5	Cargo Beach	Cargo Beach
6	Cargo Beach Road Drum Field	Cargo Beach Road Drum Field
7	Cargo Beach Road Landfill	Cargo Beach Road Landfill
9	Housing and Operations Landfill	Housing and Operations Landfill
10	Buried Drum Field	Drum Storage Area
13	Heat and Electrical Power Building	Building 110, interior
14	Emergency Power/Operations Building	Building 98, interior
18	Housing Facilities and Squad Headquarters	Buildings 99, 101W, 102, 104, 106, 109, interior
20	Air Force Aircraft Control Warning Building	Building 103, interior and exterior
21	Wastewater Treatment Facility	Wastewater Treatment facility and holding tanks, exterior
22	Water Wells and Water Supply Building	Water Storage Facility (Building 113)
27	Diesel Fuel Pump Area	Diesel Fuel Pump Island

Figure 2-3 shows the locations of all radiological surveys. Ground continuous monitoring was conducted using a Victoreen #41546 Radiacmeter, Model #450 of the U.S. Army Chemical School, Radiological Survey Manual. This meter detects beta and detects and measures gamma radiation to a depth of one meter below ground surface. The gravel borrow area was chosen as the background site for Northeast Cape. Twenty readings were collected at 10-foot grid intersects and a mean average of 0.07 millirads per hour (mR/h) was calculated. In order to calculate the background for the site, the mean result from the background survey is multiplied by a factor of two (2). This results in an action level of 0.14 mR/h. The U.S. Army standard is one (1) mR/h. All areas surveyed resulted in readings less than the established background of 0.14 mR/h.

This historic use of radioactive materials at the site was not part of the scope of this investigation, and will be addressed in a separate document.

2.6 STREAM FLOW MEASUREMENTS

Stream flow measurements were taken from eight locations to characterize the Suqi River, the Drainage Basin and its tributaries. Figure 2-4 shows the locations of the stream flow measurements with respect to the Drainage Basin.

Stream flow measurements consisted of profiling the cross-sectional area of the streambed, and estimating the stream velocity at the time of the field measurement.

The stream bed was profiled by measuring the depth of the stream bed to an arbitrary, uniform height above the stream (generally the elevation of the highest bank). Depths were measured to the nearest 0.1-foot at 5 to 15 profiling points across the stream. A wading rod with 0.1-foot graduations was used to measure water depth. Stream bank elevation was measured using a hand level, and the distance between profiling points was measured using a fiberglass tape.

Velocity of the stream was estimated using a float. The time for the float to traverse a specified distance was measured for each profiling point. An average of three observations at each profiling point was recorded. The stream flow velocity was corrected by using a factor of 0.85 the surface float velocity and multiplying by the cross-sectional area of water. Bank-to-bank profiles were used to judge historic and future variations. High water and flood data were estimated in the field and used to calculate maximum flow.

Results of the streamflow measurements are provided and discussed in Section 5.28, Drainage Basin. Actual measurements and calculations are provided in Appendix E.

2.7 INVESTIGATION-DERIVED WASTE MANAGEMENT

IDW consisted of:

- Disposable protective clothing and supplies
- Groundwater resulting from purging existing monitoring wells
- Water in flooded subterranean building structures

In accordance with the Work Plans prepared for the Phase II RI, non-hazardous disposable protective clothing and supplies (including sampling spoons, sampling gloves, and disposable

Teflon bailers) were bagged and transported to Anchorage for disposal as solid waste. The quality of the purge water was documented in previous studies (Montgomery Watson, 1995 and Montgomery Watson, 1996) as containing up to 0.0021 milligrams per liter (mg/L) benzene, 0.95 mg/L DRO and 2.2 mg/L TRPH. As documented in the Work Plan (Montgomery Watson, 1998), purge water was returned to the ground at the site.

Two flooded subterranean building structures were identified for visual investigation and could not be observed without removing accumulated water. In both cases, samples of potentially-contaminated water were collected from the flooded area to determine if the water met applicable water quality criteria and could then be discharged to the ground surface, in order to examine and inventory the subterranean structures for CON/HTRW.

Table 2-6 shows the sampling and analysis performed at each of the two subterranean site.

TABLE 2-6
SAMPLING AT THE SUBTERRANEAN STRUCTURES

Site	Description	Sample Matrix/ Location ID	Sampling Results (mg/L)		Regulatory Criteria (mg/L)	
					Proposed 18 AAC 75 Groundwater	18 AAC 70 Freshwater
18	Emergency Power/Operations Building	Water/ SH01	Benzene	ND	0.005	0.005
			Toluene	ND	1.0	NR
			Ethylbenzene	ND	0.7	32
			Xylenes	ND	10.0	NR
			TRPH	ND	NR	NR
			PCB	ND	0.0005	0.000014
	Housing Facilities and Squad Headquarters	Water/ SH02	Benzene	0.0015	0.005	0.005
			Ethylbenzene	ND	1.0	NR
			Toluene	ND	0.7	32
			Xylenes	ND	10.0	NR
			TRPH	ND	NR	NR
			PCB	ND	0.0005	0.000014

Key: ND - Not detected
NR - Not regulated

Prior to removing the accumulated water, the water level of both subterranean structures was approximately 14 inches below ground level, and the structures were thought to be basements which were approximately the size of the rooms above them. On July 30, 1996 Mr. Kalu Kalu (ADEC) gave verbal authorization, based on the water sample results listed in Table 2-6, for removing the water from the subterranean structures and discharging it to the ground surface.

After removing the water, the structures at Site 18 were found to be connected and to be a subterranean corridor for utilities and personnel to travel easily between the Main Complex (Building 101) and the Emergency Power/Operations Building (Building 98) (Toolie, 1996). According to Eugene Toolie the corridor was constructed after the two buildings had already been erected. Figure 2-2 shows the location of the flooded subterranean corridor and water discharge points.

The corridor was measured and found to be six feet wide, 12 feet tall, and 108 feet long. Approximately 67,000 gallons of water were pumped from the corridor and discharged to the ground immediately outside the two buildings. Less than 1 foot of water remained in the corridor after pumping ceased. No sludge or CON/HTRW was found in the corridor. In 1998, one to two feet of water was observed in the corridor.

An additional flooded subsurface structure was observed at Site 18. Over the course of the investigation, the water level in the underground structure was depleted and the field team was able to perform a visual inspection of the structure, which was found to be a subterranean room. This room, near the center of Building 101 (Figure 2-2), is under the boiler room and is an 8-foot high by 10-foot wide by 13-feet long area. The room was apparently a plumbing supply room, which contained miscellaneous plumbing supplies, galvanized and copper pipe, and an empty tank with dimensions of 1.5-foot diameter by 2-foot high. The room contained no sludge, odor, oil sheen, or other evidence of hazardous material.

TABLE 2-7 SUMMARY OF LEAD-BASED PAINT INVESTIGATION RESULTS

Site	Building No.	Building Name	Sample Identification	Wood Structure (%)	Corkwall (%)	Cement Board (%)	Metal (%)	Painted Area (%)	Roofing (%)	Roof Tar (%)	Wall Insulation (%)	ACM Siding (%)	Clay Tile (%)	Vinyl ACM (%)	Concrete (%)	Ceiling (%)	Total (%)	Leachable Lead Results (mg/L)	MRL (mg/L)
02	N/A	Airport Terminal with Tower	95NE02401BD1	60		10	10	2	3		2	10		3			100	0.14	0.05
03	119	Fuel Pumphouse	95NE03119BD1														0	0.13	0.05
13	110	Heat and Electrical Power Building	95NE13110BD1	52		10	1	1	15	1		20					100	0.22	0.05
14	98	Emergency Power Orperations Building	95NE14098BD1	10		2	30	3			5			5	45		100	ND	0.05
14	N/A	Steel Girder	95NE14401BD1				100	0									100	5.54*	0.05
14	N/A	Debris Pile	95NE14401BD2				100	0									100	4.41	0.05
14	N/A	Debris Pile	95NE14401BD3				100	0									100	4.2	0.05
16	112	Paint and Dope Building	95NE16112BD1	29		3	1	1	21	1	42	2					100	0.34	0.05
17	106	Mess Hall Building	95NE17106BD1	50.5	1.7	4	0.2	1	27	1	10	15	2.5	0.6			100	ND	0.05
17	107	Mess Hall Warehouse Building	95NE17107BD1	39	1	3	0.3	1	44	1	10	0.7					100	0.16	0.05
17	111	General Supply Warehouse Building	95NE17111BD1	33		3	0.5	1.5	49	1	10	1		1			100	0.3	0.05
18	99	Recreation Building	95NE18099BD1	48			50	2									100	ND	0.05
18	100	NCO Quarters - N&S Buildings	95NE18100BD1	45.5		20	0.5	1	20		1	10		2			100	0.09	0.05
18	101	Dormitory E&W Buildings	95NE180101BD1	39.5		18	0.5	1	19	1		20		1			100	2.85	0.05
18	102	BOQ Building	95NE18102BD1	50		5		1	18			3		3		20	100	0.15	0.05
18	104	Administration Building	95NE18104BD1	52		15	0.5	1	15		5	8		3.5			100	0.38	0.05
18	105	Theater Building	95NE18105BD1	25		5	1	1	25		1	12		5		25	100	0.07	0.05
19	108	Vehicle Storage Building	95NE19108BD1	37.3		2.8	0.4	1	26	1	30	15					100	0.57	0.05
19	108	Vehicle Storage Building	95NE19108BD2	37.3		2.8	0.4	1	26	1	30	15					100	0.34	0.05
19	108	Vehicle Storage Building	95NE19108BD3	37.3		2.8	0.4	1	26	1	30	15					100	0.27	0.05
19	109	Garage Building	95NE19109BD1	37.3		2.8	0.4	1	26	1	30	15					100	0.19	0.05
20	103	Aircraft Control and Warning Building	95NE20103BD1														0	ND	0.05
22	113	Water Supply Building	95NE22113BD1	60			19	1				20					100	ND	0.05
22	114	Pump Station Building	95NE22114BD1	30			1	30	19			20					100	0.2	0.05

* Adjusted leachable lead results taking into account the steel girders sampled at the debris pile in Building 98

Assuming that the steel girders do not occupy more than 1/4 of the total quantity, the adjusted concentration of leachable lead is

3/4 (95NE14098BD1) + 1/4 (95NE14401BD1) = Leachable Lead

3/4 (ND) + 1/4 (5.54%) = 1.39% Leachable Lead

Component	Thickness (assumptions based on field observations)
Window	1/4"
Door Trim	1/2"
Interior Wallboard	1/2"
Wood Structure	2" x 6" w/16" centers
Roof Insulation (glass foam)	3"
ACM Siding	1/8"
Tarpaper	1/16"
Metal Flashing	1/32" (12" height for both flor and roof)
Wall Insulataion	4"
Door	2"
Wood Siding	1"

3. HAZARD MITIGATION INCIDENTAL TO INVESTIGATION

During the field investigations, hazard mitigation incidental to the investigation was performed. Hazard mitigation involved three activities:

- Posting of "Danger" signs throughout the site where ACM was present
- Cutting fallen wire and cable that posed a physical hazard to wildlife and humans traversing the area
- Containerization and disposal of hazardous waste

3.1 POSTING OF POTENTIAL ASBESTOS HAZARDS

In 1994, Montgomery Watson prepared an inventory of ACM incidental to and part of the hazardous buildings and debris at the installation. The results of the survey are summarized below in Table 3-1.

TABLE 3-1
INVENTORY OF ASBESTOS CONTAINING MATERIALS

		Confirmed ACM											Potential ACM							
Site	Building	Pipe insulation	Pipe joint insulation	Exterior siding	Floor tile and mastic	Boiler insulation	Wall and ceiling spackle	Incinerator door lining	Exterior shingles	Roofing mastic	Transite pipe	Wainscot	Pipe insulation	Exterior siding	Floor tile and mastic	Equipment insulation	Debris	Pipe lagging (stack)	Wall and ceiling tile	Cans of asbestos cement
2	Terminal Building	X	X	X	X					X			X		X					
3	Fuel Pump House (Building 119)			X					X											
7	Debris Pile					X														
13	Power Plant Building 110												X	X		X	X			
14	Operations Building (Building 98)	X			X		X													
16	Oil and Paint Storage Building 112													X						
17	Warehouse Building (Building 111)	X						X						X						
	Mess Hall Building 107												X					X		
18	Building 99														X					
	Building 100														X					
	Dormitory (Building 101)	X			X															
	Building 102														X					
	Building 104														X					
	Recreation Building (Building 105)	X			X				X											
	Building 106														X					
	Building 125														X					
	Building 130														X					
19	Vehicle Storage Building (Building 108)			X																
	Garage Building (Building 109)	X	X		X					X	X									
20	AC&W Building 103												X	X	X				X	
21	Wastewater Treatment Building												X							
22	Water Supply Building 113													X						X
	Pump Station (Building 114)		X	X																
24	Receiver Building											X								

In 1996, the field team posted asbestos warning signs on all doors of all buildings identified as having a friable asbestos hazard potentially requiring Class C Personal Protection for site workers. The signs read: "DANGER - Asbestos cancer and lung disease hazard present".

Sign placement locations are shown below in Table 3-2 and on Figure 3-1.

3.2 WIRE AND CABLE HAZARD MITIGATION

Fallen telephone wires, power lines, and antenna wires pose a threat to the reindeer that feed in the area and to local residents traversing the area on snow machine. Where possible, these cables were snipped and placed inside covered areas (Montgomery Watson, 1997). Several reindeer racks were observed at the installation that were tangled with cable or wire. Apparently, the reindeer were grazing and became entangled in loose wire and died when they could not free themselves. Due to the limited field season, wire cutting activities were conducted only at the limited areas listed below:

- Southwest of Building 98
- Wires crossing road east of Water Tank Building
- Power lines extending from south of Water Tank Building toward White Alice
- Power lines north of White Alice Site leading eastward to the Bering Sea
- Vicinity of Operations Building
- Road from Operations Building to Pump House
- Vicinity of Mess Hall Warehouse
- Antenna field south of Heat and Electric Building
- Drainage basin west of Airport Road and south of Suqi River
- Airport Road

Approximately 6 miles of wire was cut, coiled and stored at the Airport Terminal Building (Site 2) and the Pumphouse (Site 22). Areas from which wire was removed are shown on Figure 3-1. Photographs of entangled reindeer racks and wire cutting activities are provided in Appendix A.

3.3 HAZARDOUS WASTE DISPOSAL

Containers of DS-2 and STB (supertropical bleach) were found at the site. These two materials are decontamination agents for a wide variety of chemical weapons. They were routinely issued to military bases as a contingency against chemical warfare agents. The presence of these containers at Northeast Cape does not necessarily suggest that chemical weapons were stored or used at the site.

Two hazardous wastes were containerized, marked, labeled and transported off-site for disposal. The wastes, DS-2 and STB, were containerized, marked, labeled, placarded, transported and disposed in accordance with the applicable regulations 49 CFR 170-177 and 40 CFR 260-268. Specific procedures for hazardous waste disposal were described in the Work Plan (Montgomery Watson, 1998) and were followed in the field.

TABLE 3-2
LOCATIONS OF ASBESTOS WARNING SIGNS

Site	Building	Sign Placement
2	Terminal Building	Northwest garage doors North middle door East door South middle door South garage door Door to office area from garage
13	Building 110	Northeast door North door South garage door
14	Building 98	Northeast door Northwest door East door Northeast door South middle door Southwest door West door
16	Building 112	East side West side
17	Building 107	East dock Northwest dock edge
	Building 111	Northeast dock door South door North door
18	Building 99	South wall North door
	Building 100	South door Southeast door
	Building 100S	West door
	Building 100N	West landing
	Building 101E	North door South door
	Building 101W	North door South door West door
	Corridor between Building 101 and 111	South door Middle west door Southwest door
	Building 102	East door
	Building 105	South door Southeast dock
	Building 106	Northeast dock
19	Building 108	East door Northwest door
	Building 109, Auto Maintenance	East door Garage door
	Corridor between Building 108 and 109	South side
20	Building 103	West door
18 & 20	Corridor between Squad Headquarters and Building 103	North side
22	Building 113	North door
26	Drinking Water Well House	East door

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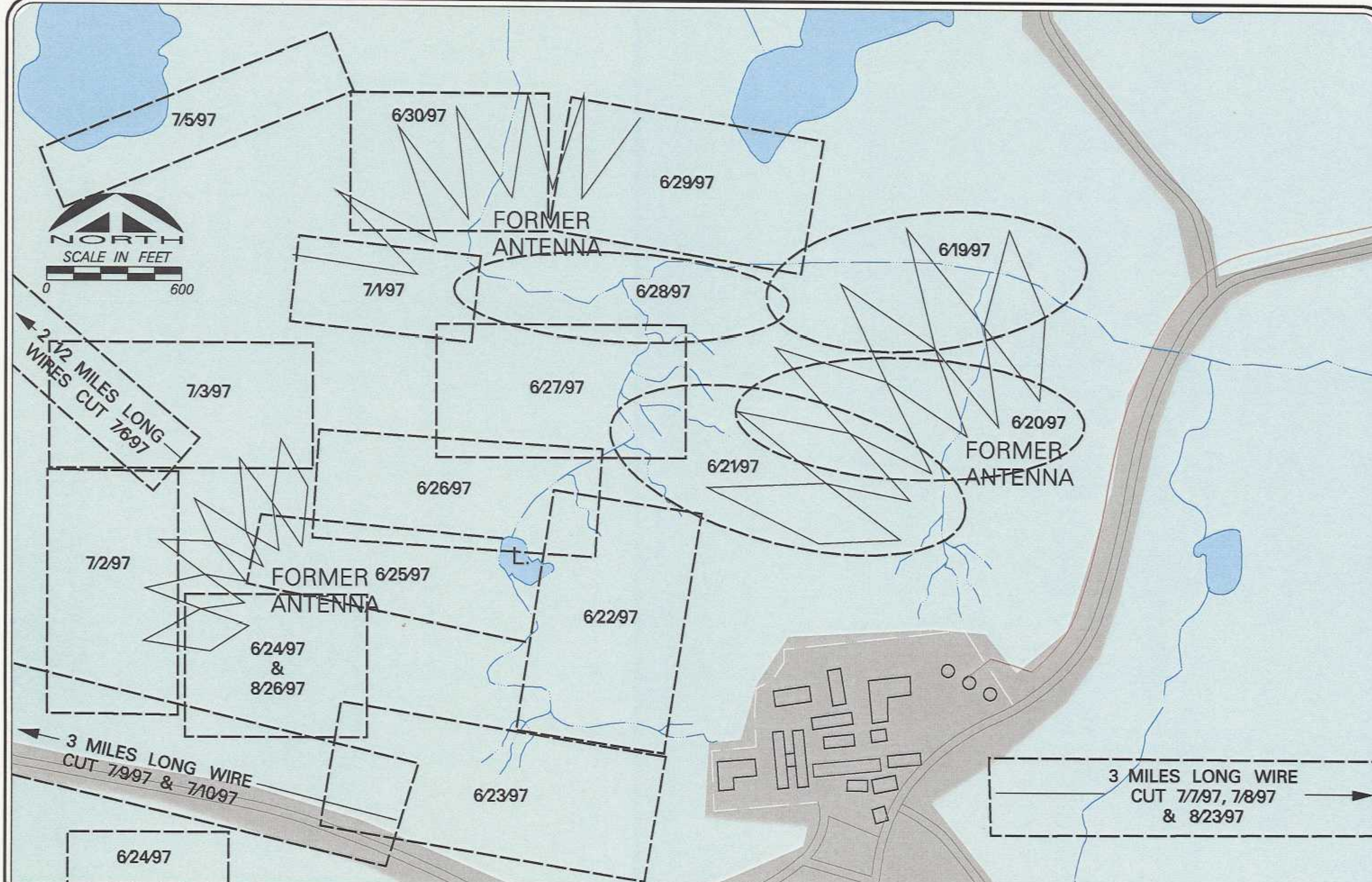


MONTGOMERY WATSON

Anchorage, Alaska

LEGEND

OR AREA AND DATE WIRE WAS CUT AND REMOVED

FIGURE 3-1

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

WIRE REMOVAL SITE MAP

Due to poor weather at the site, the first leg of transportation was modified to include removal from St. Lawrence Island to Nome, Alaska by Bering Air (EPA ID number AK0000662189). Each of the two wastes was put on a separate flight to maintain separation of incompatible wastes. In Nome, the wastes were transferred to Northern Air Cargo, and transported according to the original plan. For logistical reasons, DS-2 was transported to the Chemical Waste Management facility in Henderson, Colorado (EPA ID Number COD980591184) for transshipment to the final disposal facility in Sauget, Illinois.

DS-2 was disposed in the Chemical Waste Management hazardous waste incinerator at Sauget, Illinois (EPA ID No. ILD098642424).

The STB was disposed by deactivation at the Chemical Waste Management Facility in Arlington, Oregon (EPA ID No. ORD089452353). Copies of the completed hazardous waste manifests, required notifications to ADEC and certificates of disposal are included in Appendix G.

4. REMEDIAL PLANNING

4.1 SITE CONTROL AND SURVEY

The surveying work for the Phase II RI was conducted at Northeast Cape on September 14 and 15, 1998. The purpose of the survey was to accurately locate monitoring wells, soil and water sampling sites and photographic identification points and report these locations on the same coordinate system as previous surveys conducted by Lounsbury and Associates during the Phase I RI in 1994.

The 1998 surveying was conducted by Mullikin Surveys (Donald E. Mullikin, P.L.S.) of Homer, Alaska. Trimble 4000 SSI GPS survey units were used in Real Time Kinematic mode. The basis of coordinates was the USACE Benchmark (BM) B. The basis of the bearing was from the ALASKA DISTRICT BM B to BM H. Elevations were based on a 1994 aluminum cap marked #4, set by Lounsbury and Associates and extended using the 1996 geoid undulation model. The elevation of #4 was checked with ties to Lounsbury aluminum cap #9, as well as to two previously-tied monitoring wells (Mullikin Surveys 1998 points 2014 and 2015). Surveying results from the 1998 field work are provided in Appendix F.

4.2 CON/HTRW INVENTORY

The Montgomery Watson field team compiled an inventory of containerized toxic, hazardous and radioactive waste at the Northeast Cape installation. In accordance with the FUDS program, CON/HTRW can include USTs, ASTs, transformers, hydraulic systems, abandoned inactive monitoring wells, and contaminated soils from a leaking UST or other container.

4.2.1 Tank and Pit Inventory and Waste Characterization

Of the ASTs, USTs and the pits inventoried at the site, seven ASTs, one UST, and the mechanics' work pit were found to contain liquid and therefore, to potentially qualify as CON/HTRW.

The contents of the tanks and the work pit are listed below in Table 4-1.

TABLE 4-1
INVENTORY OF TANKS AND PITS CONTAINING LIQUIDS

Site	Tank Number	Past Contents	Current Contents	Tank/Pit Size (gallons)
4	AST 4-2	Drinking water	30% full (Potable/Rain Water)	400
11	AST 11-1	Diesel	1. 3% full (Rainwater with sheen)	400,000
13	UST 13-2	Diesel	100% full (Rainwater with sheen)	20,000
14	AST 14-1	Fuel	50% full (Contaminated rainwater)	5,000
16	AST 16-1	Oil for roads (Probably used oil)	50% full (Contaminated rainwater, sludge and floating product)	1,000
19	AST 19-1	Spent antifreeze	20% full (Spent antifreeze)	250
	Mechanics' Work Pit	None	50% full (Rainwater and sludge)	2,100
21	AST 21-1[a]	Septic	50% full (Septage)	Over 10,000
	AST 21-2[a]	Septic	50% full (Septage)	Over 10,000

a Concrete vault

4.2.1.1 AST 4-2 Waste Characterization

Based on information from Eugene Toolie, who was at the installation during the 16 years of operation and is a continual summer occupant of the subsistence camp at cargo beach, the field team concluded that AST 4-2 was used solely for potable water storage. Since the time the tank was taken out of service, some rainwater appears to have accumulated in the tank. One sample was collected from the tank and results are presented in Table 4-2 below.

TABLE 4-2
AST 4-2 CONTENTS WASTE CHARACTERIZATION
Sample ID: 96NE13TK101
Matrix: Water

Analysis	Results (mg/L)	Selected Regulatory Criteria		
		Toxicity Characteristic Limit (mg/L)	Proposed 18 AAC 75 Groundwater (mg/L)	18 AAC 70, Freshwater (mg/L)
Benzene	ND (0.001)	1.0	0.005	0.005
Toluene	ND (0.001)	NR	1.0	NR
Ethylbenzene	ND (0.001)	NR	0.7	32
Xylenes	ND (0.001)	NR	10.0	NR
TRPH	ND (1)	NR	NR	NR
RRO	NA	NR	1.1	NR
DRO	NA	NR	1.5	NR
GRO	NA	NR	1.3	NR

Analytical results, and visual and olfactory indicators support the conclusion that the current tank contains potable/rain water. The estimated quantity of potable/rain water for disposal is approximately 120 gallons. Direct discharge to the ground is recommended.

4.2.1.2 AST 11-1 Waste Characterization

AST 11-1 was used to store diesel fuel in the past. Currently the tank is approximately 1.3% full of rainwater that exhibits sheen. Field waste characterization was performed in 1994 (Montgomery Watson, 1995a). Results are shown in Table 4-3.

TABLE 4-3
AST 11-1 RCRA CHARACTERISTICS FIELD RESULTS

	AST 11-1 Tank Contents
Ignitability	
Organic vapors (ppm)	Non-detect
Flammability (Yes/No)	No
Corrosivity	
pH	6
Reactivity	
Water reactive (Yes/No)	No
Oxidative(Yes/No)	No
Sulfide reactive (Yes/No)	No
Cyanide reactive (Yes/No)	No

No sample was collected for analysis. The estimated quantity of potentially contaminated water is approximately 5,200 gallons. Carbon filtration to remove any potential petroleum constituents, then direct discharge to the ground, is recommended.

4.2.1.3 UST 13-2 Waste Characterization

Aside from the presence of sheen there was no indication of multi-phase layering or sludge. Field waste characterization was performed in 1994 (Montgomery Watson, 1995a). Results are shown in Table 4-4.

TABLE 4-4
UST 13-2 RCRA CHARACTERISTICS FIELD RESULTS

	UST 13-2 Tank Contents
Ignitability	
Organic vapors (ppm)	2
Flammability (Yes/No)	No
Corrosivity	
pH	5.5
Reactivity	
Water reactive (Yes/No)	No
Oxidative(Yes/No)	No
Sulfide reactive (Yes/No)	No
Cyanide reactive (Yes/No)	No

The tank contents were analyzed for TRPH and BTEX to characterize the liquid for disposal in the future. UST 13-2 was covered with its tank lid and wired shut to prevent further accumulation of precipitation. Sample results for UST 13-2 are provided in Table 4-5.

TABLE 4-5
UST 13-2 CONTENTS WASTE CHARACTERIZATION
Sample ID: 96NE13TK101
Matrix: Water

Analysis	Results (mg/L)	Selected Regulatory Criteria		
		Toxicity Characteristic Limit (mg/L)	Proposed 18 AAC 75 Groundwater (mg/L)	18 AAC 70, Freshwater (mg/L)
Benzene	0.002	1.0	0.005	0.005
Toluene	0.051	NR	1.0	NR
Ethylbenzene	0.050	NR	0.7	32
Xylenes	0.350	NR	10.0	NR
TRPH	25	NR	NR	NR
RRO	NA	NR	1.1	NR
DRO	NA	NR	1.5	NR
GRO	NA	NR	1.3	NR

NA = Not analyzed.
NR = Not regulated as this constituent under this regulation

Based on these results, the aqueous contents of UST 13-2 would be classified as non-hazardous. The estimated quantity of contaminated water is approximately 20,000 gallons. Based on the concentration of total petroleum hydrocarbons, carbon treatment is recommended prior to direct discharge to the ground.

4.2.1.4 AST 14-1 Waste Characterization

Field waste characterization of the contents of AST 14-1 was performed in 1994 (Montgomery Watson, 1995a). Results are shown below in Table 4-6.

TABLE 4-6
AST 14-1 RCRA CHARACTERISTICS FIELD RESULTS

	AST 14-1 Tank Contents
Ignitability	
Organic vapors (ppm)	1.6
Flammability (Yes/No)	No
Corrosivity	
pH	5
Reactivity	
Water reactive (Yes/No)	No
Oxidative(Yes/No)	No
Sulfide reactive (Yes/No)	No
Cyanide reactive (Yes/No)	No

One water sample was collected from the tank and analyzed for BTEX, TRPH, and PCBs to characterize the tank contents for disposal. One composite sludge sample was collected and analyzed for TCLP metals and ethylene glycol. AST 14-1 was covered with its lid and wired shut to prevent further accumulation of precipitation. Sample results for AST 14-1 are provided below in Table 4-7.

TABLE 4-7
AST 14-1 CONTENTS WASTE CHARACTERIZATION
Sample ID: 96NE14TK101
Matrix: Water

Analysis	Results	Selected Regulatory Criteria		
	(mg/L)	Toxicity Characteristic Limit (mg/L)	Proposed 18 AAC 75 Groundwater (mg/L)	18 AAC 70, Freshwater (mg/L)
Benzene	ND (0.001)	1.0	0.005	0.005
Toluene	ND (0.001)	NR	1.0	NR
Ethylbenzene	ND (0.001)	NR	0.7	32
Xylenes	0.002	NR	10.0	NR
TRPH	130	NR	NR	NR
RRO	NA	NR	1.1	NR
DRO	NA	NR	1.5	NR
GRO	NA	NR	1.3	NR
PCB	ND (0.007)	NR	0.0005	0.000014

Sample ID: 96NE14TK102
Matrix: Sludge

Analysis	Results (mg/L)	Toxicity Characteristic Limit (mg/L)	18 AAC 75 Under 40 inches Zone (mg/Kg)
Arsenic	ND(0.1)	5.0	NR
Barium	0.21	100.0	NR
Cadmium	ND (0.005)	1.0	NR
Chromium	ND (0.01)	5.0	NR
Lead	ND (0.03)	5.0	NR
Mercury	ND (0.0002)	0.2	NR
Selenium	ND (0.03)	1.0	NR
Silver	ND (0.005)	5.0	NR
Ethylene glycol	ND (5 mg/Kg)	NR	NR

ND = Non-detect. Detection limit is provided in parenthesis.
NA = Not analyzed.
NR = Not regulated as this constituent under this regulation.

Based on these results, the aqueous contents in AST 14-1 are classified as non-hazardous. The estimated quantity of contaminated water is approximately 2,000 gallons. Based on the concentration of total petroleum hydrocarbons, carbon treatment is recommended prior to direct discharge to the ground.

Based on these results, the sludge in AST 14-1 is also classified as non-hazardous. The estimated quantity is 500 gallons. Due to the elevated levels of petroleum in the aqueous phase, treatment of the sludge in conjunction with the treatment of other petroleum-contaminated soil at the installation is recommended.

4.2.1.5 AST 16-1 Waste Characterization

According to Eugene Toolie (1996), this tank contained oil used for oiling the roads as a dust control measure during the summer months. Field waste characterization was performed in 1994 (Montgomery Watson, 1995a). Results are shown in Table 4-8.

TABLE 4-8
AST 16-1 RCRA CHARACTERISTICS FIELD RESULTS

	AST 16-1 Tank Contents
Ignitability	
Organic vapors (ppm)	1.2
Flammability (Yes/No)	No
Corrosivity	
pH	5
Reactivity	
Water reactive (Yes/No)	No
Oxidative(Yes/No)	No
Sulfide reactive (Yes/No)	No
Cyanide reactive (Yes/No)	No

Three water samples (primary; duplicate, QC; and split, QA) were collected from the tank and analyzed for BTEX, PCBs and TRPH. Three sludge samples were also collected from the tank (primary; replicate, QC; and split, QA) and analyzed for TCLP metals, fuel identification, and glycol. These samples were collected for waste characterization prior to the removal of the tank and disposal of the tank contents. In addition to the water and sludge samples, an effort to retrieve a third sample of the approximately 1/8 inch layer of floating product present in the tank was unsuccessful. After the samples were collected, AST 16-1 was covered with its lid and wired shut to prevent further accumulation of precipitation. Sample results for AST 16-1 are presented below in Table 4-9.

TABLE 4-9
AST 16-1 CONTENTS WASTE CHARACTERIZATION
Sample ID: 96NE16TK101, 201 (QC), 301 (QA)
Matrix: Water

Analysis	Results (mg/L)			Selected Regulatory Criteria		
	Primary	QC	QA	Toxicity Characteristic Limit (mg/L)	Proposed 18 AAC 75 Groundwater (mg/L)	18 AAC 70, Freshwater (mg/L)
Benzene	ND (0.001)	ND (0.001)	ND (0.002)	1.0	0.005	0.005
Toluene	ND (0.001)	ND (0.001)	ND (0.002)	NR	1.0	NR
Ethylbenzene	ND (0.001)	ND (0.001)	ND (0.002)	NR	0.7	32
Xylenes	0.001	0.002	0.0033	NR	10.0	NR
TRPH	15	36	11.1	NR	NR	NR
RRO	NA	NA	NA	NR	1.1	NR
DRO	NA	NA	NA	NR	1.5	NR
GRO	NA	NA	NA	NR	1.3	NR
PCBs	ND (0.007)	ND (0.007)	ND (0.007)	NR	0.0005	0.000014

Sample ID: 96NE16TK102, 202 (QC), 302 (QA)
Matrix: Sludge

Analysis	Results (mg/L)			Selected Regulatory Criteria	
	Primary (mg/L)	QC (mg/L)	QA (mg/L)	Toxicity Characteristic Limit (mg/L)	18 AAC 75, Under 40 inches Zone (mg/Kg)
Arsenic	ND (0.1)	ND (0.1)	0.028	5.0	0.1
Barium	ND (0.2)	0.25	0.17	100.0	5
Cadmium	0.013	0.024	0.018	1.0	0.01
Chromium	0.019	0.027	0.013	5.0	0.3
Lead	0.056	0.046	0.03	5.0	
Mercury	ND (0.0002)	ND (0.0002)	ND (0.0005)	0.2	0.006
Selenium	ND (0.1)	ND (0.1)	ND (0.08)	1.0	0.1
Silver	ND (0.005)	ND (0.005)	ND (0.01)	5.0	0.5
Fuel ID (heavier than gasoline)	NA	NA	280 mg/Kg	NR	NR
RRO	NA	NA	NA	NR	10,000
DRO	NA	NA	NA	NR	250
Fuel ID (gasoline)	NA	NA	ND (14,000 mg/Kg)	NR	NR
GRO	NA	NA	NA	NR	300
Ethylene Glycol	10 (mg/Kg)	15 (mg/Kg)	7.1 (mg/Kg)	NR	NR

ND = Non-detect. Detection limit is provided in parenthesis.
NA = Not analyzed.
NR = Not regulated as this constituent under this regulation.

Based on these results, the aqueous contents in AST 16-1 are classified as non-hazardous. The estimated quantity of contaminated water is approximately 450 gallons. Based on the concentration of total petroleum hydrocarbons, carbon treatment is recommended prior to direct discharge to the ground.

Based on these results, the sludge in AST 16-1 is also classified as non-hazardous. The estimated quantity is 50 gallons. Due to the elevated levels of petroleum in the aqueous phase, treatment of the sludge in conjunction with the treatment of other petroleum-contaminated soil at the installation is recommended.

4.2.1.6 AST 19-1 Waste Characterization

AST 19-1 was used to store spent antifreeze in the past. Currently, the tank is approximately 20% full-spent antifreeze. Field waste characterization was performed in 1994 (Montgomery Watson, 1995a). Results are shown below in Table 4-10.

TABLE 4-10
AST 19-1 RCRA CHARACTERISTICS FIELD RESULTS

	AST 19-1 Tank Contents
Ignitability	
Organic vapors (ppm)	19.6
Flammability (Yes/No)	No
Corrosivity	
pH	7
Reactivity	
Water reactive (Yes/No)	No
Oxidative(Yes/No)	No
Sulfide reactive (Yes/No)	No
Cyanide reactive (Yes/No)	No

No sample was collected for laboratory analysis. The estimated quantity of spent antifreeze is approximately 50 gallons. Containerization and off-site disposal is recommended.

4.2.1.7 AST 21-1 and AST 21-2 Waste Characterization

AST 21-1 and AST 21-2 were used to process sewage from the installation. Currently, the tanks are approximately 50% full septage. No sample was collected for analysis. The estimated quantity of septage is over 10,000 gallons. Burial on-site or containerization and off-site disposal are recommended.

4.2.1.8 Mechanics' Work Pit Waste Characterization

One water and one sludge sample was collected from the mechanics' work pit (approximately 2,100 gallons) in the north end of the auto maintenance facility, Building 109. During the 1996 field investigation, the pit was approximately one half full of liquid, exposing miscellaneous debris including three rubbish bins, tires, metal debris, and insulation.

One water sample was collected from the pit and analyzed for BTEX, PCBs, and TRPH. One composite sludge sample was collected from the grease pit and analyzed for TCLP metals, fuel identification, and antifreeze (ethylene glycol). The sludge sample itself consisted primarily of paint chips, various kinds of insulation and other unidentifiable materials. Sample results for the mechanics' work pit are provided below in Table 4-11.

TABLE 4-11
MECHANICS WORK PIT CONTENTS WASTE CHARACTERIZATION
Sample ID: 96NE19TK101
Matrix: Water

Analysis	Results (mg/L)	Selected Regulatory Criteria: Toxicity Characteristic Limit (mg/L)	Proposed 18 AAC 75 Groundwater (mg/L)	18 AAC 70, Freshwater (mg/L)
Benzene	ND (0.001)	1.0	0.005	0.005
Toluene	ND (0.001)	NR	1.0	NR
Ethylbenzene	ND (0.001)	NR	0.7	32
Xylenes	ND (0.001)	NR	10.0	NR
TRPH	1	NR		NR
RRO	NA	NR	1.1	NR
DRO	NA	NR	1.5	NR
GRO	NA	NR	1.3	NR
PCBs	ND (0.007)	NR	0.0005	0.000014

Sample ID: 96NE19TK102
Matrix: Sludge

Analysis	Results (mg/L)	Toxicity Characteristic Limit (mg/L)	18 AAC 75, Under 40 inches Zone Adoption draft (mg/Kg)
Arsenic	0.19	5.0	0.1
Barium	0.31	100.0	5
Cadmium	0.035	1.0	0.01
Chromium	0.078	5.0	0.3
Lead	**49**	5.0	
Mercury	ND (0.0002)	0.2	0.006
Selenium	ND (0.1)	1.0	0.1
Silver	ND (0.005)	5.0	0.5
Ethylene Glycol	ND (2 mg/Kg)	NR	NR

ND = Non-detect. Detection limit is provided in parenthesis.
NA = Not analyzed.
NR = Not regulated as this constituent under this regulation.
Bold figures represent exceedence of toxicity characteristic limit

Based on these results, the aqueous contents in the mechanics' work pit are classified as non-hazardous. The estimated quantity of contaminated water is approximately 1,050 gallons. Based on the concentration of total petroleum hydrocarbons, carbon treatment does not appear necessary prior to direct discharge to the ground.

Based on these results, leachable lead concentration of 49 mg/L in the sludge in the mechanics' work pit, the sludge will be classified as hazardous waste once it is removed from the pit and designated for disposal. The estimated quantity is 50 gallons.

4.2.1.9 Summary of Tank Contents and Disposition

Table 4-12 summarizes the liquids and solids in the tanks at the site, their RCRA waste classification and proposed disposal.

TABLE 4-12
INVENTORY OF TANKS WASTES, CLASSIFICATION AND PROPOSED DISPOSAL

Site	Tank Number	Past Contents	Current Contents	Quantity of Waste (gallons)	RCRA Classification	Proposed Disposal
4	AST 4-2	Drinking water	Potable water/rain water	120	Non-hazardous	Direct discharge to ground
11	AST 11-1	Diesel	Rainwater with sheen	5,200	Non-hazardous	Process through carbon absorption unit then discharge to ground.
13	UST 13-2	Diesel	Rainwater with sheen	20,000	Non-hazardous	Process through carbon absorption unit then discharge to ground.
14	AST 14-1	Fuel	Contaminated rainwater	2,000	Non-hazardous	Process through carbon absorption unit then discharge to ground.
			Petroleum-contaminated sludge	500	Non-hazardous	Treat with other petroleum-contaminated soils
16	AST 16-1	Oil for roads (probably used oil)	Contaminated rainwater	450	Non-hazardous	Process through carbon absorption unit then discharge to ground.
			Petroleum-contaminated sludge floating product	50	Non-hazardous	Treat with other petroleum-contaminated soils
19	AST 19-1	Spent antifreeze	Spent antifreeze	50	Non-hazardous	Off-site disposal
	Mechanics' Work Pit	None	Contaminated rainwater	1,050	Non-hazardous	Direct discharge to the ground
	Mechanics' Work Pit	None	50% full (rainwater and sludge)	50	Hazardous waste - Lead (D008)	Off-site disposal at permitted hazardous waste treatment facility

TABLE 4-12 (continued)
INVENTORY OF TANKS WASTES, CLASSIFICATION AND PROPOSED DISPOSAL

Site	Tank Number	Past Contents	Current Contents	Quantity of Waste (gallons)	RCRA Classification	Proposed Disposal
21	AST 21-1	Septic	Septage	5,000	Non-hazardous	On-site burial or disposal off-site
	AST 21-2	Septic	Septage	5,000	Non-hazardous	On-site burial or disposal off-site

4.2.2 Summary of CON/HTRW

Based on the inventory prepared for Northeast Cape and the laboratory results discussed in the previous section, Table 4-13 summarizes the CON/HTRW at the site. In many instances, the field team was unable to access areas of the buildings and drum or debris piles. Therefore, the quantity of CON/HTRW should be considered a best-guess estimate. The construction contractor for the removal should be contacted to make a more accurate assessment of the quantity of material, impediments to demolition and removal and disposal.

4.3 BUILDING DEMOLITION AND DEBRIS INVENTORY

Under FUDS, BD/DR action applies to conditions that are hazardous as a result of DOD usage and are inherently hazardous when DOD divested interest in the property. Inherently dangerous BD/DR must present a clear danger likely to cause or already having caused death or serious injury to a person exercising ordinary or reasonable care.

The following is a list of hazardous structures and debris as defined by the DERP-FUDS Program Manual (USACE, 1993).

1. **Structural hazards (excluding structures or debris less than six feet above the surrounding grade)**
   - Leaning or weakened load-bearing walls or supports
   - Sagging roofs or floors
   - Unprotected openings in roof or elevated floor which are larger than 8 inches by 8 inches
   - Broken or missing stairs or railings
   - Deteriorated mortar or loss of bricks on chimneys and stacks
   - Load-bearing wood frame members weakened through natural processes such as termites or weathering

2. **Cave-in or engulfment hazards**
   - Evidence of falling rocks from tunnel ceilings or walls
   - Excavations which resulted in unstable or soft material deeper (or higher) than five feet
   - Deteriorating or collapsing tunnel linings

3. **Falling hazards**

- Open pits, manholes, silos wells, or shafts which are larger than 8 inches by 8 inches or deeper than 6 feet
- Open-sided platforms or floors six feet above the next lower level

4. **Climbing hazards**

- Any structure ten feet or higher which is readily climbable through any internal parts of the structure

TABLE 4-13
INVENTORY OF FUDS ELIGIBLE CONTAINERIZED HAZARDOUS AND TOXIC WASTE

Site Description	Debris	Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 1 - Burn Site Southeast of Landing Strip							
	No visible sources of CON/HTW						
Site 2 - Airport Terminal and Landing Strip							
	Diesel tank (AST 2-1)	Diesel, now empty	1	item		1,000 gallon	
Site 3 - Fuel Line Corridor and Pumphouse							
	Diesel tanks (AST 3-1)	Diesel, now empty	1	item		500 gallon	
	Diesel tanks (AST 3-2)	Diesel, now empty	2	item		335 gallon	
	Lead acid auto battery	Lead acid	1	item			
	Fuel hose	Diesel, empty	3	item		6-inch diameter, Rubber (20' sections)	
	Paint container	Paint, now open to rain	1	gallon			
	Fuel Pipeline	Fuel	8,500	linear feet		4-inch steel fuel pipeline	
Site 4 - Subsistence Fishing and Hunting Camp							
	Batteries and fluids in vehicles; abandoned (per BD/DR inventory)	Battery and fluids	2	items			Could be under jurisdiction of SHPO - Totally ruined
Site 5 - Cargo Beach							
	Battery and fluids in Bulldozer (D-8) (per BD/DR inventory)	Battery, fluids	1	item			Could be under jurisdiction of SHPO - totally rusted and destroyed
Site 6 - Cargo Beach Road Drum Field							
	Battery	Lead acid	1	item			
Site 7 - Cargo Beach Road Landfill							
	Batteries	Lead acid	7	item			
Site 8 - POL Spill Site							
	Aboveground POL pipeline	Fuel					POL pipe inventoried under Site 3
Site 9 - Housing and Operations Landfill							
	Containerized chemical; powder 2 quart-size	Unknown Chemical	1	item			
	Battery	Lead acid	1	item			
Site 10 - Buried Drum Field							
	No visible sources of CON/HTW						
Site 11 - Fuel Storage Tank Area							
	Diesel Tank (AST 11-1)	Water with petroleum sheen	1	item		400,000 gallon; 28 ft tall, 50 ft. diameter	On concrete foundation
	Contaminated-water in AST 11-1	Diesel contaminated water, RCRA non-hazardous	5,200	gallons			
	Diesel Tanks (AST 11-2, AST 11-3)	Diesel, now empty	2	item		400,000 gallon, 28 ft tall, 50 ft. diameter	On concrete foundation
	Misc. valves, piping, pipe racks	Diesel, now empty	1500	lbs.	1,500		

TABLE 4-13
INVENTORY OF FUDS ELIGIBLE CONTAINERIZED HAZARDOUS AND TOXIC WASTE

Site Description	Debris	Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 12 - Gasoline Tank Area							
	Gasoline Tank (AST 12-1)	Gasoline, now empty	1	item		15,000 gallon	
	Gasoline Tank (AST 12-2)	Gasoline, now empty	1	item		30,000 gallon	
	Fuel valves and piping	Gasoline, now empty	500	lbs.	500		
Site 13 - Heat and Electrical Power Building							
	Cummins diesel generators	Diesel, now empty	4	item			3.5 ft. wide x 12 ft. long x 6 inches high
	Diesel tank (AST 13-1)	Diesel, now empty	1	tank		1,000 gallon	
	Diesel tank (UST 13-2)	Diesel, rainwater infiltrated	1	tank		20,000 gallon	
	Diesel tank (AST 13-4)	Diesel, now empty	1	tank		5,000 gallon	
	Rainwater in UST 13-2	Diesel contaminated water, RCRA non-hazardous	20,000	gallons			
	Diesel tank (UST 13-3)	Diesel, now empty	1	tank		5,000 gallon	
	Transformer Pad	PCB	1	pad		10 ft. x 20 ft.	Concrete pad
	Transformer Pad	PCB	2	pad		5 ft. x 10 ft	Concrete pad
Site 14 - Emergency Power Operations Building							
	Diesel tank (AST 14-1)	Diesel, now 50% full of contaminated rainwater	1	item		5,000 gallon	
	Contaminated water in AST 14-1	Diesel-contaminated water, RCRA non-hazardous	2,000	gallons			
	Containerized sludge in AST 14-1	Diesel-contaminated sludge; RCRA non-hazardous	500	gallons			
	Containers; military grease	Grease	5	item			
	Drum	Antifreeze - full	1	item			Outside (south side)
	Transformer Pad	PCB	1	pad		10 ft. x 15 ft.	Concrete pad
Site 15 - Buried Fuel Line Spill Area							
	Underground fuel pipeline	Fuel	50	linear feet		50 ft. tall x 4-inch diameter	
Site 16 - Paint and Dope Storage Building							
	Solvents, paints, POLs, dielectric fluids, cleaners and other liquids	Now empty. Potentially toxic chemicals.	150	gallons			
	Oil Tank (AST 16-1)	Used oil, now 50% full of contaminated water	1	item		1,000 gallon steel	
	Liquid in Oil Tank (AST 16-1)	Petroleum-contaminated water, RCRA non-hazardous	450	gallons			
	Sludge in Oil Tank (AST 16-1)	Petroleum-contaminated sludge; RCRA non-hazardous	50	gallons			
	Overpack Container	Unknown, Marked 16-5, 16-6	2	item		15 gallon	Contents unknown - overpacks left by NES
	Overpack Container	Unknown Marked 16-2, 16-3, 16-4	3	item		8 gallon	Contents unknown - overpacks left by NES
Site 17 - General Supply Warehouse and Mess Hall Warehouse							
	Containers; miscellaneous cleaners	Miscellaneous cleaners (25 lb./tub)	22	tubs			Believed to be dishwashing powder
	Compressed gas cylinder	Unknown	??	cylinder			Building 111
	Drum(s)	Unknown	8	item			
	Drum(s)	Unknown	1	item			Unknown contents

TABLE 4-13
INVENTORY OF FUDS ELIGIBLE CONTAINERIZED HAZARDOUS AND TOXIC WASTE

Site Description	Debris	Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 18 - Housing Facilities and Squad Headquarters							
	Compressed gas cylinders	Unknown	1	cylinder			Northwest of Building 101 West
	Compressed gas cylinder	Unknown	1	cylinder			In "AM" barracks
	Containerized fluids or cleaners	Potentially toxic chemicals	10	item			Located in Mess Hall
	Incinerator	Potential incineration by-products	1	item			
	Electrical panels with switches	PCB in switch fluid	4	switches			In Building 99. Suspect about 8 gallons dielectric fluid.
Site 19 - Auto Maintenance and Storage Facilities							
	Generator with trailer	Fuel	1	item			2 ft. wide x 4 ft. tall x 6 ft. long with trailer
	Cylindrical air compressor tank	Compressed gas	1	item			2-1/2 ft. x 6 ft.
	Containers; foaming liquid type-5	Potentially toxic chemicals	39	item		5 gallon	Empty
	Smudge pots	Diesel, solvents	24	item			Drain liquid - Probably diesel-contaminated water
	Mechanics' work pit	Falling and Drowning hazard: open work pit > 5 ' deep, accessible to rain and snow melt run-off with hazardous sludge.		cubic feet			
	Water in mechanics work pit	Contaminated water	1,050	gallons			
	Sludge in mechanics work pit	Sludge, hazardous waste for lead	50	gallons			
	Antifreeze Tank (AST 19-1)	25% full, spent antifreeze	1	item		250 gallon	
	Contents of Tank AST 19-1	Antifreeze (spent)	50	gallons			
	Military Aircraft Washing Powder	Washing powder	72	buckets		5 gallon buckets	
Site 20 - Aircraft Control and Warning Building							
	Battery	Lead acid	6	item		6 volt	
	Compressed gas cylinder	Unknown	1	item			
	Freon cylinder	Freon	1	cylinder		4 ft. high, 1 ft. diameter	Northwest side of Building 117
Site 21 - Wastewater Treatment Facility							
	Piping; influent/effluent	Septage	500	linear feet		8-inch cast iron	
	Wastewater Treatment Tank (AST 21-1)	Falling and Drowning hazard: open cistern filled with water. Septage.	1	item		Over 10,000 gallons	
	Waste water cistern (AST 21-2)	Septage falling and drowning hazard: open cistern filled with water and septage.	1	tank		Over 10,000 gallons	3 ft. x 4 ft.
	Septage in AST 21-1 and AST 21-2	Septage, non-hazardous	10,000	gallons			
Site 22 - Water Wells and Water Supply Building							
	Generator and pump	Fuel	1	item			
	Containerized ACM cement	Asbestos	150	gallons			
	Asbestos cement	Asbestos	10	50 lb. bags			
	Diesel Tank (UST 22-1)	Diesel, now empty	1	tank		500 gallons	
	Drinking water wells	Contaminant migration pathway	3	wells		Nominal 12-inch diameter	Decommission per ADEC guidelines

TABLE 4-13
INVENTORY OF FUDS ELIGIBLE CONTAINERIZED HAZARDOUS AND TOXIC WASTE

Site 23 - Power and Communication Line Corridors							
	Drums	Unknown	5	Drums			
Site 24 - Receiver Building Area							
	No visible CON/HTW						
Site 25 - Direction Finder Area							
	Transformer casing	PCB	1	item			
Site 26 - Former Construction Camp Area							
	No visible sources of CON/HTW	N/A	N/A	N/A			
Site 27 - Diesel Fuel Pump Area							
	Fuel pump shed	Diesel	Unknown	N/A		4 ft x 6 ft x 8 ft high	Needs to be removed to provide access to fuel lines
	Concrete sump	Diesel				3 ft x 3 ft with piping and faucets	
	Fuel pump	Diesel	1	pump			
	Pipeline, buried and fuel pump	Diesel	1	item			

Excluded Items:

Site 7	Landfill
Site 9	Landfill
Site 10	Estimated 29,500 buried drums with lube oil grease
Site 19	Drain (Auto maintenance)
Site 24	Drum field
All	Items removed during the 1994 removal

KEY:

ACM - Asbestos-containing material
BD/DR - Building demolition/debris removal
CON/HTW - Containerized hazardous or toxic waste
DERP - Defense Environmental Restoration Program
FUDS - Formerly Used Defense Site
N/A - Not applicable
NE - Northeast Cape
PCB - Polychlorinated biphenyls
POL - Petroleum, oil and lubricants
SHPO - State Historic Preservation Office
TCLP - Toxic characteristic leaching procedure
UST - Underground storage tank

NOTE

(a) - Combined estimated quantity of building material at Site NE 18

5. **Drowning hazard**
   - Any pit, depression or tank which can collect or contain standing water

6. **Other hazards**
   - Exposed nails, broken timbers, sharp metal, unstable concrete block piles
   - Openings large enough for a child to enter (i.e., 8 inches by 8 inches) and be trapped or be exposed to other hazards

Table 4-14 presents the inventory of BD/DR at the Northeast Cape installation. In many instances, the field team was unable to access areas of the buildings and drum or debris piles. Therefore, the quantity of BD/DR should be considered a best-guess estimate. The construction contractor for the removal should be contacted to make a more accurate assessment of the quantity of material, impediments to demolition and removal and disposal options.

4.4 RECONNAISSANCE FOR PROSPECTIVE C&D WASTE MONOFILL SITE AND COVER MATERIAL

4.4.1 Reconnaissance of Gravel Fill Pads

The main operations complex is built upon an gravel pad most likely constructed from gravel from the borrow area located along the mountain front of the Kinipaghulghat Mountains south of the installation. The dimensions, thickness, and geotechnical parameters of the gravel pad are of interest because this pad may represent an appropriate location for construction of an inert C&D monofill in which inert building debris can be disposed during remediation.

During the 1996 site reconnaissance, the dimensions of the gravel pad at the Main Operations Complex were estimated by visual observation. This data was combined with historical data from the 1994 Phase I RI to produce an isopach map of the gravel pad, as illustrated in Figures 4-1 and 4-2. The isopach map was created by:

- observation of the thickness of the borders of the pad during field efforts

- projection of contours of equal elevation of native topography under the pad and notation of pad surface topography (based on historical topographic mapping)

- boring log information from the 1994 RI

TABLE 4-14
INVENTORY OF FUDS-ELIGIBLE BUILDING DEMOLITION AND DEBRIS REMOVAL ITEMS

Site Location	Building or Debris	Evaluation of Physical Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 1 - Burn Site Southeast of Landing Strip							
	No visible sources of BD/DR			N/A			
Site 2 - Airport Terminal and Landing Strip							
	Airport Terminal with Tower	Structural hazard unprotected openings > 8" x 8" in roof and tower wall, missing front stairs and railings; Climbing hazard tower readily climbable from main floor, Other numerous exposed nails, broken timbers, and openings > 8" x 8", collapsed tower	1,600	square feet		Estimate building size at 25 ft x 75 ft Also has 15 ft x 15 ft second story tower	Radio antenna (steel) has fallen over
	Roller	Collision hazard	1,000	pounds	1,000	4 ft long by 4 ft diameter steel cylinder	
	Drag frame	Collision hazard	200	pounds	200	8 ft by 15 ft "L" steel drag frame for runway grading	
	Cable	Entanglement hazard	25	feet			Steel tow cable
	Cable	Collision/Entanglement	10,500	feet		Cable - 2 strand copper with 3/4" rubber coating and 3/8" wire rope to main operations complex	Cable - 2 strand copper with 3/4" rubber coating and 3/8" wire rope to main operations complex
	Hoist assembly	Collision hazard	1,500	pounds	1,500	Hoist assembly 18 ft tall x 8 ft wide	
	Sled	Collision hazard	1	sled		1 sled 10 ft long x 3 ft wide - 1 pipe frame	
	Power lines/Poles	Collision and entanglement hazard for snow machine traffic	9	item			
	Tractor	Collision hazard for snow machine traffic	1	item			Could be under jurisdiction of SHPO - poor condition
	Drum(s)	Empty	5	item			Empty, deteriorated condition
	Fire extinguisher	Empty	1	item			
Site 3 - Fuel Line Corridor and Pumphouse							
	Bldg 119 - Fuel Pumphouse	Structural opening west end (15 ft by 30 ft)	448	square feet			Will need to be removed for contaminated soil removal - Has concrete foundation and tank pad
	Debris, metal	Other sharp metal edges protruding, collision hazard from fish camp housing to beach by snow machines	5,200	pounds	5,200		
	Rusted drums	Empty	15	drums			
Site 4 - Subsistence Fishing and Hunting Camp							
	Vehicles, abandoned	Collision and entanglement hazard for snow machine traffic	2	items			Could be under jurisdiction of SHPO - Totally ruined
	Drum(s)	Empty	275	drums			
	Water Tank (AST 4-1)	Empty	1	tank		15,000 gallon, 27 ft long x 10 ft diameter	Steel
	Water Tank (AST 4-2)	30% full of potable water	1	tank		400 gallon, 5.5 ft long x 3.6 ft diameter	Double-walled, insulated, aluminum

TABLE 4-14 (continued)
INVENTORY OF FUDS-ELIGIBLE BUILDING DEMOLITION AND DEBRIS REMOVAL ITEMS

Site Location	Building or Debris	Evaluation of Physical Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 5 - Cargo Beach							
	Bulldozer (D-8)	Collision hazard for snow machine traffic	1	vehicle			Could be under jurisdiction of SHPO - totally rusted and destroyed
	Cable	Collision and entanglement hazard for snow machine traffic	1,000	linear feet		2-inch diameter	
	Marston mats	Other protruding sharp metal edges, collision hazard for snow machine traffic	265	mats			
	Aluminum siding	Other protruding sharp metal edges, collision hazard for snow machine traffic	1,000	linear feet			
	Drum(s)	Empty	275	item			
Site 6 - Cargo Beach Road Drum Field							
	Debris, metal (small mats)	Other protruding sharp metal edges, collision hazard for snow machine traffic	200	cubic yards	500		
	Drum(s)	Empty	1,500	item			Estimated quantity
	Water Tank (AST 6-1)	Empty	1	item		500 gallon	Trailer mounted
Site 7 - Cargo Beach Road Landfill							
	Boiler	Collision hazard for snow machine traffic	1	item			Located in pond, with ACM liner
	Copper cable on spools	Collision hazard for snow machine traffic	3	item			
	Caterpillar cab	Collision hazard for snow machine traffic	1	item			
	Drum(s)	N/A	2,300	item			Estimated quantity
	Aluminum Radio antenna		2	towers			1 SE and 1 NE side of site
	Misc metal debris		10,000	pounds	10,000		
Site 8 - POL Spill Site							
	No visible sources of BD/DR						
Site 9 - Housing and Operations Landfill							
	Aluminum	Other protruding sharp metal edges, collision hazard for snow machine traffic	40	linear feet		40 feet	
	Truck frame	Other protruding sharp metal edges, collision hazard for snow machine traffic	1	item			
	Cable, steel	Other collision and entanglement hazard for snow machine traffic	100-500	linear feet			
	Drum(s), POL	Empty	50	item			
Site 10 - Buried Drum Field							
	Drum(s), surface	Empty	10	item			
Site 11 - Fuel Storage Tank Area							
	Drums	Empty	5	drums			
Site 12 - Gasoline Tank Area							
	No visible sources of BD/DR						
Site 13 - Heat and Electrical Power Building							
	Bldg 110 - Heat and Electrical Power	Structural hazard: unprotected openings > 8" x 8" in roof and tower wall, missing front stairs and railings. Climbing hazard 2nd floor readily climbable from main floor. Other numerous exposed nails, broken timbers, and openings > 8" x 8"	7400	square feet			

TABLE 4-14 (continued)
INVENTORY OF FUDS-ELIGIBLE BUILDING DEMOLITION AND DEBRIS REMOVAL ITEMS

Site Location	Building or Debris	Evaluation of Physical Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 13 - Heat and Electrical Power Building							
	Water (pressure) tank (AST 13-5)		1	item		500 gallon	
	Water tank (AST 13-6)	Climbing hazard, tank is >8' from ground, the rack allows the tank readily climbable for children	1	item		204,000 gallon	
Site 14 - Emergency Power Operations Building							
	Bldg 98 - Emergency Power Operations	Other roof, floor, and ceilings are collapsing from weathering. Drowning hazard the basement contains water	16,250	square feet			Aluminum roofing (mostly blown off) This building has ~ 6 inch concrete exterior walls and steel girder roof Steel stud/wire mesh/cement grout interior
	Antenna, triangular	Other entanglement and collison hazard	1	item		35 feet high	
	Debris, miscellaneous building	Other exposed nails & sharp metal protruding debris	2 est	cubic yards			
	Power lines/Power poles	Other: entanglement hazard for ATV and snow machine traffic	9	item			
	Loose 3-wire cable	Entanglement hazard	200	linear feet			
	Wooden spools with copper cable	Collision hazard	2	spools		5 ft diameter	
Site 15 - Buried Fuel Line Spill Area							
	No visible sources of BD/DR						
Site 16 - Paint and Dope Storage Building							
	Bldg 112 - Paint and Dope Building	Climbing hazard exterior provides easy access to roof > 10' above ground	N/A	N/A			
	Drum(s); rollers	Other collision hazard for ATV and snow machine traffic	2	item		3 5 ft diameter x 4 ft long, for compacting drums	
	Cable (spool)	Other collision hazard for ATV and snow machine traffic	1	spool		7 wire, 3/4 inch	
	Cable (spool)	Other collision hazard for ATV and snow machine traffic	1	spool		20 wire, 1 5 inch	
	Antenna (triangular)	Other collision hazard for ATV and snow machine traffic	1	item		12-feet	
	Steel girders	Other collision hazard for ATV and snow machine traffic	2,000	pounds	2,000		
	Marston matting	Other collision hazard for ATV and snow machine traffic	500	pounds	500	8 ft x 1 5 ft (176 item)	
	Crates, silica sand	Other collision hazard for ATV and snow machine traffic	6	crates		4 4 ft x 2 ft	
	Galvanized metal	Other collision hazard for ATV and snow machine traffic	200	pounds			Culvert material
	Corrugated copper steel half rounds	Other collision hazard for ATV and snow machine traffic	150	item		12-inch radius	
	Pipe	Other collision hazard for ATV and snow machine traffic	2	item		4-inch diameter x 20 ft long	
	Pipe	Other collision hazard for ATV and snow machine traffic	1	item		4-inch diameter x 12 ft long	
	Masonry bricks	Other collision hazard for ATV and snow machine traffic	200	item			
	Fire Extinguisher, empty	Other collision hazard for ATV and snow machine traffic	1	item			Empty
Site 17 - General Supply Warehouse and Mess Hall Warehouse							
	Bldg 111 - General Supply Warehouse	Structural hazard roof, floor, and ceiling are collapsing from weathering	9900	square feet			

TABLE 4-14 (continued)
INVENTORY OF FUDS-ELIGIBLE BUILDING DEMOLITION AND DEBRIS REMOVAL ITEMS

Site Location	Building or Debris	Evaluation of Physical Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 17 - General Supply Warehouse and Mess Hall Warehouse							
	Bldg 107 - Mess Hall Warehouse Building	Structural hazard roof, floor, and ceiling are collapsing from weathering	10,200	square feet			Concrete slab
Site 18 - Housing Facilities and Squad Headquarters							
	Unknown Tank (AST 18-1)	Empty, climbing hazard	1	tank		200 gallons	In subterranean room
	Bldg 99 - Recreation Building	Structural hazard roof, floor, and ceilings are collapsing from weathering, numerous openings > 8"x 8" Climbing hazard 2nd floor readily climbable from interior and exterior	72050[a]	square feet (NE 18)			Unpainted steel building, recycle possibility No roof Laminated 6-inch hardwood floor
	Bldg 100 - NCO Quarters - N&S buildings	Structural hazard roof, floor, ceilings, and load-bearing walls are collapsing from weathering, numerous openings > 8" x 8" Climbing hazard 2nd floor readily climbable from interior and exterior	72050[a]	square feet (NE 18)			Debris near all buildings at Site 18
	Bldg 101 - Dormitory E&W	Structural hazard roof, floor, ceilings, and load-bearing walls are collapsing from weathering Drowning hazard the basement is full of water > 8' deep	72050[a]	square feet (NE 18)			Building lumber, recycle possibility
	Bldg 102 - BOQ	Structural hazard roof is sagging and floors are collapsing, and weakening load-bearing walls are collapsing from weathering	72050[a]	square feet (NE 18)			ACM, too dangerous to abate
	Cables, and power lines	Other: entanglement hazard for ATV and snow machine traffic	unknown	N/A			
	Utility Corridor	Cave-in hazard deteriorating wooden covers and wall linings are producing open holes >5'	unknown	N/A			Located throughout facility
	Subterranean walkway	Drowning, falling hazard		linear feet			
	Bldg 104 - Administration	Structural hazard roof is sagging, floors, ceilings, and weakening load-bearing walls are collapsing from weathering	72050[a]	square feet (NE 18)			
	Bldg 105 - Theater	Structural hazard roof is sagging, floors, ceilings, and weakening load-bearing walls are collapsing from weathering	72050[a]	square feet (NE 18)			Stainless-steel inside building, recycle possibility
	Bldg 106 - Mess Hall	Structural hazard roof is sagging, floors, ceilings, and weakening load-bearing walls are collapsing from weathering	72050[a]	square feet (NE 18)			
	Bldg 125 - Pre-fab Building	Collapsed, total ruin	unknown	N/A			
	Bldg 130 - Hobby Shop	Structural hazard roof is sagging, floors, ceilings, and weakening load-bearing walls are collapsing from weathering	unknown	N/A			
Site 19 - Auto Maintenance and Storage Facilities							
	Water tank (AST19-2)	Empty	1	item		250 gallon	
	Bldg 109 - Auto Maintenance Facility	Structural hazard roof, floor, ceilings, and load-bearing walls are collapsing from weathering, numerous openings > 8"x8" Climbing hazard 2nd floor readily climbable from interior and exterior	unknown	N/A			South side is 2 story, concrete slab foundation

TABLE 4-14 (continued)
INVENTORY OF FUDS-ELIGIBLE BUILDING DEMOLITION AND DEBRIS REMOVAL ITEMS

Site Location	Building or Debris	Evaluation of Physical Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 19 - Auto Maintenance and Storage Facilities							
	Bldg. 108 - Auto Storage	Structural hazard roof is sagging and load-bearing walls are strained from weathering	unknown	N/A			Concrete slab foundation
	Floor jacks		2	item			
Site 20 - Aircraft Control and Warning Building							
	Bldg. 103 - Aircraft Control and Warning	Structural hazard walls and ceilings have collapsed, remaining load-bearing walls are sagging and deteriorated due to weathering	3358	square feet			
	Lead-shielded cable	N/A	25	linear feet		1-inch cable	
Site 21 - Wastewater Treatment Facility							
	Wastewater Treatment Tank	Falling and Drowning hazard open cistern filled with water	1	item		800 gallon	Concrete cistern bermed with earthen materials
	Steam line piping	N/A	500	linear feet		1-1/4-inch diameter	
	Wastewater Treatment Building	Structural hazard	Unknown	N/A			
Site 22 - Water Wells and Water Supply Building							
	Drinking water wells		4	Wells			Abandon per ADEC procedures
	Bldg. 113 - Water Supply Building	Structural hazard roof and walls collapsing. Falling hazard subsurface floor is >6 and concrete lined thus resulting in a drowning hazard	28	feet high			Contains 4 large water tanks listed separately
	Well #4 pumphouse	Structural hazard openings > 8" x 8", roof sagging and load-bearing walls deteriorated due to weathering					
	Bldg. 114 - Pump Station	Climbing hazard	1	item			
	Water tanks (AST22-2 to 5)	Climbing hazard, empty	4	tanks		60,000 gallon	In Building 113
Site 23 - Power and Communication Line Corridors							
	Downed power pole	Entanglement hazard					
	Drum(s)	Empty, sharp edges, rusted	1,500	item			
Site 24 - Receiver Building Area							
	Drum(s)	Empty	300	item			
	Concrete Receiver Building and foundation	Structural hazard					
Site 25 - Direction Finder Area							
	Concrete building foundation	Structural hazard					Foundation only
	Drums	Empty, rusted, sharp edges				55-gallon drums	Included in Site 23

TABLE 4-14 (continued)
INVENTORY OF FUDS-ELIGIBLE BUILDING DEMOLITION AND DEBRIS REMOVAL ITEMS

Site Location	Building or Debris	Evaluation of Physical Hazard	Estimated Quantity	Units	Estimated Weight (Pounds)	Estimated Dimensions	Comments
Site 26 - Former Construction Camp Area							
	Drinking water well	Contaminant migration pathway	1	well			Decommission per ADEC guidelines
	Well house	Structural hazard, collapsing	1	building			
Site 27 - Diesel Fuel Pump Area							
	No visible sources of BD/DR						
All	Antenna	Climbing hazard	108	antenna			Throughout site

Excluded Items:

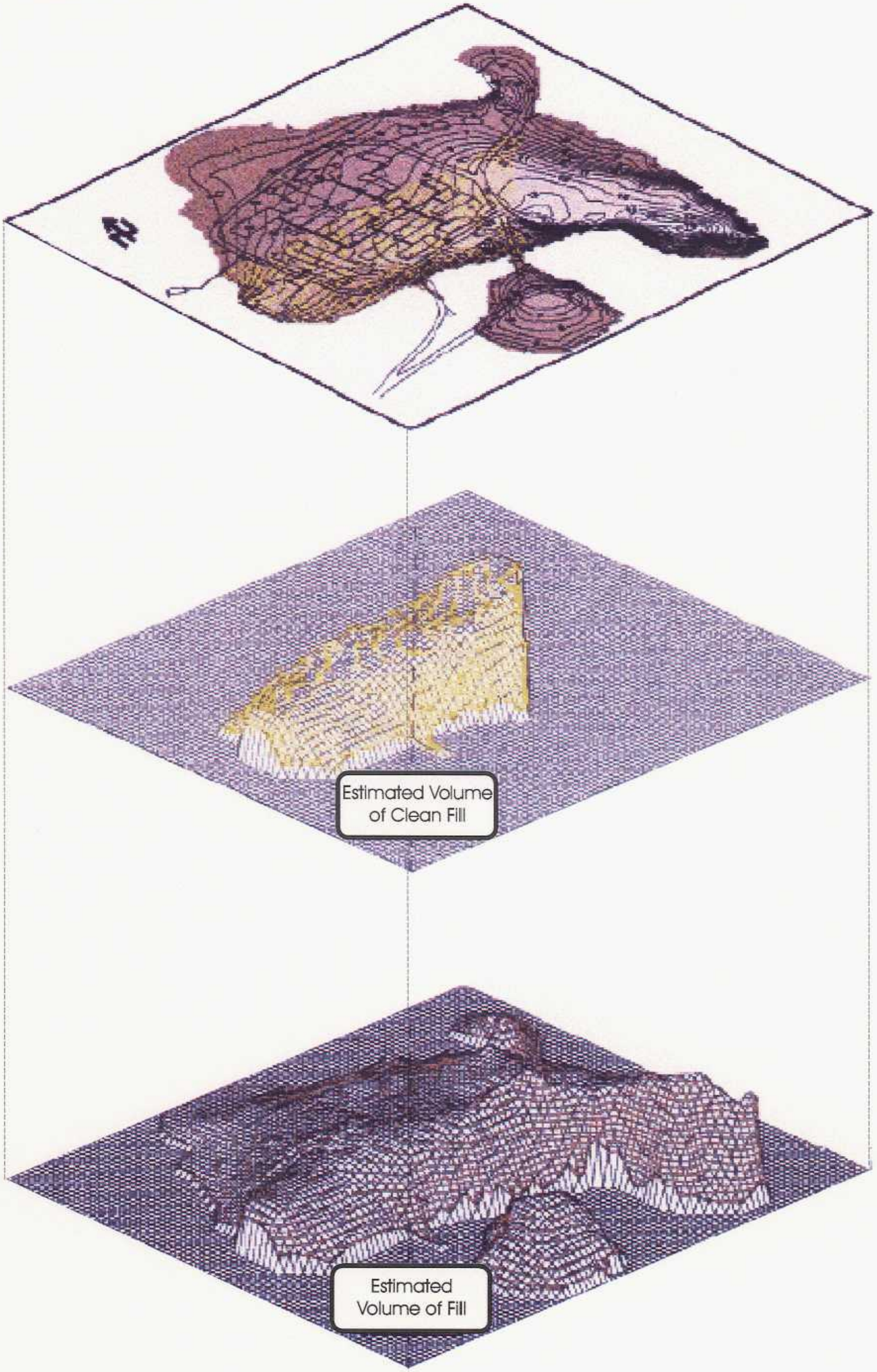
Site 7	Landfill
Site 9	Landfill
Site 10	Estimated 29,500 buried drums with lube oil grease
Site 19	Drain (Auto maintenance)
Site 24	Drum field
Site 27	Partially buried drums

KEY:

ACM - Asbestos-containing material
BD/DR - Building demolition/debris removal
CON/HTW - Contaminated hazardous or toxic waste
DERP - Defense Environmental Restoration Program
FUDS - Formerly Used Defense Site
N/A - Not applicable
NE - Northeast Cape
PCB - Polychlorinated biphenyls
POL - Petroleum, oil and lubricants
SHPO - State Historic Preservation Office
TCLP - Toxic characteristic leaching procedure
UST - Underground storage tank

NOTE

(a) - Combined estimated quantity of building material at Site NE 18



MONTGOMERY WATSON

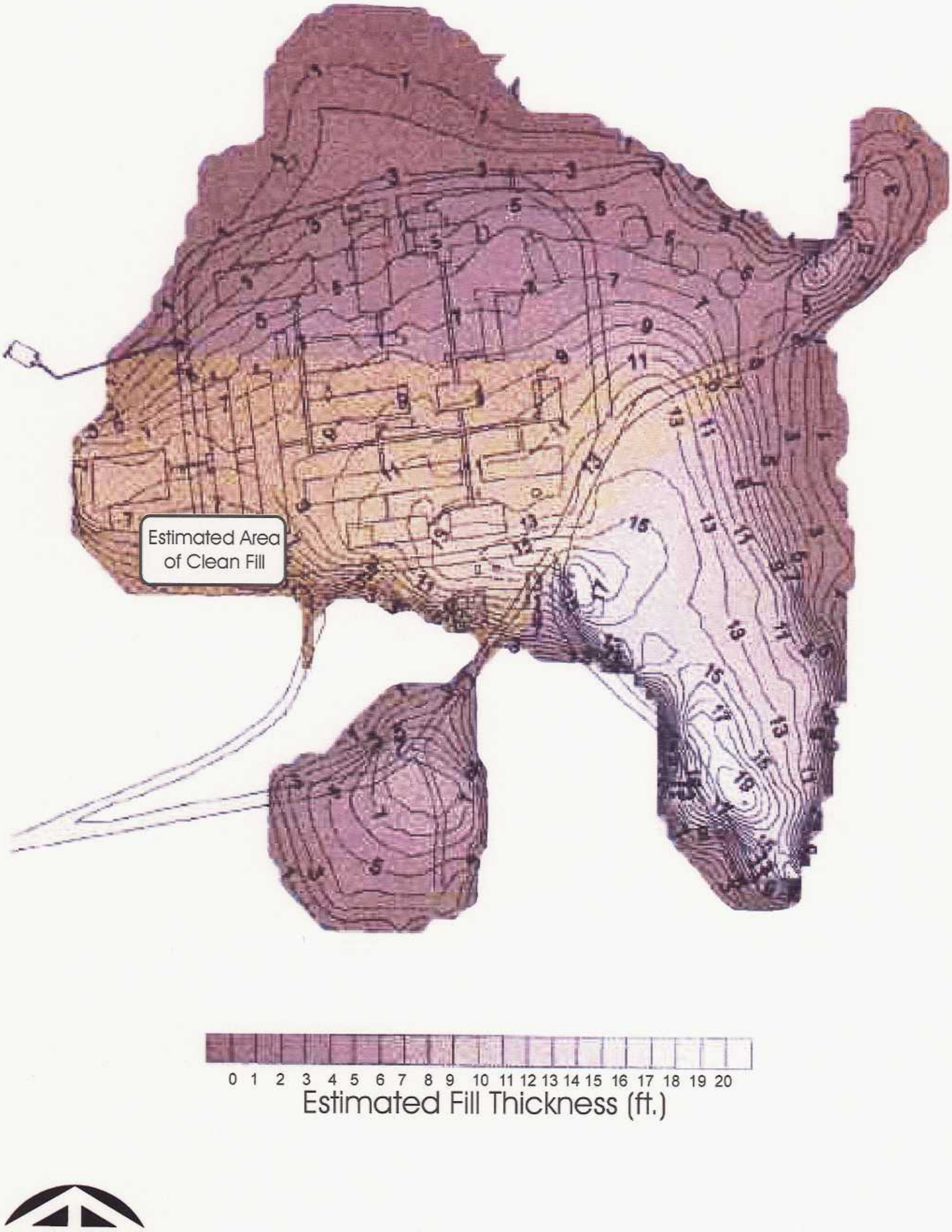
Anchorage, Alaska

FIGURE 4-1

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

FILL VOLUMES

JOB No. 1811.0



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MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 4-2

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE-ST. LAWRENCE ISLAND, ALASKA

FILL DEPTH CONTOUR MAP

The isopach map shown in Figures 4-1 and 4-2 is subject to several estimation inaccuracies (the primary potential inaccuracy being the estimation of the original topography that underlies the fill material). A substantial amount of artificial fill is contained within the gravel pad at the main operations complex. The total volume of fill was estimated using volume-estimating routines developed by Golden Software, which calculates the volume of a surface overlying a reference plane. Using this method, the total volume of fill is estimated at approximately 360,000 cubic yards. The largest volume appears to be the two lobes south of the main operations complex that did not have permanent structures. The westernmost lobe is identified in older maps as a "softball diamond", although it was believed to be originally used for construction equipment staging during the construction of the main operations complex. The easternmost lobe was used by Morrison Knudsen (MK) for temporary construction housing and construction staging in 1950 to 1966 (Toolie, 1996). An abandoned construction well used by MK during building of the facility is on the eastern lobe.

The quantity of usable fill may be limited by contamination. Fill on the northern edge of the gravel pad (Sites 13, 15, 16, 17, 19, and 20) is contaminated with diesel fuel. However, there is no current evidence of contamination at Site 14 and Site 18, which represent a major portion of the fill pad. Site 21 was not included in the fill volume because of potential contamination associated with the wastewater treatment facility.

As previously noted, the two lobes at the southern edge of the fill pad do not have structures on them, and represent a substantial amount of artificial fill. However, three locations were noted in these areas which may suggest that buried waste and debris may be contained under this fill. The western lobe consists of coarse, poorly sorted angular gravel with boulders to a maximum of 1 foot in diameter. The road which crosses this lobe contains finer fill material of crushed rock, with a grain size of generally less than 3 inches. An approximately 40-foot section of the embankment near the Cargo Beach Road contains partially buried metal and wood debris. In addition, a portion of the southwest embankment shows indications of tar oozing from the fill material. In the north-central portion of the eastern lobe, a weathered concrete foundation pad is located in an area of rounded darker rocks that probably originated from the beach area. The eastern lobe also shows indications of debris and tar on the southern edge of the fill pad. These observations are consistent with the reports that when MK demobilized in about 1966, they burned and buried obsolete items such as construction offices and barracks (Toolie, 1996).

Thus, the total usable amount of fill materials may be much less than the total fill area. The total usable fill has been estimated by eliminating areas of known contamination, and estimating the depth to groundwater beneath the pad. This results in an estimated usable volume of approximately 140,000 cubic yards. However, sampling data in this area is limited and the estimated quantity of usable fill may be further reduced by unanticipated soil contamination.

Vegetation is present throughout the fill pad, with the exception of roads and driveways that have been used in the recent past or have been compacted by vehicular traffic. Vegetation in non-traveled areas consists of light grasses and small low shrubs. In areas that were never subject to heavy traffic, such as relatively inaccessible areas between buildings, revegetation has occurred in as much as 25 to 50 percent of the total surface area. In other areas that may have had minor traffic during operation of the facility, revegetation on the order of 10 to 20 percent has occurred.

Because of the extreme wind conditions at Northeast Cape, deflation of traveled areas is a significant erosional process. In less traveled areas, wind erosion appears to have stabilized due to revegetation and creation of a natural pavement created by larger sand and gravel clasts. Heavily traveled areas, such as the Airport and Cargo Beach Road can be observed to be the source of windblown sand and dust during wind events. These roads are reported to have deflated several feet since military maintenance ceased (Toolie, 1996). During the military era, the roads were oiled with "drain oil", although little evidence of this oiling can be observed today. Drain oil was stored in Tank 16-1 north of the Paint and Dope Building at Site 16.

Much of the artificial fill pad on which the main operations complex is constructed is believed to have originated from the gravel borrow pit, which consists of coarse, angular granitic rocks. The surface of the pad consists of poorly sorted fine to coarse gravel combined with sand and windblown silt. Boring logs from the northern section of the fill pad suggest that the fill materials do not consist exclusively of coarse material, but also contain a significant amount of silt. This suggests that native soils may have been mixed with materials from the borrow pad during construction of the pad. In many areas, the fill material is difficult to distinguish from native soils during drilling.

4.4.2 Reconnaissance of the Former Borrow Area

The borrow area was investigated as a potential source of fill, or as a potential site for an inert monofill. The borrow area was used during construction of the facility, and is located at the mountain front of the Kinipaghulghat Mountains, approximately 2,000 feet south of the main operations complex. The borrow area is located on a broad colluvial slope consisting of clasts of igneous material weathered from granitic rocks at higher elevation. The mountain front rises steeply at the borrow area, where bedrock materials crop out and reach a maximum elevation of 1,800 feet.

The borrow area materials were derived from the Cretaceous Kinipaghulghat Pluton. The approximately 10 square mile pluton is present as relatively resistant bedrock outcrops, which form the mountains of the northeast cape of the island. The rocks of the Kinipaghulghat Pluton are reported by Patton and Csejtey (1980) to consist primarily of massive quartz monzonite, which grades locally to monzonite, granodiorite, syenite, and alaskite. Some of the monzonite and syenites contain abundant mafic minerals but little or no quartz.

Field observations at the borrow area indicate two large areas which have been worked. The westernmost area appears to have been the most heavily used. The main borrow area is approximately 1,500 feet wide and 800 feet long, with a smaller area of about 600 by 200 feet which has been heavily worked. The colluvium at this location consists of angular to subangular granitic rock. The typical clast size is about 3 inches, although boulders to 3 feet in diameter are common. Higher on the hillslope, the typical clast size is about 6 inches. Monzonitic rocks are the most abundant in the immediate vicinity of the borrow area, although fine-grained apalitic rocks, rocks consisting almost entirely of mafic minerals, and rocks consisting almost entirely of plagioclase feldspar were occasionally found. At higher elevations above the borrow area, more mafic granitic rocks form a large intrusion in the pluton which is less resistant to weathering.

Based on observations at the site, the borrow area was worked by pushing materials down the slope with heavy equipment. Toolie (1996), confirmed this, and indicated that blasting was not required. The rock was crushed in two different sizes, one for roading materials, and another for the runway materials. Disturbance by heavy equipment is evident approximately 500 feet up the colluvial slope. At the base of the slope is a working pad of about 1/2 acre on the working pad is a loading dock and driveway at which materials could be loaded in trucks. The loading dock still appears serviceable.

At the base of the colluvial slope near the working pad are several springs and ponded water. These springs originate from seepage in the granitic rock, and suggest that subsurface water may be perched on shallow bedrock beneath the working pad. Based on the elevations of the springs and surrounding topography, it would not be unreasonable to assume that subsurface water is less than 20 feet deep on the working fill pad.

Based on these field observations, the former borrow area is an excellent source of fill materials, with an estimated volume of 50,000 cubic yards or more that could be collected without blasting. Much of the material may be oversized (greater than 6 inches) for structural purposes, and the fill material will have a high hydraulic conductivity. A road from the main operations complex to the borrow area is in good repair, and could be used with minimal further environmental damage.

The observations of springs at the borrow area suggest that it may not be a viable landfill location because of the potential for shallow bedrock and shallow subsurface water. A landfill should not be planned in this location without subsurface investigation.

4.4.3 Reconnaissance for Low Permeability Cover Material

During the 1998 field work, an installation-wide reconnaissance for a source of low permeability geologic materials was conducted. The low-permeability materials may be needed as a capping material if a landfill is constructed on-site.

The scope of the reconnaissance was:

- Review of the boring logs from the 1994 investigation
- Visual inspection of the entire installation
- Hand-digging shallow test holes at selected locations

The reconnaissance revealed no apparent or obvious high-volume source of fine silt or clay material available within one mile of the Main Operations Complex, Airport or Cargo Beach. Although thin silt and clay lenses are prevalent at the site, these materials are generally interbedded with sand and coarse materials.

The southern portion of the site (near the Kinipaghulghat Mountains) constitutes the proximal portions of an alluvial fan, and thus are composed of relatively coarse, permeable material. Geologic materials become finer at more distal portions of the fan toward the Bering Sea, and discontinuous finer-grained deposits can be found. However, sensitive ecological environments, such as tundra or wetlands almost universally overlie these materials. Mining of sediments in these areas would cause significant damage to fragile vegetation. Beach deposits have little vegetation, but are composed of coarse sand and gravel. No significant clay deposit was found during the reconnaissance.

4.4.4 Summary of Monofill Data

Based on the data from this and previous site investigations, several significant issues were identified regarding the design and construction of an on-site monofill. These include:

Siting. Most of the installation is situated on tundra or wetlands, and, therefore, inappropriate for excavation and construction of a monofill. The former gravel borrow area and the Main Operations Complex (Figure 1-4) are both previously disturbed areas with limited or no vegetation and could be developed into a monofill. Based on limited subsurface information, the southern portion of the Main Operations Complex appears suitable for a monofill and would be close to much of the debris destined for the monofill. The depth to groundwater underneath the southern portion of the Main Operations Complex is estimated between 15 and 25 feet. The depth of gravel beneath the southern portion of the Main Operations Complex is estimated to be between 1 and 15 feet.

Although potentially feasible, the former gravel borrow area has shallow subsurface water and springs that would raise concerns over leaching from a monofill. Siting a monofill at the former gravel borrow area would probably be more complex and costly.

Fill materials. The total usable (uncontaminated) quantity of fill material at the Main Operations Complex has been estimated at 140,000 cubic yards. However, much of this area has not been subject to subsurface investigation. If previously-unidentified contamination is found, the quantity of usable fill may be significantly reduced. Shallow groundwater or frozen soils may also limit the use of these materials.

The former gravel borrow area is an excellent source of fill materials, with an estimated quantity of at least 50,000 cubic yards. Much of this material is oversized (greater than 6 inches), and will have a high hydraulic conductivity. The material could be used to backfill excavations or as a high-permeability cover material, but would be unsuitable as a low-permeability cover material for the monofill.

Cover materials. No significant quantities of clay or other low permeability earthen materials were observed at or near the installation. Mining of shallow organic silts present at many of the sites would disturb sensitive tundra and wetlands.

Access. Existing gravel roads to the Main Operations Complex and former gravel borrow area are generally in adequate condition for use by the heavy equipment typically used to construct and operate a construction and demotion debris monofill. However, road improvements for a 500-foot length of road may be necessary, primarily to fill swales formed by erosion. This conclusion should be verified with the potential remediation contractors, since construction methods and equipment vary.

Data Gaps. Subsurface investigation at both the Main Operations Complex and former gravel borrow area is limited. Design and construction of a monofill in either area should be preceded with at least an investigation to determine the presence or absence of subsurface water and flow characteristics, extent of contamination at the Main Operations Complex, and extent of frozen soils or permafrost.

5. SITE INVESTIGATION AND REMEDIATION SUMMARIES

This section presents a physical description of each site, potential sources of contamination, a summary of investigative activities, contaminants of concern, and recommended remedial actions. Tables of analytical results (Tables 5-1 through 5-50) are found in a separately bound document. Site photographs are provided in Appendix A. Complete laboratory results and data validation reports are provided in Appendix B and C, respectively. Biological sampling results and stream flow measurements are provided in Appendix D and E, respectively.

5.1 SITE 1: BURN SITE SOUTHEAST OF LANDING STRIP

Physical Description. The burn site is located southeast of the runway (Figure 1-4). The site is part of the gravel pad and currently there are no structures or debris at the site (Figure 5-1). The site is sparsely vegetated.

Potential Sources of Contamination. Materials reportedly burned at the site and by-products of burning.

Investigation Activities. E&E field personnel inspected the site for buildings and debris that because of their state of disrepair could represent a physical hazard at the site, of containerized hazardous or toxic wastes, and potential sources of environmental contamination. No hazardous structures, hazardous debris, or CON/HTRW was observed at this site (E&E, 1993). There were no visual indications of potential contamination, such as distressed vegetation or charred debris.

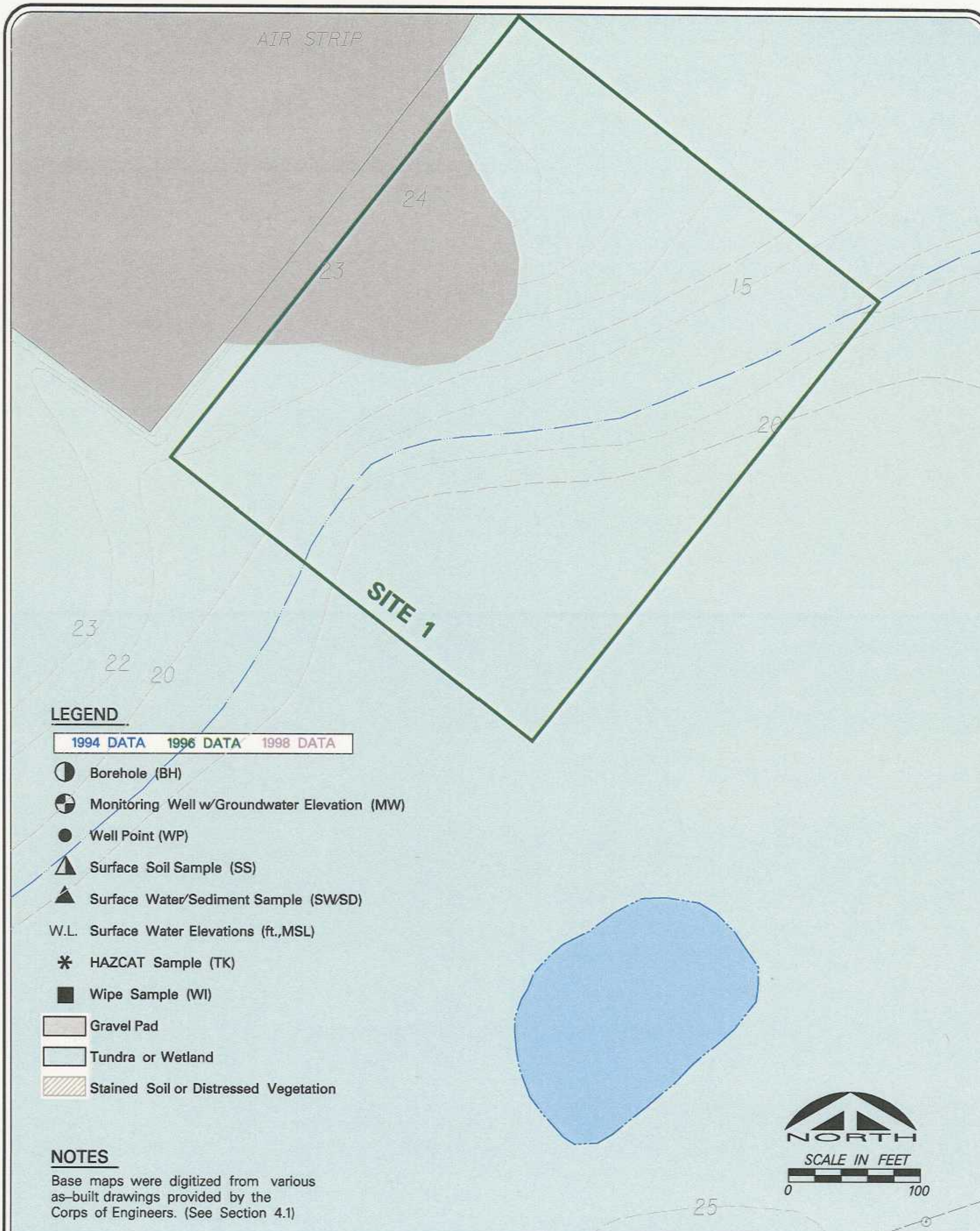
This site is not eligible for DERP cleanup because no CON/HTRW, hazardous structures, or hazardous debris are present or suspected to be present at the site.

Contaminants of Concern. None.

Recommended Remedial Action. No further action.

5.2 SITE 2: AIRPORT TERMINAL AND LANDING STRIP

Physical Description. The airport is located north of the Main Operations Complex (Figure 1-4). The airport terminal area consisted of two buildings, the Terminal Building and a Transformer Shed (now removed), and an apron pad located on the southeast side of the airstrip at approximately the midpoint of the airstrip (Figure 5-2). The structures consist of a 25 foot wide by 64 foot long by 18 foot high operation/control tower (Terminal Building); an approximately 6 foot wide by 9 foot long by 8 foot high transformer shed located approximately 30 feet southeast of the Terminal Building. The Transformer Shed was removed from the site during the 1994 Interim Removal Action (NES, 1995). There is also a 1,000-gallon AST (AST 2-1) at the southeast corner of the Terminal Building.



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5-1

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 1 BURN SITE SOUTHEAST OF LANDING SITE

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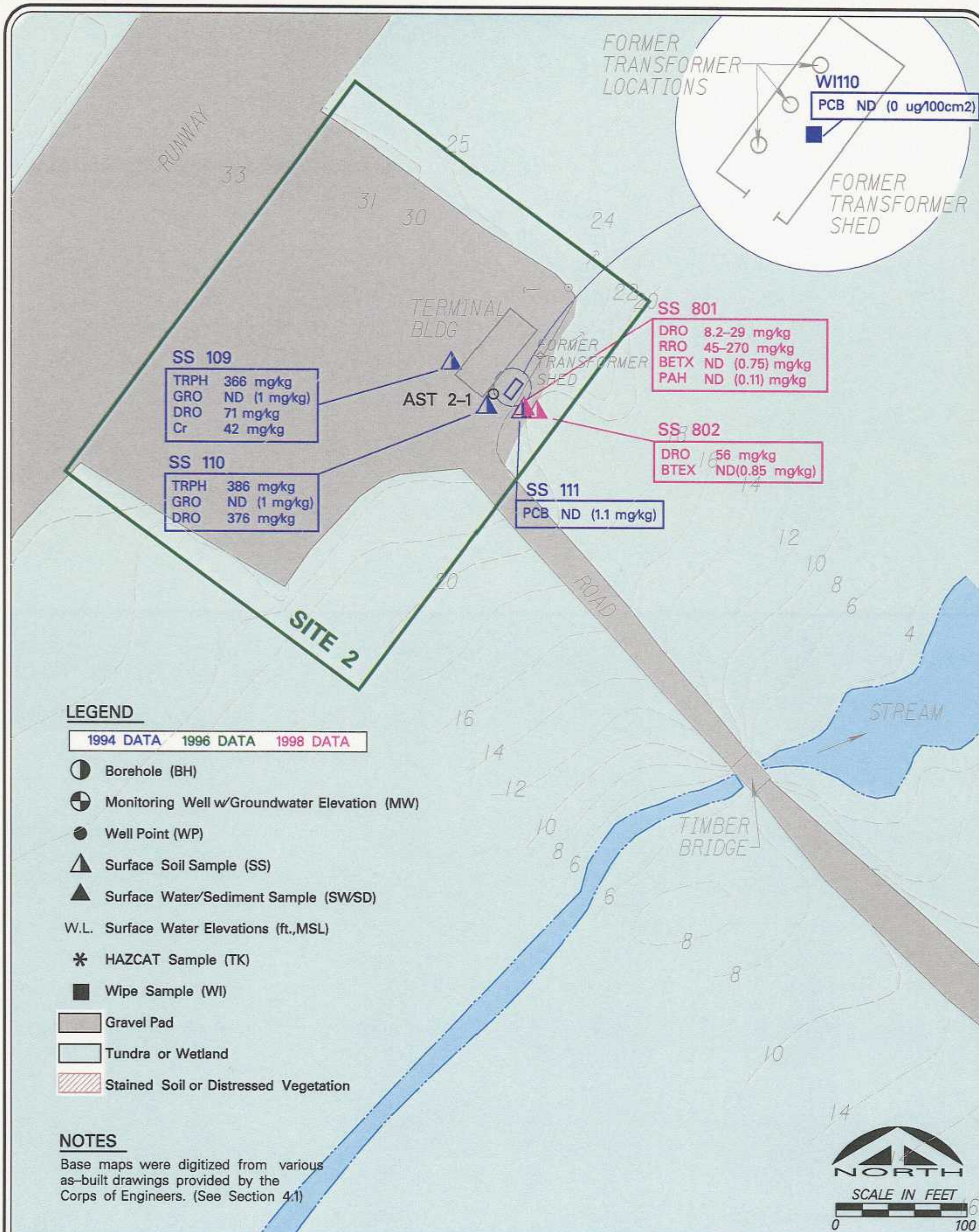

MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5–2

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 2 AIRPORT TERMINAL AND LANDING STRIP

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Potential Sources of Contamination. AST, transformers.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995). The type and location of the ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to buildings suspected to contain friable asbestos. Table 3-2 lists warning sign locations. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of buildings and debris slated for demolition and removal is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, two 500-gallon diesel ASTs were identified and found to be empty. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

Two potential sources of environmental contamination were identified at this site, the AST and Transformer Shed. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 1, Soil Matrix Level C criteria and ADEC Method 2 soil cleanup standards for PCB. Soils around the AST and at the edge of the pad were sampled and analyzed for TRPH, RRO, DRO, GRO, BTEX, metals, and PAH. Complete soil analytical data are presented in Table 5-1 and compared to the cleanup criteria. All results were below the cleanup criteria, except for one soil sample in which chromium at 42 mg/Kg was detected (only one sample was analyzed for metals). This exceeds the proposed cleanup criteria of 26 mg/Kg. Since there is no apparent source and only one exceedence, chromium is not considered a contaminant of concern.

background
64 ppm
5-390

One surface soil sample and one wipe sample were collected from the Transformer Shed and analyzed for PCB. As shown in Table 5-1 (for soil) and Table 5-2 (for wipe samples), no PCBs were detected.

Contaminants of Concern. ACM and lead-based paint incidental to BD/DR.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR. A tractor of potential historical significance is located adjacent to the southern edge of the runway.

Gravel Pad: No further action.

Tundra/Wetlands: No further action.

Potential Obstacles to Remediation. None identified at this time.

5.3 SITE 3: FUEL LINE CORRIDOR AND PUMPHOUSE

Physical Description. Site 3 is located in the northeast corner of the installation (Figure 1-4) on the Cargo Beach. It consists of a fuel pumphouse housing engine-driven pumps, two 500-gallon ASTs (AST 3-1 and AST 3-2) located outside the pumphouse, and a 4-inch welded steel fuel line (Figure 5-3). The fuel line was used to transfer diesel fuel approximately 8,000 feet from the pumphouse at the Cargo Beach to the bulk storage facilities at the housing and operations area. Miscellaneous debris, such as an auto battery and a bucket of paint, are scattered at the site.

Potential Sources of Contamination. Two ASTs, Pumphouse, fuel line, auto lead-acid battery, bucket of paint.

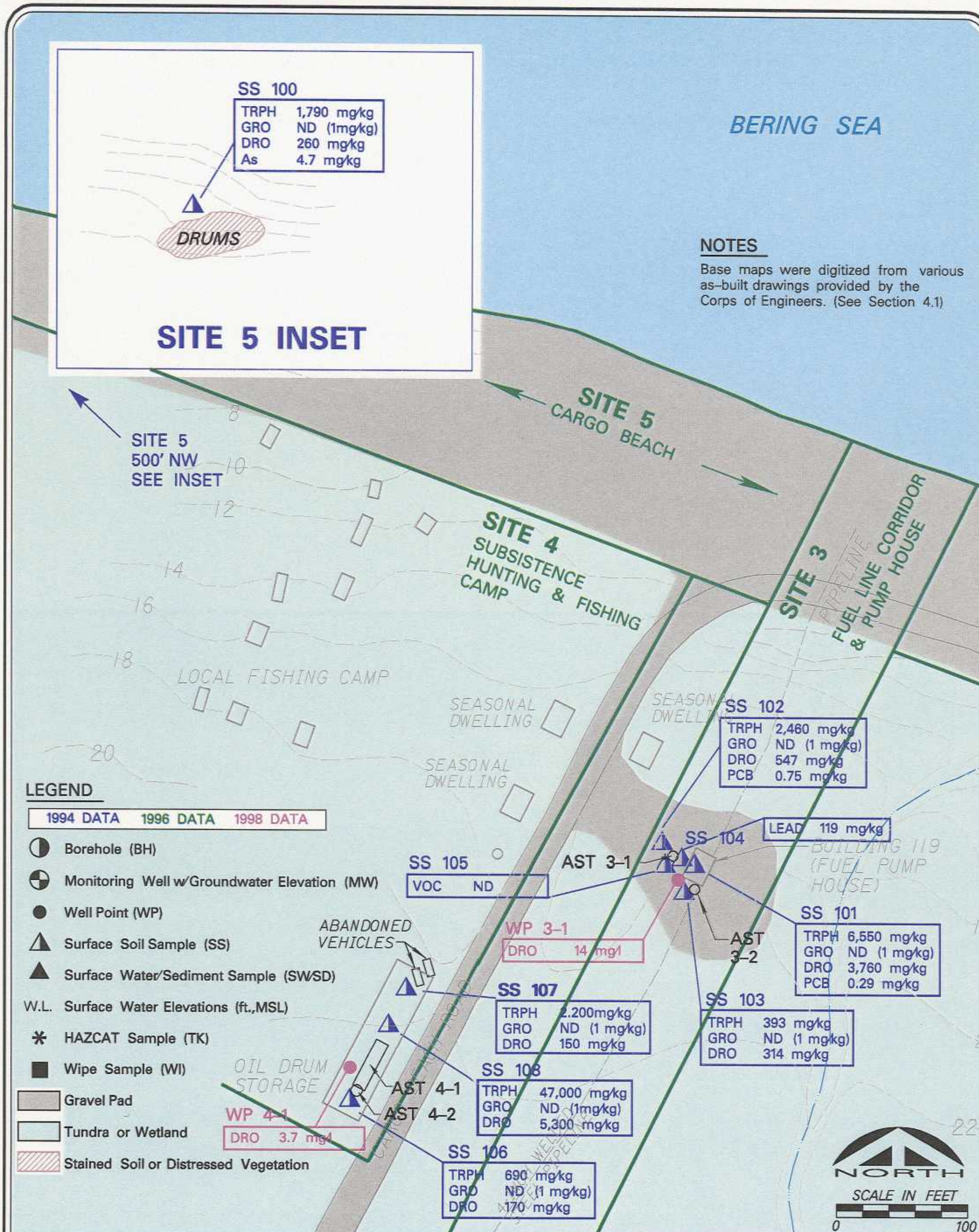
Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM and lead-based paint. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of the ACM is summarized in Table 3-1. Non-friable ACM were observed at the site. No warning signs were posted for non-friable ACM. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, two 500-gallon diesel ASTs were identified and found to be empty. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

The potential sources of environmental contamination identified at this site are the two ASTs, pumphouse and fuel line, lead-acid battery and bucket of paint. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 1, Soil Matrix Level C standards for petroleum and ADEC Method 2 soil cleanup standards for all other constituents. Soils around the potential sources were sampled and analyzed for TRPH, DRO,



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5-3

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 3, 4 & 5 FUEL LINE, SUBSISTENCE CAMP, & CARGO BEACH

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GRO, BTEX, RCRA metals, PCB and volatile organic compounds (VOC). Analytical results are presented in Table 5-3 (for soil) and Table 5-4 (for water) and compared to the cleanup criteria. Isolated areas of site soils exceed the ADEC Method 1 Soil Cleanup Standards for TRPH and DRO.

One subsurface water sample was collected and analyzed for DRO, BTEX and PAH. The DRO result of 14 mg/L DRO exceeds the ADEC cleanup criteria for DRO of 1.5 mg/L. Although ethylbenzene, xylene, fluorene and naphthalene were detected in subsurface water, the levels do not exceed cleanup criteria for those constituents.

Contaminants of Concern. DRO in soil and subsurface water. ACM and lead-based paint incidental to BD/DR.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. Address petroleum-contaminated subsurface water consistent with installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: No further action.

Potential Obstacles to Remediation. None identified at this time.

5.4 SITE 4: SUBSISTENCE FISHING AND HUNTING CAMP

Physical Description. The subsistence fishing and hunting camp is located southwest of the Cargo Beach barge off-loading area (Figure 1-4). The site includes wood frame structures originally constructed as housing for Alaskan Native civilian employees of the base. Three of the structures are presently used by Alaskan Natives as a fishing and hunting camp for part of the year. The other structures are in disrepair due to inclement weather.

There are also two abandoned vehicles and two abandoned ASTs located just south of the housing area. The larger tank (AST 4-1) is approximately 15,000 gallons, with steel construction and dimensions of 27 feet long and 10 feet in diameter. The second tank (AST 4-2) is approximately 400 gallons, double-walled and insulated, and 5.5 feet long and 3.6 feet in diameter. Both tanks reportedly were used to store potable water. Figure 5-3 shows the layout of the site.

Similar to the majority of the Northeast Cape installation, vegetation at Site 4 consists primarily of sedges and grasses giving way to beach grasses near the Bering Sea Coast. The vegetation appears to be healthy with extensive coverage over the site, with the exception of the Cargo Beach Road and the beach itself. Drainage from the site is north/northeast towards the beach with standing water scattered about the site in depressed areas. There is no source of potable water at Site 4.

Potential Sources of Contamination. Two abandoned vehicles, abandoned drums (currently empty).

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

The three structures that are currently used as seasonal housing were inspected for ACM by a certified asbestos inspector. The inspection included all visually accessible material including flooring, wainscoting, exterior materials, and roofing materials. Although no sampling or invasive inspection was performed, no materials believed to contain asbestos were noted in any of the homes. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of the debris slated for demolition is provided in Section 4.3. The buildings at the site were constructed by local residents and are therefore not eligible for DERP-FUDS action.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, two ASTs were reported to have held drinking water were identified. According to Eugene Toolie, both tanks located within Site 4 (AST 4-1 and AST 4-2) were used to supply water to the Subsistence Hunting and Fishing Camp (Toolie, 1996). AST 4-1 (15,000 gallons) was empty and all points of entry secured. AST 4-2 (400 gallons) was about 30% full of rainwater. All sample results for AST 4-2, sample ID 96NE04TK101 were non-detect. AST 4-2 was covered and secured with wire to prevent further accumulation of precipitation. The drums appear to be empty and rusted. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

The potential sources of environmental contamination identified at this site were the vehicles and abandoned, rusted drums. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 1, Soil Matrix Level C standards for petroleum and ADEC Method 2 soil cleanup standards for all other constituents. Soil samples were collected adjacent to the potential sources and analyzed for TRPH, DRO, GRO, BTEX and lead. Analytical results are presented in Table 5-5 (soil) and Table 5-6 (water) and compared with the cleanup criteria. As shown on Figure 5-3, isolated soil samples exceed the cleanup criteria for DRO. Based on the data presented in Section 5.30.1, Background Levels of Site Contaminants in Soil, TRPH was eliminated as a contaminant of concern at this site.

One subsurface water sample was collected from Well Point 4-1 and analyzed for DRO, PAH and BTEX. As shown in Table 5-5, the result of 3.7 mg/L DRO exceeds the ADEC groundwater cleanup criteria. Individual petroleum constituents of PAH and BTEX are all below the ADEC groundwater cleanup criteria.

Contaminants of Concern. DRO in tundra and subsurface water.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: No further action.

Tundra/Wetlands: Remediate isolated areas of petroleum-contaminated tundra consistent with installation-wide cleanup criteria and remedial action. Address petroleum-contaminated subsurface water consistent with installation-wide cleanup criteria and remedial action.

Potential Obstacles to Remediation. The Cargo Beach Road is in disrepair and has eroded significantly since the 1994 field investigation. Remedial activities involving large or heavy equipment at Site 4 would be difficult. In its present condition, the Cargo Beach Road can only be traversed by means of all-terrain vehicles.

5.5 SITE 5: CARGO BEACH

Physical Description. The Cargo Beach area is immediately north of the Subsistence Hunting and Fishing Camp (Figure 1-4) and extends eastward from the Cargo Beach Road approximately 3,000 feet, and westward approximately 1,700 feet. The Cargo Beach extends from the low tide level approximately 150 feet inland. This area was used for barge off-loading operations. According to E&E (1993), the site contains approximately 275 drums (currently empty) in various states of decay. Figure 5-3 shows the layout of the site, buildings, storage tanks, sampling locations and results. All accessible drums were discovered to be empty or partially-filled with rainwater (in open drums). Some of the drums inaccessible to the field team could contain their original contents.

Potential Sources of Contamination. Approximately 275 abandoned drums, currently empty.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris, that because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) were present on the site. Debris, such as abandoned drums, marston matting and cable, is present at the site. An inventory of the buildings and debris slated for removal is provided in Section 4.3. No ASTs or USTs were observed at the site. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

One potential source of environmental contamination was identified at this site, the abandoned drums. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 1, Soil Matrix Level C standards for petroleum and ADEC Method 2 soil cleanup standards for all other constituents. Soils around the drums were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB and metals. Analytical results are presented in Table 5-7 and compared with the cleanup criteria. As shown on Figure 5-3, soil analytical results are below the Soil Cleanup Standards in all cases, except for arsenic in one soil sample. The concentration of arsenic was 4.7 and 4.8 mg/Kg in the primary sample and QA split.

Contaminants of Concern. Arsenic on Cargo Beach gravel.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR. Inspect underlying soils for staining and sample if staining is observed.

Gravel Pad/Sand beach: Remediate isolated area of arsenic contaminated soil consistent with the installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.6 SITE 6: CARGO BEACH ROAD DRUM FIELD

Physical Description. This site was used primarily for the disposal of empty drums containing petroleum, oil, and lubricants (POL) generated during operation of the former base. The drum field is located 0.6 miles south of Sites 3 and 4 along the Cargo Beach Road (Figure 1-4). The site consists of approximately 1,500 POL drums, one empty 500-gallon potable water storage tank and miscellaneous metal debris (Figure 5-4). All of the items are aboveground and easily accessible from the Cargo Beach Road.

Potential Sources of Contamination. 1,500 POL drums, battery.

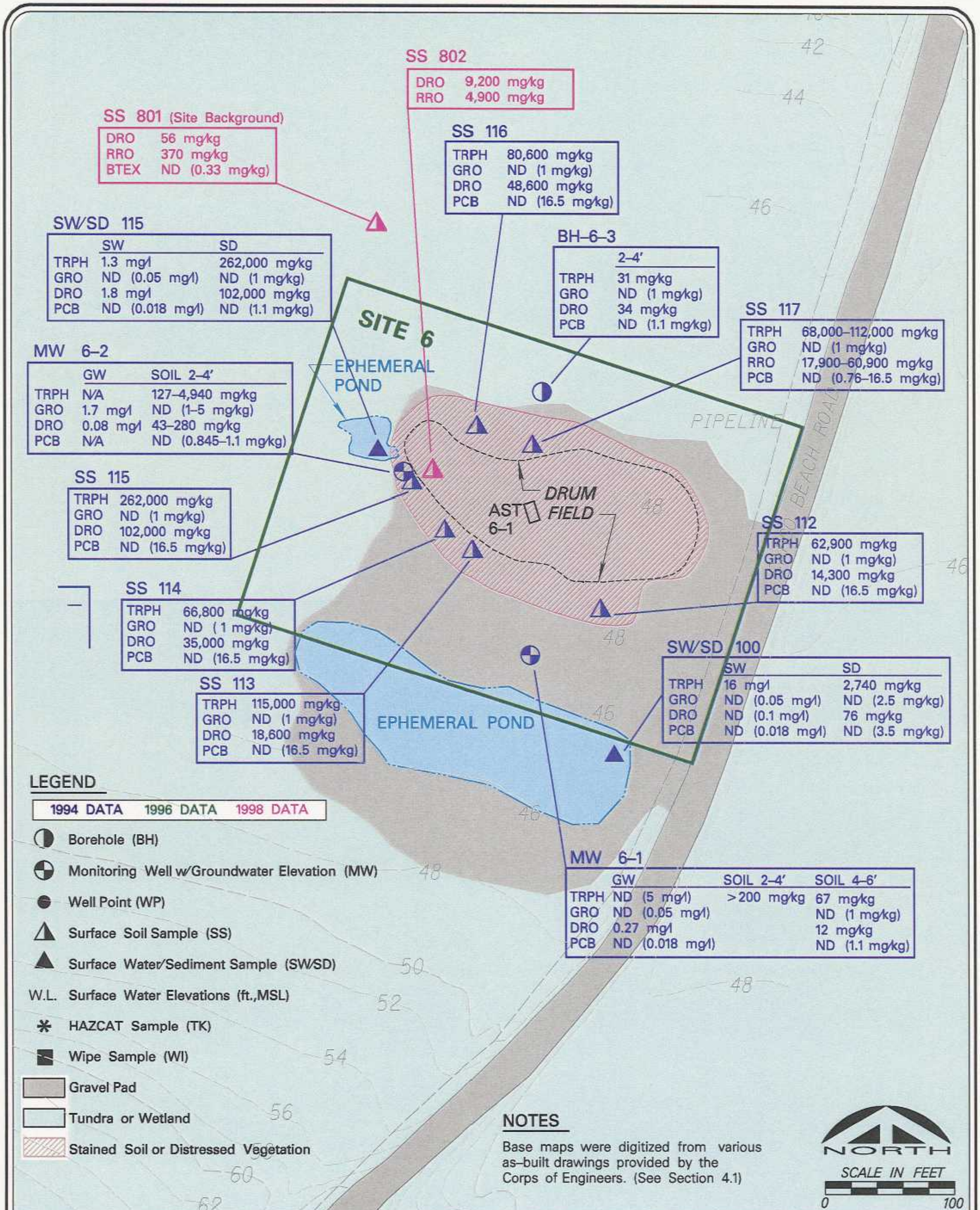

FIGURE 5-4

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 6 CARGO BEACH ROAD DRUM FIELD

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Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures are present on the site. Debris is present at the site including the abandoned drums and metal mats. An inventory of buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, one potable water AST was identified and found to be empty. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

Two potential sources of environmental contamination were identified at this site, the POL drums and the battery. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 1 soil cleanup standards for petroleum and Method 2 for all other constituents. Soils and sediments around the drums were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, semivolatile organic compounds (SVOC), pesticides and metals. Analytical results are presented in Table 5-8 and compared with the cleanup criteria. As shown on Figure 5-4, soil analytical results exceed the Soil Cleanup Standards for RRO and DRO.

Surface water and subsurface water around the drums was sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, VOC, SVOC, pesticides and metals. Analytical results are presented in Table 5-9 and compared with the cleanup criteria. Surface water exceeds the Water Cleanup Standards for TRPH, DRO, total zinc, and zinc. Total and dissolved concentrations of zinc exceed the standard in one of the two surface water samples. No source of zinc was identified so zinc in surface water is excluded as a contaminant of concern. Subsurface water exceeds the Ground Water Cleanup Standards for DRO, total beryllium, total chromium, total zinc, total lead, and total nickel. However, these metals were not detected in the filtered sample and, therefore not included as a contaminant of concern.

In addition to drums disposed in the Cargo Beach Drum Field, the source of DRO in subsurface water may be Site 7, the Cargo Beach Landfill south of the site.

Contaminants of Concern. RRO and DRO in soil. DRO in tundra soil and water. DRO in subsurface water.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. Address petroleum-contaminated surface and subsurface water consistent with installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: Remediate isolated areas of petroleum-contaminated tundra consistent with installation-wide cleanup criteria and remedial action.

Potential Obstacles to Remediation. None identified at this time.

5.7 SITE 7: CARGO BEACH ROAD LANDFILL

Physical Description. The landfill is located approximately 0.8 miles south of Sites 3 and 4 along the Cargo Beach Road (Figure 1-4). The Cargo Beach landfill (Figure 5-5) was used as the base's solid waste disposal area from 1965 to base closure in 1974 (E&E, 1993), and contains a wide variety of materials. According to E&E (1993), the landfill contains approximately 2,300 exposed POL drums, miscellaneous metal debris and several batteries. Based on available information this was not an ADEC-permitted landfill. According to the seasonal residents (E&E, 1993) the trash was often burned prior to burial. These reports of burned debris have lead to a concern that dioxins and furans may be present.

Potential Sources of Contamination. Drums, batteries and other materials in the landfill.

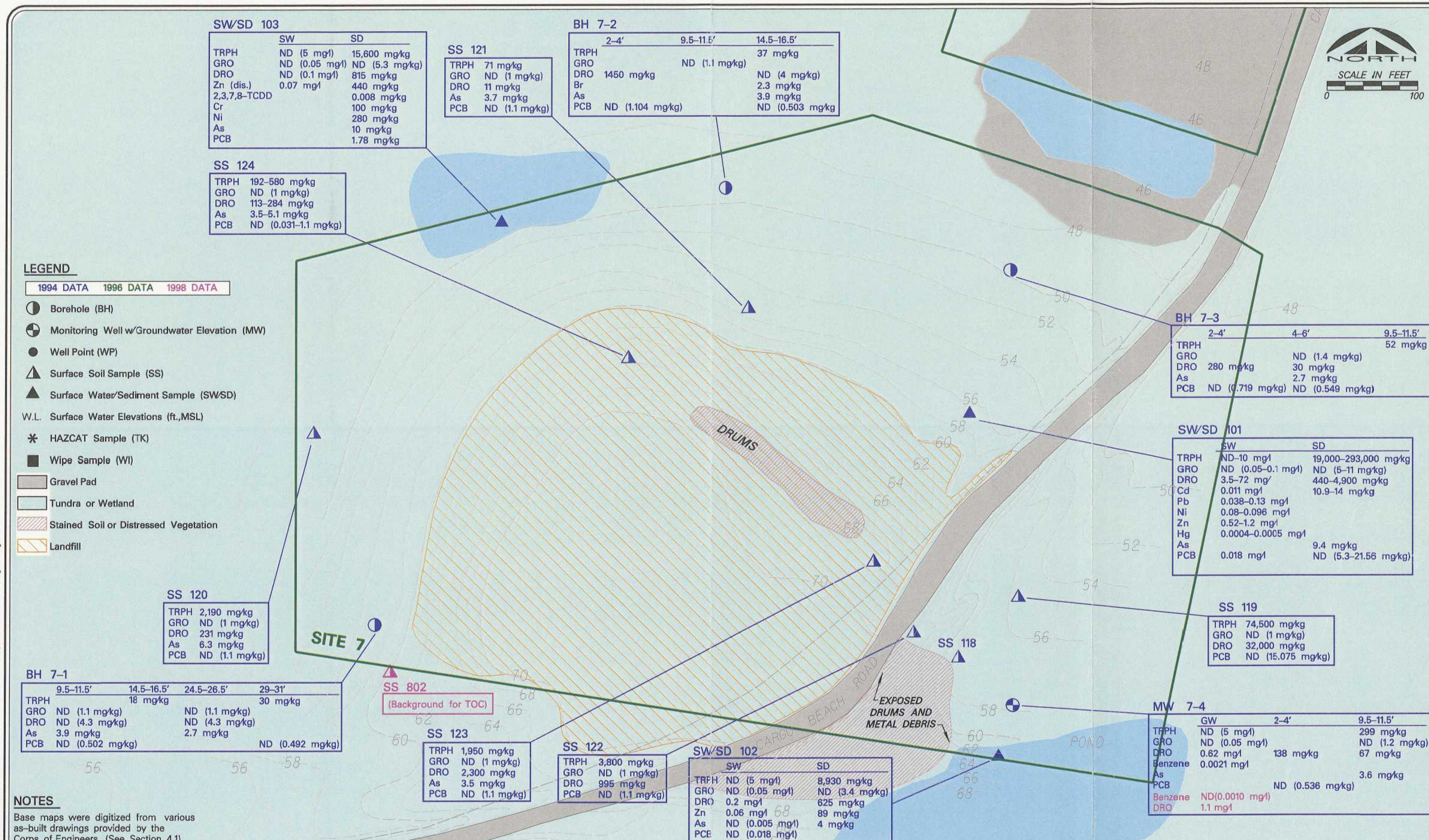
Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) are present at the site. Some ACM was identified in the landfill. The type and location of the ACM is summarized in Table 3-1. No signs could be posted, since the asbestos materials were in the open. Debris is present in the landfill but buried debris is not included in the inventory of debris slated for demolition provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, no tanks were identified. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

The potential source of environmental contamination at this site is the landfill. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 1 for petroleum and Method 2 soil cleanup standards for all other constituents. Surface



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MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5-5

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 7 CARGO BEACH ROAD LANDFILL

and subsurface soils, subsurface water, surface water, and sediment around the landfill were sampled and analyzed for TRPH, RRO, DRO, GRO, PCB, VOC, SVOC, pesticides, priority pollutant metals, dioxin, and furan contamination.

Analytical results are presented in Table 5-10 and compared with the cleanup criteria. As shown on Figure 5-5, soil analytical results exceed the Soil Cleanup Standards for DRO, arsenic, beryllium, cadmium, chromium, and nickel. Levels of dioxins were below the Soil Cleanup Standards.

Surface water and subsurface water around the drums were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, VOC, SVOC, pesticides and metals. Analytical results are presented in Table 5-11 and compared with the cleanup criteria. Surface water exceeds the Water Cleanup Standards for DRO, total lead, total nickel, total cadmium, total thallium, zinc (total and dissolved), mercury (total and dissolved). Dissolved concentrations of lead, nickel, cadmium and thallium are below the water cleanup standard, suggesting that metals attached to soils entrained in the water are the source of the exceedences. Therefore, lead, nickel, cadmium and thallium are excluded as contaminants of concern. Both zinc and mercury concentrations were exceeded in the filtered and unfiltered samples, making these metals contaminants of concern in surface water.

Based on the location of the surface and subsurface samples, it appears that petroleum constituents, probably from the landfill, have impacted the surface water.

Contaminants of Concern. DRO, arsenic, beryllium, cadmium, chromium, and nickel in tundra soil. DRO, mercury, and zinc in tundra surface water.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR including procedures for closing the landfill.

Gravel Pad: No gravel pad.

Tundra/Wetlands: Remediate isolated areas of contaminated tundra consistent with an installation-wide cleanup criteria and remedial action.

Potential Obstacles to Remediation. None identified at this time.

5.8 SITE 8: POL SPILL SITE

Physical Description. In the 1993 CDAP for the Northeast Cape site, E&E noted a reported spill of diesel fuel in the POL pipeline that runs along the Cargo Beach Road from Site 4 to the main operations complex and the three 400,000-gallon storage tanks at Site 11. Figure 1-4 shows the location of Site 8. Because no evidence of a release was observed, E&E deemed the site not eligible for the DERP-FUDS program. However, in response to concerns raised in a public meeting, a subsequent inspection of Site 8 was performed on August 5, 1996 and September 14, 1998. Mr. Eugene Toolie, who was working at Northeast Cape at the time that the spill occurred and was responsible for the pipeline repair and cleanup efforts, accompanied the Montgomery Watson field team. Mr. Toolie reported that a spill of approximately 500 gallons occurred in 1973, and was discovered by a discrepancy in the amount of fuel pumped from the Cargo Beach, and the amount received at the 400,000-gallon tanks. Figure 5-6 shows the location of the reported spill.

This is the only spill Mr. Toolie is aware of from the POL pipeline.

Potential Sources of Contamination. Release from fuel pipeline.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) or debris were present at the site. No ASTs or USTs were observed at the site. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2. The fuel pipeline at the site is slated for removal and is listed under Site 3, Fuel Line Corridor and Pumphouse.

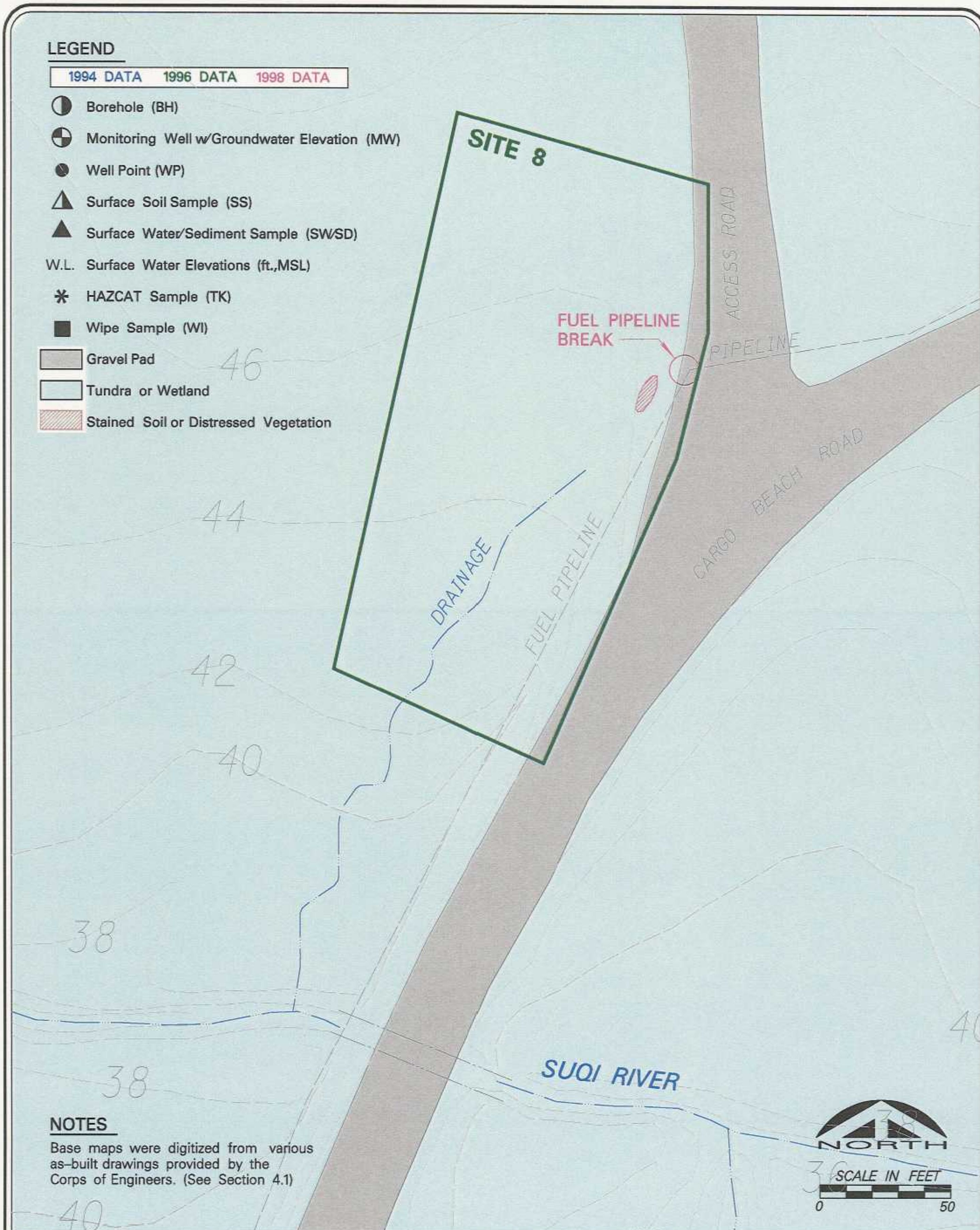
The source of environmental contamination is the diesel fuel release. The spill was discovered at a welded bend in the pipeline, which is marked today by the compression fitting installed by Mr. Toolie at the time of the break. Cleanup efforts were initiated shortly thereafter. Cleanup consisted of spreading absorbent pads over the spill area. These pads were later taken to a location north of the Paint and Dope Building (Site 16) and burned. Mr. Toolie indicated that the cleanup efforts were relatively successful. Below the road embankment, immediately downslope of the fuel line break, is a wetlands area about 40 feet wide and 60 feet long. The wetlands area drains to the south to the Suqi River, which crosses under the road approximately 400 feet to the south of the spill area. Within the wetlands area and parallel to the road embankment lies a 10 foot by 3 foot surface water area with a diesel sheen and odor. Even in this area, the wetlands are apparently healthy and choked with cottonweed grass. The diesel-contaminated area appears localized, and there is no evidence that it flowed to the Suqi River, which is consistent with Mr. Toolie's recollections. No sampling was performed because the presence of diesel was readily observed in a small, localized area.

Contaminants of Concern. DRO in tundra soils and surface water.

Recommended Remedial Action.

CON/HTRW: Action listed under Site 3 for the fuel pipeline.

BD/DR: No further action.



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5-6

U.S. ARMY ENGINEER DISTRICT, ALASKA
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SITE 8 POL SPILL SITE

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Gravel Pad: No further action.

Tundra/Wetlands: Remediate isolated areas of petroleum-contaminated tundra consistent with installation-wide cleanup criteria and remedial action.

Potential Obstacles to Remediation. None identified at this time.

5.9 SITE 9: HOUSING AND OPERATIONS LANDFILL

Physical Description. This landfill was a waste disposal area from the time period of the construction of the base in 1952 to 1965, when Site 7 became the primary landfill (E&E, 1993). The landfill is located approximately 500 feet northeast of the housing and operations area (Figure 1-4). The visible landfill debris consists of miscellaneous metal debris, POL drums, and one abandoned vehicle in the surface water body near the southwest corner of the landfill perimeter (Figure 5-7). Based on current information, this landfill was not permitted by ADEC. As with Site 7, local residents report that most waste was burned prior to burial (E&E, 1993), thus presenting the potential for dioxin and furan contamination.

Potential Sources of Contamination. Materials in the landfill.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) were present on the site. Most debris at the landfill is buried. Buried debris is not included in the inventory of the buildings and debris slated for demolition provided in Section 4.3. No ASTs or USTs were observed at the site. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

The potential source of environmental contamination at this site is the landfill. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 2 soil cleanup standards for all constituents. Surface and subsurface soils, subsurface water, surface water, and sediment around the landfill were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, SVOC, pesticides, priority pollutant metals, dioxin and furan contamination. Analytical results are presented in Table 5-12 and compared with the cleanup criteria. As shown on Figure 5-7, soil analytical results exceed the Soil Cleanup Standards for DRO, arsenic, antimony, beryllium, and chromium. Levels of dioxin and furan were below the Soil Cleanup Standards. Contaminated areas are in the tundra.

Surface water and subsurface water around the landfill were sampled and analyzed for TRPH, DRO, GRO, BTEX, VOC, SVOC, PCB, pesticides, metals and dioxins. Analytical results are

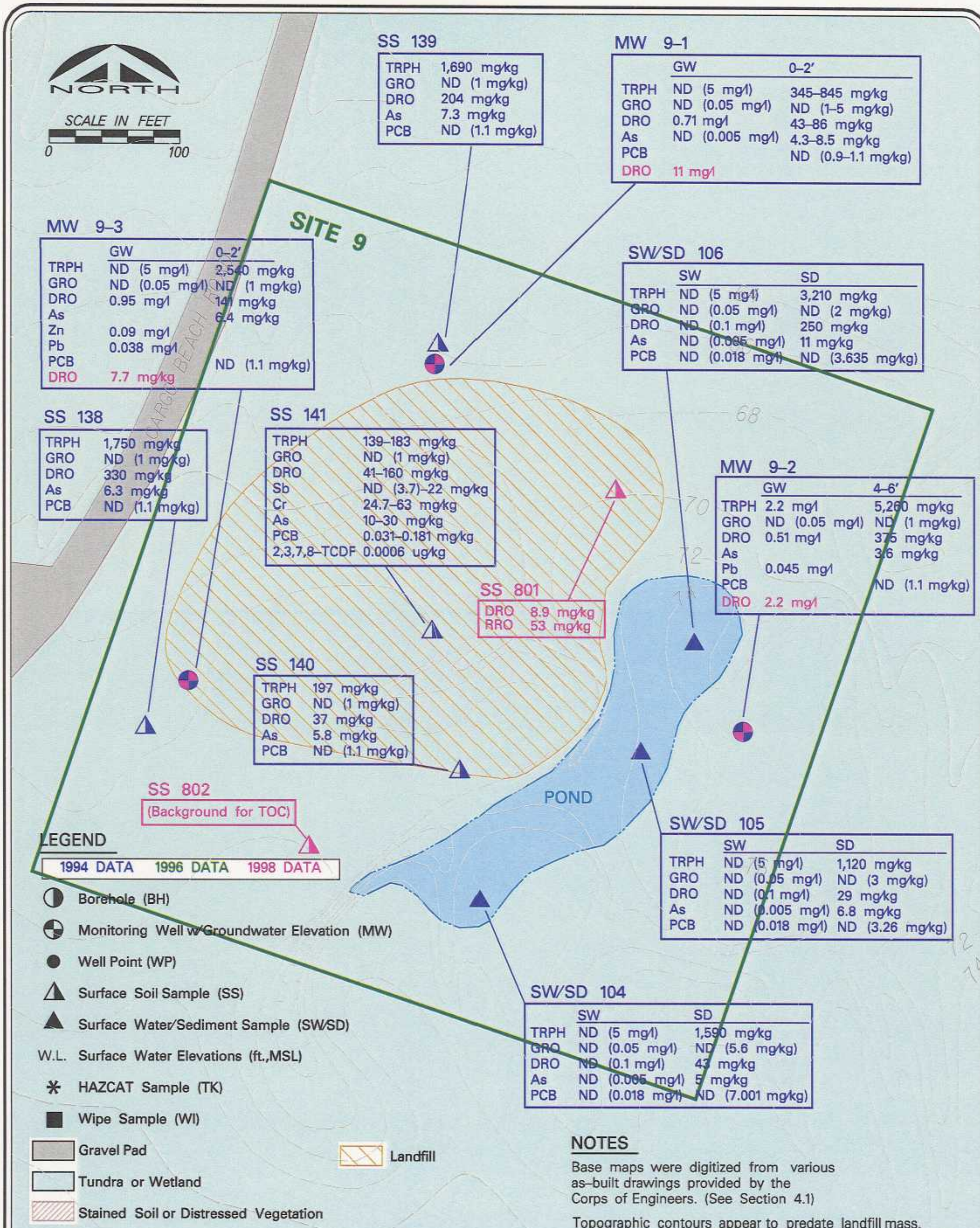

FIGURE 5-7

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 9 HOUSING & OPERATIONS LANDFILL

MONTGOMERY WATSON
Anchorage, Alaska

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presented in Table 5-13 and compared with the cleanup criteria. DRO, total zinc, and total lead in unfiltered samples exceeded the Ground Water Cleanup Standards. The filtered sample for lead and zinc were below the criteria, therefore, was eliminated as contaminants of concern at this site. All other subsurface water results were below the Ground Water Cleanup Standards selected for the site. All surface water results were below the Water Cleanup Standards, except for dissolved zinc. All other surface water samples were below the criteria for zinc, including the total zinc for this sample, therefore, zinc is eliminated as a contaminant of concern.

Contaminants of Concern. DRO, arsenic, antimony, beryllium and chromium in tundra.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR, including closing the landfill.

Gravel Pad: None.

Tundra/Wetlands: Remediate isolated areas of petroleum-contaminated tundra consistent with installation-wide cleanup criteria and remedial action, including the exceedence of DRO in subsurface water.

Potential Obstacles to Remediation. None identified at this time.

5.10 SITE 10: BURIED DRUM FIELD

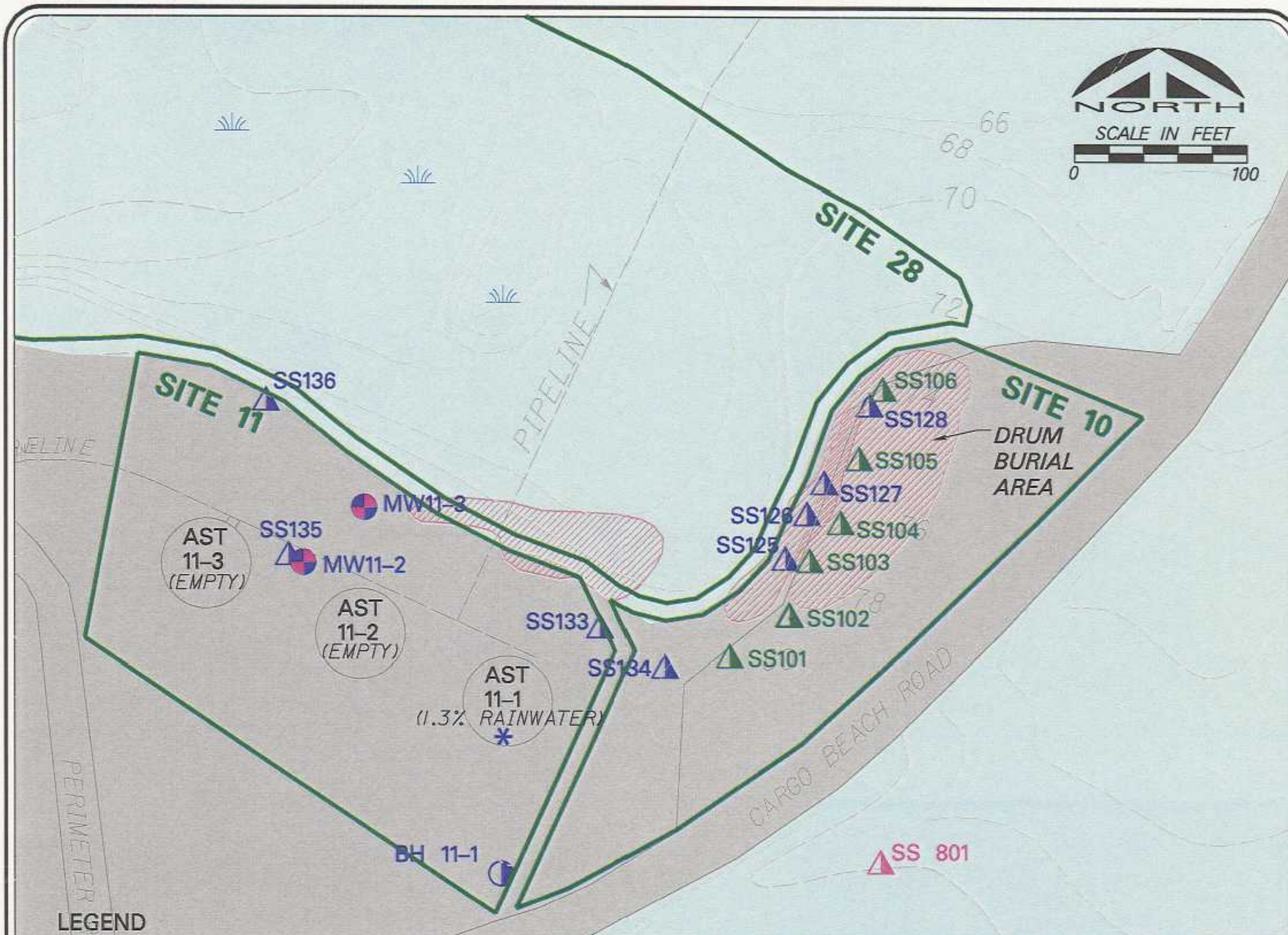
Physical Description. According to local residents (E&E, 1993), this area is believed to hold approximately 29,500 drums containing 90-weight waste oil. The area was used as a drum storage area for a variety of POL types (Toolie, 1996). There is a large stained area towards the northwest corner of the burial plateau along with numerous smaller stained areas on the surface of the site (Figure 5-8). There is also visible staining along the bermed west edge of the site.

The site is located directly across the Cargo Beach Road from Site 9 and lies approximately 400 feet northeast of the housing and operations complex (Figure 1-4). The site is level with the road and proceeds eastward where it drops off approximately 8 feet.

The biota of Site 10 is limited due to the gravel pad area extending from the Cargo Beach access road. The gravel pad at Site 10, similar to the pad covering the remainder of the site, consists of compacted fine to medium gravels with sand. The sparse vegetation covering (approximately 40% of the site), includes sedges, grasses, and some mosses. The drainage of the site is north to northwesterly through Site 11 towards the Drainage Basin Site.

Potential Sources of Contamination. Buried drums with 90-weight waste oil.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical



LEGEND

1994 DATA 1996 DATA 1998 DATA

- Borehole (BH)
- Monitoring Well w/Groundwater Elevation (MW)
- Well Point (WP)
- Surface Soil Sample (SS)
- Surface Water/Sediment Sample (SW/SD)
- W.L. Surface Water Elevations (ft.,MSL)
- * HAZCAT Sample (TK)
- Wipe Sample (WI)
- Gravel Pad
- Tundra or Wetland
- Stained Soil or Distressed Vegetation

NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers. (See Section 4.1)

Sample/Depth	DRO (mg/kg or mg/l)	TRPH (mg/kg or mg/l)	GRO (mg/kg or mg/l)	PCB (mg/kg or mg/l)
1996				
SS 101	1,600–2,300	1,700–5,230		
SS 102	220	160		
SS 103	1,200	2,100		
SS 104	17,000	32,000		
SS 105	59	130		
SS 106	2,000	2,500		
1994				
SS 125	22,700	43,700	ND (1)	ND (16.5)
SS 126	26,500	62,300	ND (1)	ND (33)
SS 127	24,500	119,000	ND (1)	ND (16.5)
SS 128	2,170	7,910	ND (1)	ND (1.1)
SS 133	69,100	32,100	ND (1)	0.793
SS 134	379	416	ND (1–5)	ND (0.9–1.1)
SS 135	902	2,120	ND (1)	0.323
SS 136	195	464	ND (1)	ND (1.1)
MW 11-2 GW	1.4	ND (5)	ND (0.05)	
MW 11-2 0-2'	130	436	ND (1)	
MW 11-2 2-4'	358	168	ND (1)	
MW 11-3 GW	6.1	6.6	1.1	
MW 11-3 0-2'	27	182	ND (1)	
MW 11-3 2-4'	31	90	ND (1)	
MW 11-3 4-6'	11	76	ND (1)	
MW 11-3 9.5-11.5'	22,000	29,200	192	
SW 116	ND (0.1)	ND (5)	ND (0.05)	ND (0.018)
SD 116	ND (4)	67	ND (1)	ND (1.1)
1998	DRO	RRO		
MW 11-2	0.34	ND (0.25)		
MW 11-3	45	ND (5)		
SS 801	410	980		

MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 5-8

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 10 & 11 BURIED DRUM & FUEL STORAGE TANKS

JOB No. 1189098.0…01 TIME: 24-AUG-1999 10:16 FILE: e:\usace\necape\99rl_fs\draft\fig5_08.dgn hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) were present at the site. Debris at the site is scattered drums. The remaining debris is buried and therefore not included in the inventory of the buildings and debris slated for demolition provided in Section 4.3. No ASTs or USTs or CON/HTRW was observed at the site.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

The potential source of environmental contamination at this site is the buried drums. A geophysical magnetic survey found only a small anomaly in this area, suggesting that the burial of 29,500 drums may have been an overestimate. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 2 soil cleanup standards for all constituents. Surface and subsurface soils, surface water, and sediment around the landfill were sampled and analyzed for DRO, GRO, PCB, SVOC, pesticides, and priority pollutant metals contamination. Analytical results are presented in Table 5-14 (soil) and Table 5-15 (water) and compared with the cleanup criteria. As shown on Figure 5-8, soil analytical results exceed the Soil Cleanup Standards for DRO.

Surface water exceeds the Water Cleanup Standards for dissolved silver in one sample. Silver was undetected in the unfiltered water sample and no sources of silver were identified, therefore, the metal is excluded as a contaminant of concern.

This site drains to Site 28, the Drainage Basin, consisting of tundra/wetlands to the northwest. Potential impacts of site contaminants on the Drainage Basin are discussed in Section 5.28, the Drainage Basin.

Contaminants of Concern. DRO in soil. DRO, PCB and lead in surface water.

Recommended Remedial Action.

CON/HTRW: Confirm or refute the presence of free product in the buried drums. If present, remediate.

BD/DR: Perform BD/DR.

Gravel Pad: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. Address petroleum-contaminated surface and subsurface water consistent with installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.11 SITE 11: FUEL STORAGE TANK AREA

Physical Description. The site consists of three diesel fuel storage tanks measuring 50 feet in diameter and 28 feet in height (approximately 400,000 gallons) and all associated piping and valves (Figure 5-8). It is located directly adjacent to Site 10 in the northeast corner of the housing and operations complex (Figure 1-4). The gravel pad has little to no vegetation. Drainage from Site 11 is north / northwesterly to a large pond which discharges towards the Drainage Basin.

In March of 1967 or 1968, AST 11-2 was punctured during snow removal operations and approximately 180,000 gallons of diesel fuel were released (E&E, 1993; Toolie, 1998). The spill occurred in the winter when there was heavy blowing snow, but little ice. Mr. Toolie (Toolie, 1998) remembers that diesel was one inch thick all the way to the mouth of the Suqi River at the Bering Sea. No cleanup was attempted. A large volume of the fuel collected in the sediment of the wetlands area directly north of the tanks. Significant staining and distressed vegetation were still visible in September 1998.

Potential Sources of Contamination. Diesel release from AST 11-2 and potential releases from the other two tanks.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) were present at the site. An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, three 400,000-gallon ASTs were identified. Two tanks, AST 11-2 and AST 11-3, were found to be empty. AST 11-1 contained about 4 inches of accumulated rain water with a petroleum sheen. The tank contents were sampled and analyzed to determine appropriate disposal. Sample results are provided in Section 4.2 and suggest that the contents are non-hazardous water with sheen. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

The source of environmental contamination at this site is the diesel release from AST 11-2 and potential releases from the other two ASTs. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 2 soil cleanup standards for all constituents. Surface and subsurface soils, subsurface water, surface water, and sediment around the tanks were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, VOC, SVOC, pesticides, and priority pollutant metals contamination. Analytical results are presented in Table 5-16 and compared with the cleanup criteria. As shown on Figure 5-8, soil analytical results exceed the Soil Cleanup Standards for DRO. Contaminated areas are on the gravel pad.

Subsurface water under the gravel pad was sampled and analyzed for TRPH, DRO, GRO, BTEX, and VOC. Analytical results are presented in Table 5-17 and compared with the cleanup criteria. In 1994, DRO and benzene exceeded the Ground Water Cleanup Standards. All other subsurface water results were below the Ground Water Cleanup Standards selected for the site. In 1998, DRO concentrations were still above the Ground Water Cleanup Standards, but benzene levels had decreased to below the standard as a result of either degradation or increased water levels. The water levels during the 1998 sampling were approximately 2-3 feet higher than in 1994. Therefore, benzene will be retained as a contaminant of concern.

Although it is a common laboratory contaminant, methylene chloride is retained as a contaminant of concern due to its appearance in groundwater at this site and multiple occurrences in soil and groundwater at adjacent Site 28.

This site drains to Site 28, the Drainage Basin, consisting of the tundra/wetlands to the northwest. Potential impacts of site contaminants on the Drainage Basin are discussed in Section 5.28, the Drainage Basin.

Contaminants of Concern. DRO in soil. DRO, benzene and methylene chloride in subsurface water.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. Address petroleum-contaminated subsurface water consistent with installation-wide cleanup criteria and remedial action.

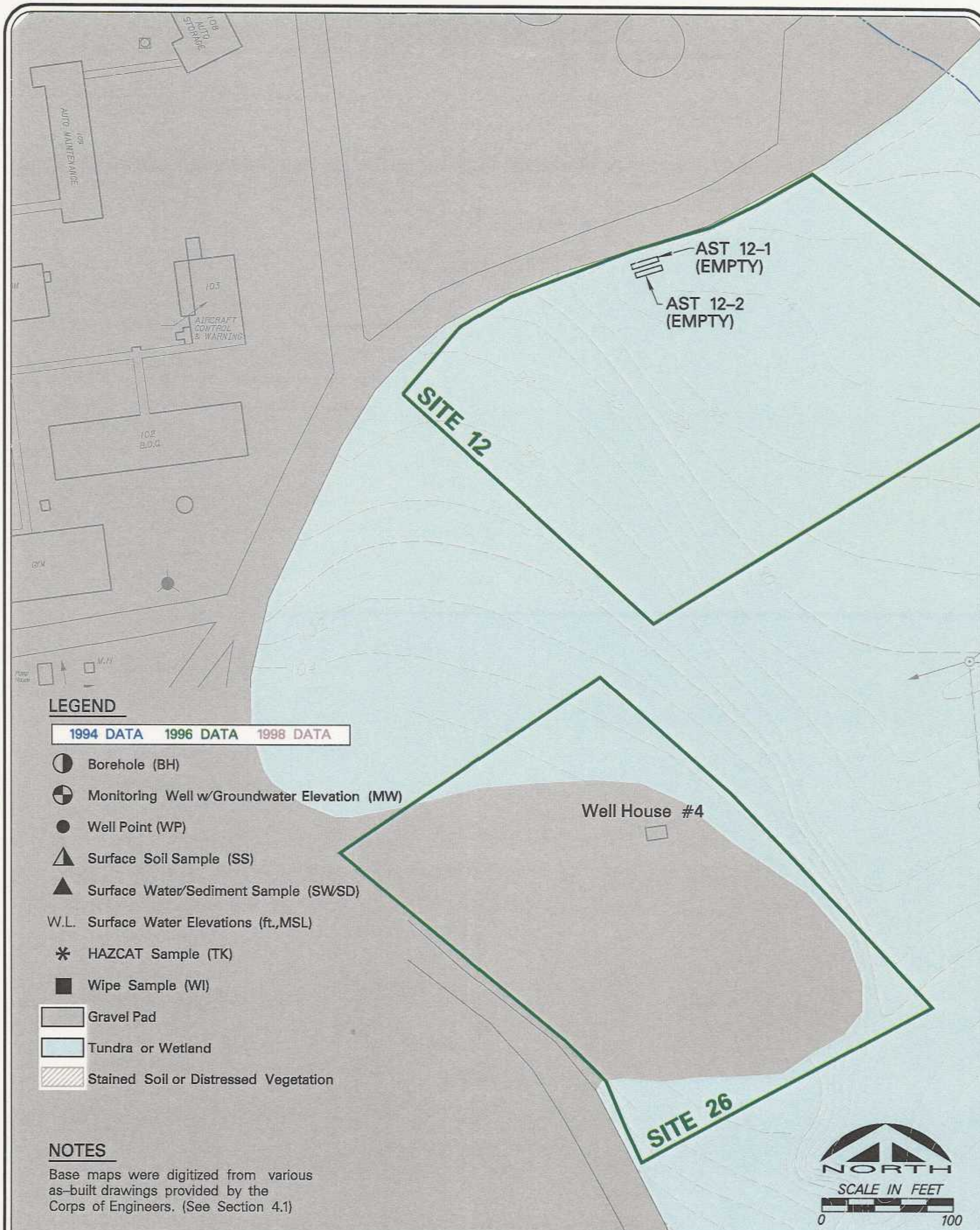
Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.12 SITE 12: GASOLINE TANK AREA

Physical Description. Site 12 is adjacent to the Main Operations Complex (Figure 1-4). This site contains two ASTs, which contained leaded gasoline and a fuel pump mounted inside a shed immediately east of the two tanks (Figure 5-9). The tanks are 15,000 and 30,000 gallons.

Potential Sources of Contamination. Two ASTs and fuel pump.



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Anchorage, Alaska

FIGURE 5–9

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 12 & 26 GASOLINE TANKS AND FORMER CONSTRUCTION CAMP

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Investigation Activities. E&E found no evidence during the previous site inspection to suggest that any discharge had occurred at this location (E&E, 1993). The site was re-inspected in 1998 by Montgomery Watson and no evidence of a release was observed. Both ASTs are empty. No soil or water samples were collected at this site.

An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2. No visible sources of BD/DR were observed at the site.

Contaminants of Concern. GRO, DRO in gravel pad soil.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: None.

Gravel Pad: Investigate and remediate isolated areas of petroleum. Contaminated soils consistent with installation-wide cleanup criteria and remedial action. Address potential for petroleum-contaminated subsurface water consistent with installation-wide cleanup criteria and remedial action.

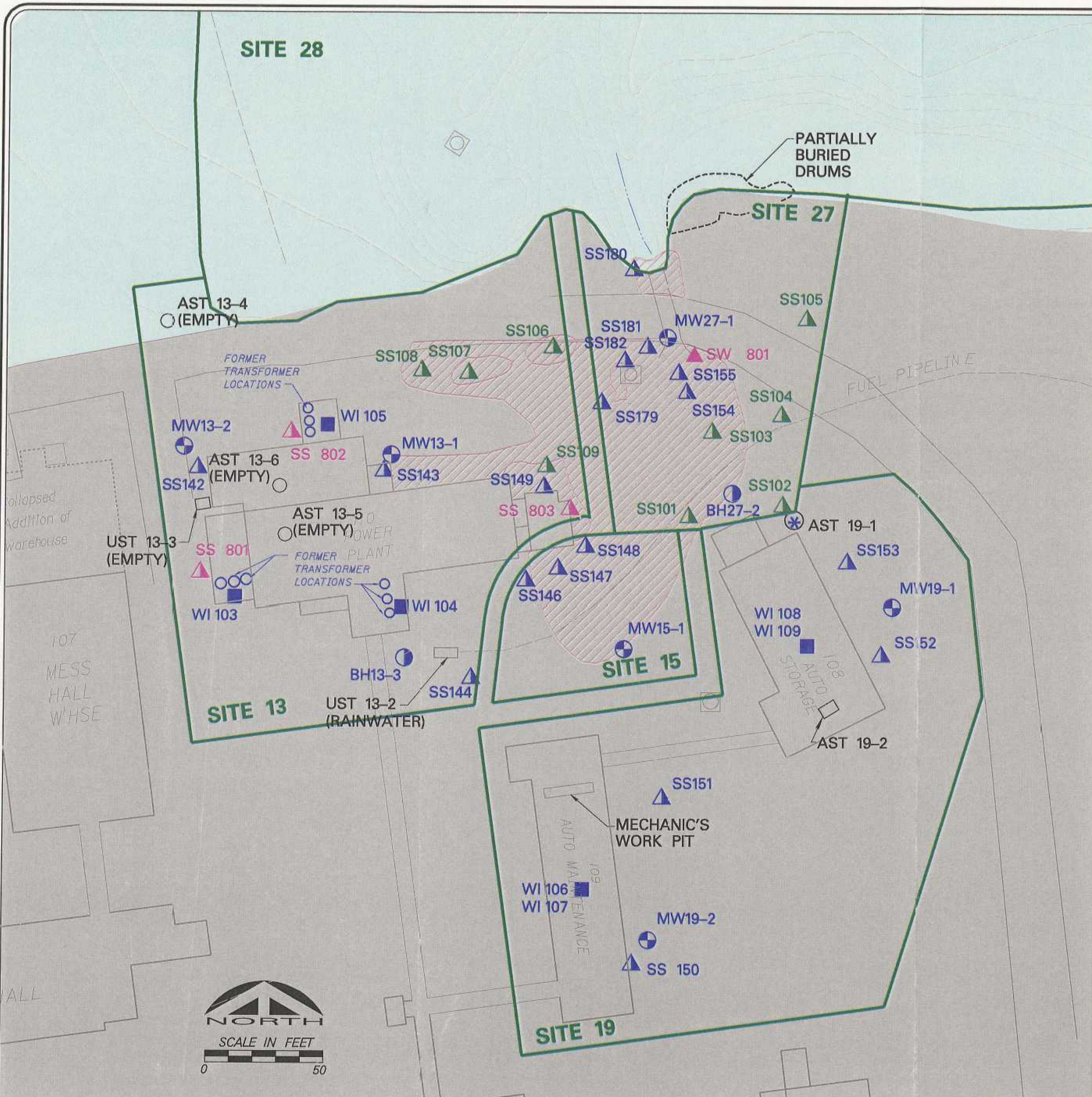
Tundra/Wetlands: No further action.

Potential Obstacles to Remediation. None identified at this time.

5.13 SITE 13: HEAT AND ELECTRICAL POWER BUILDING

Physical Description. This site was the central heating and power generating facilities for the base. It consists of Building 110 of the housing and operations complex and the land surrounding it, and also includes two diesel USTs, two diesel ASTs and two potable water ASTs (Figure 5-10). One diesel UST is located on the south of the building and has a volume of 20,000 gallons (E&E, 1993). The other diesel UST is located on the northwest side of the building and reportedly holds 5,000 gallons. There are also two empty ASTs located within Site 13, the first a 1,000-gallon diesel AST on the north side of the building directly adjacent to the generator area, and the second is a 5,000-gallon diesel AST, directly across the perimeter road. Two potable water tanks are housed in Building 110. The first is a 500-gallon steel pressure tank; the second is a 204,000-gallon steel water storage tank.

The site formerly included three transformer banks consisting of three transformers each, which were removed during the 1994 removal action (NES, 1995). One is located in a room on the south side; another is in a room on the north side; and the third is in an add-on room on the southwest side of the building. Building 110 also contains four Cummins Diesel generators with associated piping and ventilation ducts.



LEGEND

1994 DATA 1996 DATA 1998 DATA

- Borehole (BH)
- Monitoring Well
- Well Point (WP)
- Surface Soil Sample (SS)
- Surface Water/Sediment Sample (SW/SD)
- W.L. Surface Water Elevations (ft.,MSL)
- HAZCAT Sample (TK)
- Wipe Sample (WI)
- Gravel Pad
- Tundra or Wetland
- Stained Soil or Distressed Vegetation

Sample 1998	RRO (mg/L)	DRO (mg/L)	Total PCB (mg/kg)
MW 13–1	ND (12)	100	
MW 13–2	0.52	32	
MW 15–1	3.8	960	
MW 19–1	ND (2.5)–0.93	16–18	
MW 19–2	ND (1.2)	7.3	
MW 27–1	ND (0.25)	1.4	
SS 801			25
SS 802			8.4
SS 803			180
SW 801	ND (0.2)	0.73	

Sample 1996	TRPH (mg/kg)	DRO (mg/kg)	Total PCB (mg/kg)
SS 101		150–480	
SS 102		700	
SS 103		91	
SS 104		680	
SS 105		2,900	
SS 106	12,000		0.43
SS 107	22,000		9
SS 108	14,000		28
SS 109			0.54

NOTES

Base maps were digitized from various as–built drawings provided by the Corps of Engineers. (See Section 4.1)

Sample /Depth 1994	TRPH (mg/l & mg/kg)	GRO (mg/l & mg/kg)	DRO (mg/l & mg/kg)	As (mg/l & mg/kg)	Cr (mg/l & mg/kg)	Benzene (mg/l & mg/kg)	PCB (ug/100cm2)
MW 13–1 GW	190	4	23		0.24		
MW 13–2 GW	24	3.6	22		0.14	0.12	
MW 13–2 4–6'	945	7	955				
BH 13–3 4–6'	431–1,150	ND (1)–7.1	434–1,000				
BH 13–3 9.5–11.5'	7,880	225	10,800				
MW 15–1 GW	31	ND (0.05)	9.3				
MW 15–1 9.5–11.5'	535	ND (1)	2,190				
MW 19–1 GW	9.7	6.1	13			0.025	
MW 19–1 0–2'	690	ND (1)	110	3.9	21	ND (0.0025)	
MW 19–1 4–6'	28,800	6,650	971	4.4	16	ND (2.5)	
MW 19–1 9.5–11.5'	16,300	461	13,300	4.3	6.4	0.737	
MW 19–2 GW	ND (5)	ND (0.05)	34				
MW 19–2 14.5–16.5'	389	ND (1)	122				
MW 27–1 GW	0.7–2.6	1.2–1.9	2–3.8			0.0056	
MW 27–1 0–2'	18,000		5,710			ND (0.05–5.4)	
MW 27–1 2–4	10,000–29,300	410–1,300	8,470–16,000				
MW 27–1 4–6'	1,690	39	569			0.157	
MW 27–1 9.5–11.5'	181	ND (1)	19			0.064	
BH 27–2 0–2'	52,400	283	9,230			ND (0.0025)	
BH 27–2 4–6'	535	2.3	52				
BH 27–2 9.5–11.5'	170	ND (1)	11				
SS 142	3,280	ND (1)	2,610				
SS 143	551	ND (1)	398				
SS 144	6,130	ND (1)	1,530				
SS 146	20,500	ND (1)	4,660				
SS 147	12,400	ND (1)	2,840				
SS 148	24,200	ND (1)	4,860				
SS 149	22,400–36,800	ND (1)	6,580–7,610				
SS 150	2,000		868		57		
SS 151	680		328		23		
SS 152	3,150		1,240		18		
SS 153	413		43		40		
SS 154	16,600	17	9,460				
SS 155	12,800	4.4	35,700				
SS 179	53,700	9.1	27,500				
SS 180	44,700	89	37,900				
SS 181	66,400	370	33,600				
SS 182	41,800	7	9,850				
WI 103							6,500
WI 104							54–4,100
WI 105							2,100
WI 106	12.000						
WI 107		ND (100)–3,600					
WI 108		ND (100)–580					
WI 109							

MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 5–10

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 13, 15, 19 & 27 HEAT & ELECTRICAL POWER, BURIED FUEL LINE SPILL, AUTO MAINTENANCE, DIESEL FUEL PUMP

JOB No. 1189098. JI TIME: 24-AUG-1999 10:16 FILE: e:\usace\necape\99rl_fs\draft\fig5_10.dgn

There is virtually no vegetation at this site, as it lies within the confines of the main complex and was constructed exclusively on the gravel pad. Drainage from the site is northward towards the Drainage Basin Site. There is no standing water at Site 13.

Potential Sources of Contamination. Two diesel USTs, two diesel ASTs, three banks of transformers (now removed), generators and piping.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of the ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to the buildings suspected to contain friable asbestos. Table 3-2 lists the warning sign locations. Samples of paint were tested and found to be lead-based paint (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, two diesel ASTs, two diesel USTs and two water tanks were observed. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

Six potential sources of environmental contamination were identified at this site, including the two diesel ASTs, the two diesel USTs, the generators and transformer shed. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 2 soil cleanup standards for all constituents. Surface and subsurface soils around the tanks and buildings were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, VOC, SVOC, pesticides, and priority pollutant metals contamination. Analytical results are presented in Table 5-18 and compared with the cleanup criteria. As shown on Figure 5-10, soil analytical results exceed the Soil Cleanup Standards for DRO and PCB. Contaminated areas are on the gravel pad.

Subsurface water under the gravel pad was sampled and analyzed for TRPH, RRO, DRO, GRO, BTEX, and priority pollutant metals. Analytical results are presented in Table 5-19 and compared with the cleanup criteria. DRO, GRO, benzene, total arsenic, total chromium, total lead and total nickel exceed the Ground Water Cleanup Standards. Levels of dissolved arsenic, chromium, lead and nickel in filtered samples are below the Ground Water Cleanup Standards, indicating that metals in soil entrained in the water samples caused the exceedence. Therefore, none of these metals are identified as a contaminant of concern at this site.

In 1994, benzene exceeded the Ground Water Cleanup Standards; however, in 1998 the benzene levels had decreased to below the standard. It would appear likely that the concentrations of benzene, a mobile, volatile, and readily-biodegradable constituent, have rapidly attenuated in the environment. Therefore, benzene was eliminated as a constituent of concern in subsurface water at the site.

Wipe samples were collected from the three Transformer Pads and analyzed for PCB. Analytical results are presented in Table 5-20. Residual PCB-1260 levels detected on the Transformer Pads ranged from 54 to 6500 $\mu g/100cm^2$.

This site drains to Site 28, the Drainage Basin, consisting of the tundra/wetlands to the northwest. Potential impacts of site contaminants on the Drainage Basin are discussed in Section 5.28, the Drainage Basin.

Contaminants of Concern. DRO and PCB in soil. DRO and GRO in subsurface water. ACM and lead-based paint incidental to BD/DR.

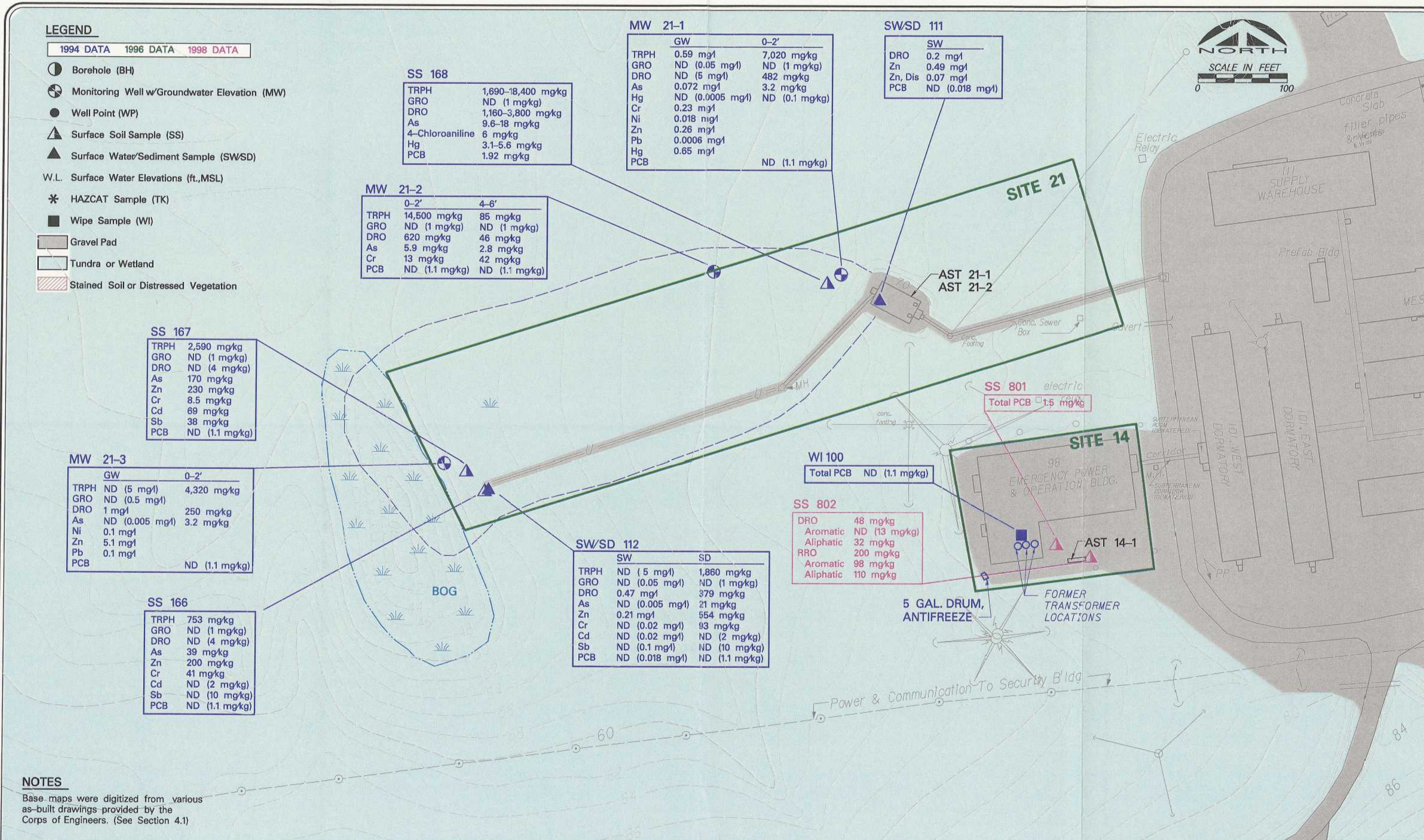
Recommended Remedial Action.

> CON/HTRW: Remove and dispose/recycle CON/HTRW. Investigate PCB concentrations in building foundation.
>
> BD/DR: Perform BD/DR.
>
> Gravel Pad: Remediate isolated areas of petroleum- and PCB- contaminated soil consistent with installation-wide cleanup criteria and remedial action. Address petroleum-contaminated subsurface water consistent with installation-wide cleanup criteria and remedial action.
>
> Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.14 SITE 14: EMERGENCY POWER/OPERATIONS BUILDING

Physical Description. This site includes the emergency power generation and communications equipment that was housed in Building 98 of the housing and operations area, and the land immediately around it (Figure 5-11). The site includes one 5,000-gallon AST located on the south side of the building, and one 55-gallon drum full of antifreeze, also located on the south side of the building. The basement of Building 98 was found to be flooded during previous investigations. When the water was pumped out, the "basement" was found to be a subterranean passage. In 1998, the passage had partially refilled with water. The site formerly included a transformer shed containing one transformer bank with three transformers (located immediately on the left side of the southeast entrance of the building). The transformer shed and transformers were removed in 1994 (NES, 1994).



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5–11

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 14 & 21 EMERGENCY POWER/OPERATIONS, WASTEWATER TREATMENT FACILITY

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The site is located adjacent to the Main Operations Complex (Figure 1-4). Vegetation at the site ranges from sparse in areas encompassed by the gravel pad to completely coverage in non-disturbed areas. Vegetation consists of tundra grasses, sedges, moss, and lichens. There are several drainages from Site 14. Drainage pathways typically follow the contours of the building footprint. Drainages from the north, south, and west sides of the building are primarily in the same direction, i.e., north, south, and west, respectively. Drainage from the east side of the building is primarily towards the north. There is no standing water in the immediate vicinity of the site.

Potential Sources of Contamination. AST, transformers, drum of antifreeze.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995). The type and location of ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to buildings suspected to contain friable asbestos. Table 3-2 lists warning sign locations. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, one AST was identified and found to be approximately 50% full of rainwater and sludge. A drum of antifreeze was observed at the site and is included on the CON/HTRW inventory. A full inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

Two potential sources of environmental contamination were identified at this site, the AST and transformer bank. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 2 soil cleanup standards for all constituents. Surface soils around the tank and transformers were sampled and analyzed for RRO, DRO, PCB and BTEX. Analytical results are presented in Table 5-21 and compared with the cleanup criteria. As shown on Figure 5-11, all soil analytical results are below the Soil Cleanup Standards, except for PCBs. Wipe samples were collected from the flooring around the transformers was analyzed for PCB. Analytical results are shown in Table 5-22.

Contaminants of Concern. ACM, lead-based paint and PCB incidental to BD/DR. PCB's in soil.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW. Investigate PCB concentrations in building foundations.

BD/DR: Perform BD/DR.

Gravel Pad: Remediate isolated areas of PCB-contaminated soil consistent with the installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.15 SITE 15: BURIED FUEL LINE SPILL AREA

Physical Description. This site encompasses the area running west from the 20,000-gallon UST at Site 13 towards the diesel fuel pump island at Site 27 (Figure 5-10). A break in this fuel line resulted in an approximately 40,000-gallon diesel fuel spill. The rupture is reported to have occurred in 1971 or 1973 (Toolie, 1996 and Toolie, 1998). This ruptured fuel line was abandoned in place and a second line was installed at a shallower depth (E&E, 1993).

Vegetation in the area is minimal as the site lies entirely on the gravel pad and within the confines of the main complex. There is significant surface soil staining about the site, which may be attributable to the historic underground fuel release or fueling operations at the site. Drainage from the site is north through Sites 13 and 27 and into the Drainage Basin.

Potential Sources of Contamination. Diesel release from fuel line.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) were present on the site. No materials are listed on the inventory of the buildings and debris slated for demolition is provided in Section 4.3. No ASTs or USTs were observed at the site. A full inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

The source of environmental contamination at this site is the diesel release from the fuel line. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 2 soil cleanup standards for all constituents. Surface and subsurface soils around the fuel line were sampled and analyzed for TRPH, DRO, GRO, and BTEX. Analytical results are presented in Table 5-24 and compared with the cleanup criteria. As shown on Figure

5-10, soil analytical results exceed the Soil Cleanup Standards for DRO. Contaminated areas are on the gravel pad.

Subsurface water under the gravel pad was sampled and analyzed for TRPH, RRO, DRO, GRO, BTEX, and priority pollutant metals. Analytical results are presented in Table 5-25 and compared with the cleanup criteria. RRO, DRO, total arsenic, total beryllium, total lead, total zinc, and total nickel exceed the Ground Water Cleanup Standards. Levels of dissolved arsenic, beryllium, lead, zinc, and nickel in filtered samples are below the Ground Water Cleanup Standards, indicating that metals in soil entrained in the water samples caused the exceedence. Therefore, these metals are not included as contaminants of concern.

This site drains to Site 28, the Drainage Basin, consisting of the tundra/wetlands to the northwest. Potential impacts of site contaminants on the Drainage Basin are discussed in Section 5.28, the Drainage Basin.

Contaminants of Concern. DRO in soil. RRO and DRO in subsurface water.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: None.

Gravel Pad: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. Address petroleum-contaminated surface and subsurface water consistent with installation-wide cleanup criteria and remedial action.

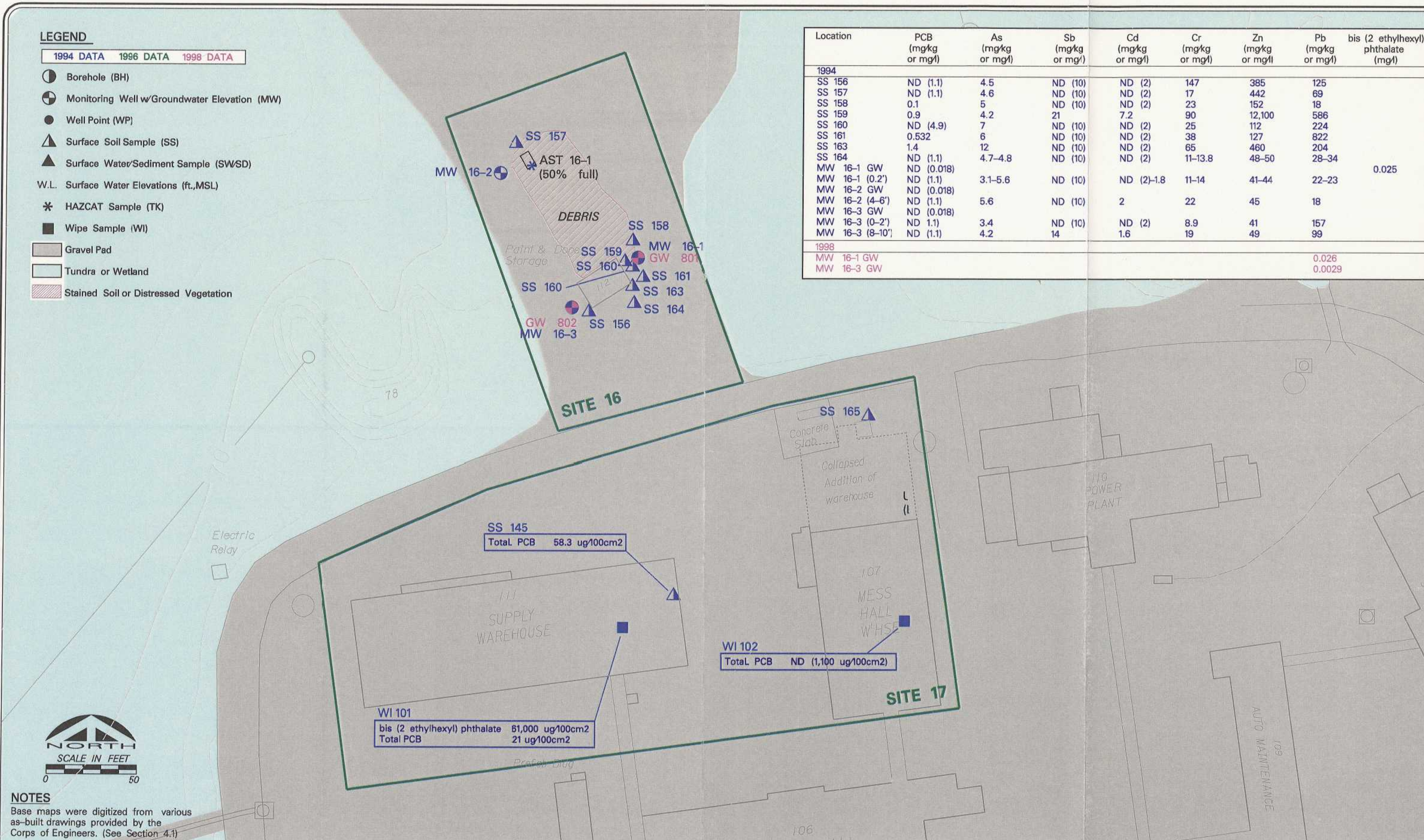
Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.16 SITE 16: PAINT AND DOPE STORAGE BUILDING

Physical Description. This site includes a single-room wood framed building on a concrete slab foundation (Figure 5-12) located on the north side of the perimeter access road surrounding the housing and operations complex (Figure 1-4). This site was originally a flammable liquids storage facility. Numerous decaying containers ranging in size from 1 pint to 5 gallons are scattered both inside the building and throughout the surrounding area. One steel AST, reported to be used for oiling roads (Toolie, 1996), is located on the northern border of the site. Its dimensions are 7.5 feet long with an oval cross section of 6 feet by 4 feet. In addition to the AST, there is a large amount of miscellaneous debris located on the north side of the building.

Vegetation in the area is minimal due to physically disturbed earth and the gravel fill pad. However, the lack of vegetation appears to be a result of earthmoving rather than fuel



Location	PCB (mg/kg or mg/l)	As (mg/kg or mg/l)	Sb (mg/kg or mg/l)	Cd (mg/kg or mg/l)	Cr (mg/kg or mg/l)	Zn (mg/kg or mg/l	Pb (mg/kg or mg/l)	bis (2 ethylhexyl) phthalate (mg/l)
1994								
SS 156	ND (1.1)	4.5	ND (10)	ND (2)	147	385	125	
SS 157	ND (1.1)	4.6	ND (10)	ND (2)	17	442	69	
SS 158	0.1	5	ND (10)	ND (2)	23	152	18	
SS 159	0.9	4.2	21	7.2	90	12,100	586	
SS 160	ND (4.9)	7	ND (10)	ND (2)	25	112	224	
SS 161	0.532	6	ND (10)	ND (2)	38	127	822	
SS 163	1.4	12	ND (10)	ND (2)	65	460	204	
SS 164	ND (1.1)	4.7–4.8	ND (10)	ND (2)	11–13.8	48–50	28–34	
MW 16–1 GW	ND (0.018)							0.025
MW 16–1 (0.2')	ND (1.1)	3.1–5.6	ND (10)	ND (2)–1.8	11–14	41–44	22–23	
MW 16–2 GW	ND (0.018)							
MW 16–2 (4–6')	ND (1.1)	5.6	ND (10)	2	22	45	18	
MW 16–3 GW	ND (0.018)							
MW 16–3 (0–2')	ND 1.1)	3.4	ND (10)	ND (2)	8.9	41	157	
MW 16–3 (8–10')	ND (1.1)	4.2	14	1.6	19	49	99	
1998								
MW 16–1 GW							0.026	
MW 16–3 GW							0.0029	

NOTES
Base maps were digitized from various as-built drawings provided by the Corps of Engineers. (See Section 4.1)

MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 5–12
U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA
SITES 16 & 17 PAINT & DOPE STORAGE BLDG, GENERAL SUPPLY & MESS HALL WAREHOUSE

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contamination distress. The sparse grasses present at the site appeared healthy. There is no clear drainage pathway as the site is fairly well graded.

Potential Sources of Contamination. Abandoned containers, AST.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of the ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to buildings suspected to contain friable asbestos. Table 3-2 lists warning sign locations. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, one AST was identified and found to be approximately 50% full of the fluids, black oil and gray water. The fluids appeared to be weathered heavy motor oil, and rainwater and snowmelt accumulation. Fluids were sampled and results are provided in Section 4.2.1. A listing of CON/HTRW at the site is shown on the inventory provided in Section 4.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

Two potential sources of environmental contamination were identified at this site, the AST and the abandoned containers. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils is ADEC Method 2 for all constituents. Soils and subsurface water around the AST and abandoned containers were sampled and analyzed for SVOC, VOC, PCB, pesticides and priority pollutant metals. Analytical results are presented in Table 5-26 (for soil) and Table 5-27 (for water) and compared to the cleanup criteria. All soil constituents were below the Soil Cleanup Standards, except PCBs, arsenic, antimony, cadmium, chromium, lead, and zinc.

Bis-(2-ethylhexyl)phthalate, total beryllium, total cadmium, total chromium, total lead, total zinc, and total nickel exceeded the Water Cleanup Standards. Dissolved concentrations of beryllium, cadmium, chromium, lead, zinc, and nickel are below the Water Cleanup Standards, suggesting that metals attached to soils entrained in the water are the source of the exceedences. Therefore, these metals are eliminated contaminants of concern. Although a common laboratory contaminant, bis-(2-ethylhexyl)phthalate is retained as a contaminant of concern, due to its occurrence at this site and high detection levels of the same contaminant in a wipe sample at the adjacent Site 17.

Contaminants of Concern. PCBs, arsenic, antimony, cadmium, chromium, lead, and zinc in soil. ACM and lead-based paint incidental to BD/DR. Bis-(2-ethylhexyl)phthalate in subsurface water.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW. Investigate PCB concentrations in building foundations.

BD/DR: Perform BD/DR.

Gravel Pad: Address elevated levels of metals in the gravel pad as part of the installation-wide cleanup criteria and remedial action. Address bis-(2-ethylhexyl)phthalate contaminated subsurface water consistent with installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.17 SITE 17: GENERAL SUPPLY WAREHOUSE AND MESS HALL WAREHOUSE

Physical Description. The site includes Buildings 111 and 107 of the housing and operations complex (Figure 1-4). The warehouses were both single story buildings approximately 10,000 square feet in area (Figure 5-12). They were used to store miscellaneous materials such as paper goods, food and cleaning fluids required for base operations. Cold storage facilities were located at this site.

Potential Sources of Contamination. Lead or ACM. Any remaining potentially- hazardous materials such as cleaning fluids. Leaking drum.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to buildings suspected to contain friable asbestos. Table 3-2 lists warning sign locations. Painted surfaces were tested and found to consist of lead-based paint (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, no tanks were identified. Twenty 25-pound tubs of dishwashing compound labeled as "Chlorine Releasing" were observed in the General Supply Warehouse (Building 111) and are considered CON/HTRW. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

No potential sources of environmental contamination were identified at this site. Soil samples were collected beneath the leaking drum and analyzed for SVOC and VOC. None were detected (Table 5-28). Wipe samples were collected from the flooring in the warehouses was analyzed for PCB and SVOC. One wipe sample showed PCB at 21 μg/square centimeter. Analytical results are presented in Table 5-29. No PCB source was identified.

A soil sample was collected at the entrance to the Supply Warehouse (Building 111). PCB concentrations soils from the gravel pad exceeded the Soil Cleanup Standards.

Contaminants of Concern. PCB in soil. ACM, lead-based paint and PCB incidental to BD/DR.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW. Investigate PCB in building foundations.

BD/DR: Perform BD/DR.

Gravel Pad: Excavate and dispose of PCB-contaminated soil.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.18 SITE 18: HOUSING FACILITIES AND SQUAD HEADQUARTERS

Physical Description. As shown in Figure 1-4, Site 18 is in the Main Operations Complex. The Housing Facilities and Squad Headquarters consists of 10 buildings, including Buildings 99, 100 (east and west buildings), 101, 102, 104, 105, 106, 125 and 130, all linked by enclosed walkways. Figure 5-13 shows the layout of the site. All of the buildings are in disrepair and debris is scattered throughout the site. Site 18 makes up most of the main complex and is built on the gravel pad. Vegetation throughout the site is sparse to non-existent, but the existing vegetation appears healthy and not adversely effected by site conditions. Drainage from the site in general is towards the north. There is no standing water at the site.

Potential Sources of Contamination. Lead- and asbestos-containing building materials.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

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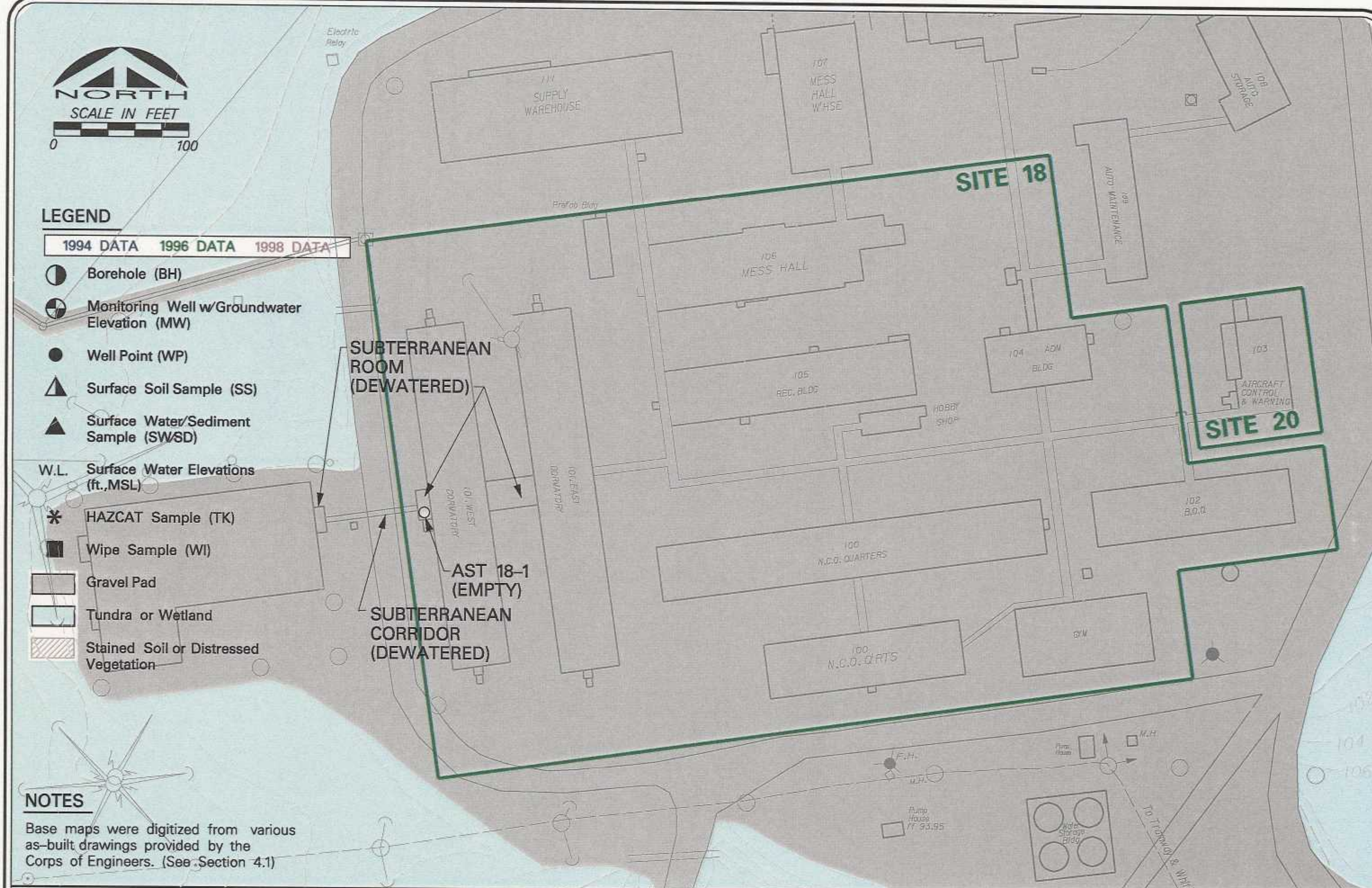

MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5-13

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 18 & 20 HOUSING FACILITIES & SQUAD HEADQUARTERS, AC&W BLDG.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of the ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to buildings suspected to contain friable asbestos. Table 3-2 lists warning sign locations. Paint chips from painted surfaces were collected and analyzed and found to contain lead-based paint (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

One subterranean structure (the underground corridor between Building 101 and Building 98 at Site 14) was found flooded during the investigation. Dewatering of the subterranean corridor was necessary to inspect it for potentially hazardous materials. As described in Section 2.4.4, IRD Management, the water within the corridor was analyzed and found to be suitable for discharge directly to the ground adjacent to the buildings. No sludge or potentially toxic or hazardous materials were observed in the corridor during inspection of the subterranean passage.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. One tank was observed at the site in the subterranean corridor, once it had been dewatered. The tank, in contact with the water, showed no evidence of its past contents. Four 5-gallon pails and six quart-sized containers of Decontamination Agent, DS-2 were containerized into seven 12-gallon drums, transported and disposed off-site. Five 5-gallon pails of Super Tropical Bleach (STB) were containerized in one 55-gallon drum and were transported from the site for off-site disposal. Containerization, transportation and disposal activities are reported in Section 3.3, Hazardous Waste Disposal. An inventory of the remaining CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

No other potential sources of environmental contamination were identified at this site.

Contaminants of Concern. ACM and lead-based paint.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: No further action.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.19 SITE 19: AUTO MAINTENANCE AND STORAGE FACILITIES

Physical Description. The Auto Maintenance and Storage Facilities are located in the Main Operations Complex (Figure 1-4). The site consists of the Auto Storage Facility (Building 108), Auto Maintenance Facility (Building 109) and the adjacent land (Figure 5-10). The buildings were constructed using wood framing, with steel columns and trusses that support the roofs. The flooring in both buildings is a concrete slab. Both floors are stained and have floor drains, which are assumed to drain to the north along the downward sloping grade. There is a mechanics' work pit in the north end of the auto maintenance facility, which is flooded with water. The site also contains the following CON/HTRW items: one 250-gallon oblong AST located outside of the northeast corner of Building 108 containing approximately 50 gallons of spent antifreeze; one empty 250-gallon AST located by Building 108; 24 two-gallon smudge pots; and 72 five-gallon buckets of Military Aircraft Washing Powder.

Vegetation in the area is limited, as this site is located within the main complex on the gravel fill pad. The sparse vegetation consists of grasses and appears to be healthy. The drainage of the site is to the north towards the Drainage Basin. There is no standing water at the site.

Potential Sources of Contamination. Two ASTs, mechanics' work pit, floor drains from auto maintenance and storage areas, 24 smudge pots, 72 buckets of Military Aircraft Washing Powder.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of the ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to buildings suspected to contain friable asbestos. Table 3-2 lists warning sign locations. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, two ASTs were identified. One 250-gallon AST was found to contain approximately 50 gallons of spent antifreeze. The other 250-gallon AST was found to be empty. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

Seven potential sources of environmental contamination were identified at this site, including each of the two ASTs, each of the two floor drains, the mechanics' work pit, the smudge pots and the Military Aircraft Washing Powder. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils ADEC Method 2 for all constituents. Soils and subsurface water around the ASTs, floor drains and smudge pots were sampled and analyzed for TRPH, DRO, GRO, BTEX and metals. Analytical results are presented in Table 4-11 (for wastes in containers and tanks), Table 5-31 (for soil) and Table 5-32 (for water) and compared to the cleanup criteria. Isolated areas of site soils exceed the Soil Cleanup Standards for DRO, GRO, arsenic and chromium.

The concrete floor was wipe-sampled and analyzed for petroleum and metals. Analytical results are presented in Table 5-33. As described in Section 4.2.1, water and sediment from the mechanics' work pit was sampled and analyzed for metals and ethylene glycol (water) and TRPH, BTEX and PCB (sediment). Water in the pit appears to be below groundwater and surface water criteria and may be appropriate for direct discharge to the ground. The sediment in the mechanics' work pit exceeds the RCRA toxicity characteristic and, if excavated and disposed, will require disposal as a hazardous waste. The containers of Military Aircraft Washing Powder were inside the building, unbroken, and there was no evidence of leaks or spills to the environment.

Two monitoring wells were installed at the site. Subsurface water was collected from the monitoring wells in 1994 and 1998. Water quality criteria are exceeded for DRO, GRO, total zinc, total lead, and benzene. The filtered samples of zinc and lead are below the Water Cleanup Standard, therefore, they are not included as contaminants of concern. In 1998, the benzene levels had decreased to below the standard. It would appear likely that the concentrations of benzene, a mobile, volatile, and readily-biodegradable constituent, have rapidly attenuated in the environment. Therefore, benzene was eliminated as a constituent of concern in subsurface water at the site.

Contaminants of Concern. DRO, GRO, arsenic and chromium in soil. DRO and GRO in subsurface water. ACM and lead-based paint incidental to BD/DR.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: Remediate isolated areas of contaminated soil consistent with installation-wide cleanup criteria and remedial action. Address petroleum-contaminated subsurface water consistent with installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.20 SITE 20: AIR FORCE AIRCRAFT CONTROL WARNING (AC&W) BUILDING

Physical Description. Site 20 is located in the Main Operations Complex (Figure 1-4). It consists of Building 103, the Air Force Aircraft Control Warning (AC&W) Building (Figure 5-13). The building is very weathered and the roof has collapsed.

Potential Sources of Contamination. Lead- and asbestos-containing building materials.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to the buildings suspected to contain friable asbestos. Table 3-2 lists the warning sign locations. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

No ASTs and USTs were observed at the site. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

No other potential sources of environmental contamination were identified at this site.

Contaminants of Concern. ACM and lead-based paint incidental to BD/DR.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: No further action.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.21 SITE 21: WASTEWATER TREATMENT FACILITY

Physical Description. Site 21 consists of the wastewater treatment system which served the Housing and Operations Complex. The facility is located east of the perimeter road (Figure 1-4) and consists of two side-by-side septic settling tanks approximately 15 feet wide by 50 feet long and eight feet deep (Figure 5-11). Effluent from these tanks was discharged via an 8-inch insulated cast iron pipe to a wetland area approximately 450 feet to the east.

Aside from areas of physically disturbed earth from earthmoving activities, vegetation in this area is healthy. Soil characteristics range from gravelly fill near the building to very organic marshy areas and grasses. The drainage of the site follows a stream located at the ends of the outfall approximately 1,000 feet west of the main structure. The flow rate of this stream is approximately 100 gpm.

Potential Sources of Contamination. Wastewater treatment effluent.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of the ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to buildings suspected to contain friable asbestos. Table 3-2 lists warning sign locations. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, two 500-gallon diesel ASTs were identified and found to be empty. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

One potential source of environmental contamination was identified at this site, the discharge from the septic tanks. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils is ADEC Method 2 for all constituents. Soils and sediments around the septic tank discharge were sampled and analyzed for TRPH, DRO, GRO, PCB, VOC, SVOC, pesticides and metals. Analytical results are presented in Table 5-34 (for soil) and compared to cleanup criteria. Isolated areas of site soils and sediments exceed the Soil Cleanup Standards for DRO, PCB, arsenic, antimony, cadmium, chromium, and mercury. 4-chloroanaline was detected at SS168 in the primary and duplicate samples at 6 mg/Kg and 4.94 mg/Kg, respectively. 4-chloroanaline was not detected (MDL = 1.7 mg/Kg) in the split sample from the same location that went to the QA/QC laboratory or in any other site sampling locations. It is assumed that this constituent was a laboratory contaminant and, therefore, is excluded as a contaminant of concern at the site.

Subsurface water samples were collected and analyzed from 3 monitoring wells in 1994 and 1998 and several surface water sampling locations. Analytical results are presented in Table 5-35 (for subsurface water). Total arsenic, total chromium and total lead exceed the Water Cleanup Standards, while dissolved concentrations of these metals are all below the standards.

This suggests that metals associated with soils entrained in the water are the source of the metals, therefore, they are excluded as contaminants of concern in the subsurface water. Total and dissolved concentrations of zinc exceed the standard in one of two surface water samples. No source of zinc was identified so zinc in surface water is excluded as a contaminant of concern.

Contaminants of Concern. DRO, PCB, arsenic, antimony, cadmium, chromium, and mercury in tundra soils. ACM and lead-based paint incidental to BD/DR.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: None.

Tundra/Wetlands: Remediate isolated areas of contaminated tundra consistent with an installation-wide cleanup criteria and remedial action identified for the site.

Potential Obstacles to Remediation. Site obstacles to removal of the wastewater treatment facility include uneven terrain and marshy conditions, which may impede earthmoving activities and demolition of the facility.

5.22 SITE 22: WATER WELLS AND WATER SUPPLY BUILDING

Physical Description. Site 22 is located adjacent to the Main Operations Complex (Figure 1-4). This site consists of the potable water storage building (Building 113), the pumphouse (Building 114) and three of the four water supply wells at the installation (Figure 5-14). The water storage building holds four 20-foot diameter and 26-foot high water tanks and miscellaneous piping.

Inside the building's northern entrance, 150 1-gallon paint cans containing Asbestos Retort Cement and ten 50-pound bags of asbestos cement are piled. The pumphouse contains a motor driven pump and diesel pump drive (E&E, 1993). There is also a UST (UST 22-1), which apparently supplied the pump, located on the south side of this building. The building is in fair condition but has suffered some weathering due to the lack of windows and doors. Little information is available pertaining to the four wells.

Potential Sources of Contamination. Diesel-powered engine and pump, UST 22-1, cans and bags of asbestos cement.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

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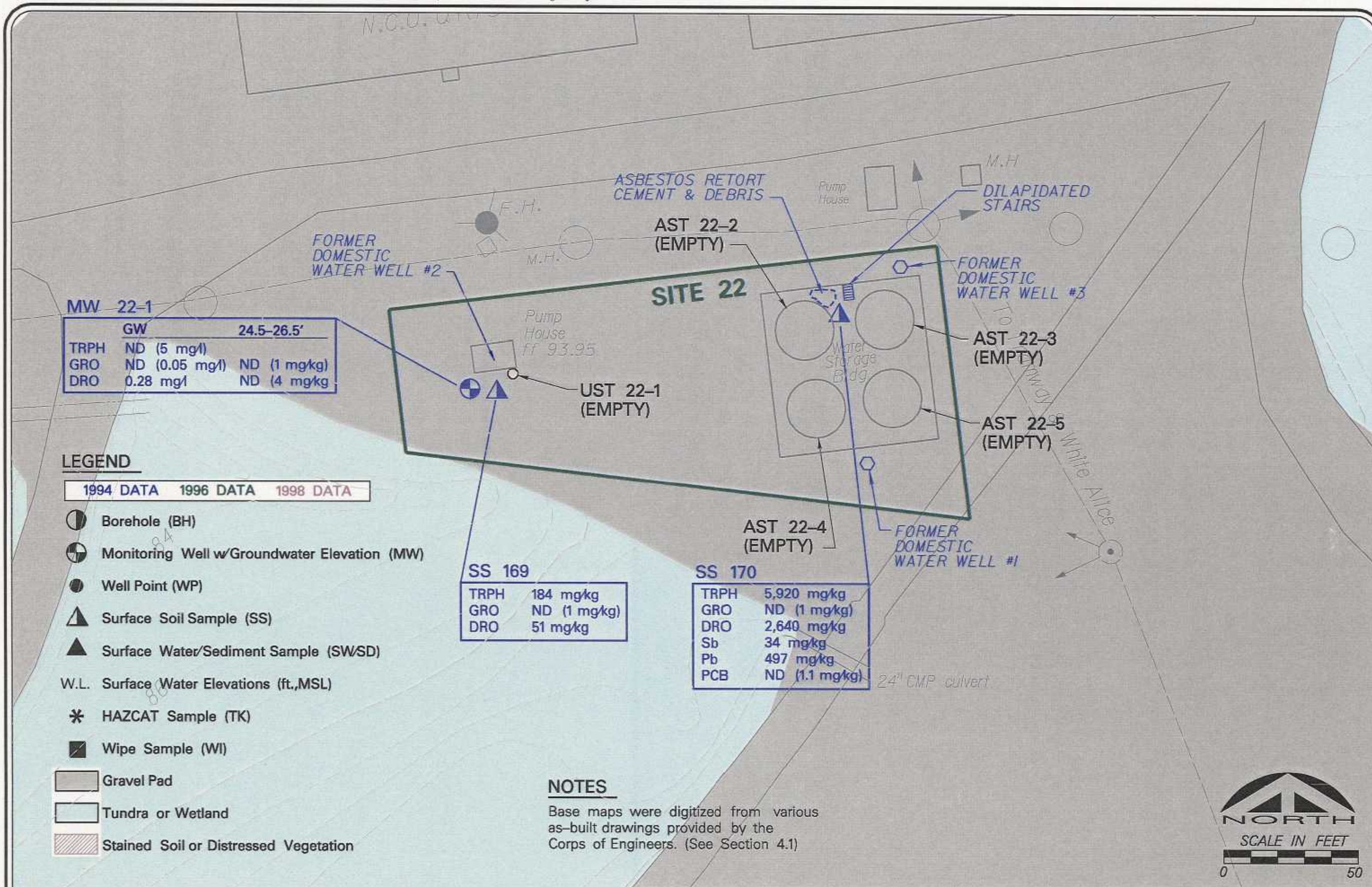


MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 5-14

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 22 WATER WELLS AND WATER SUPPLY BUILDING

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of the ACM is summarized in Table 3-1. Signs warning of the presence of asbestos and its potential hazards were posted at all viable entrances to buildings suspected to contain friable asbestos. Table 3-2 lists warning sign locations. Paint chips from painted surfaces were collected, analyzed and found to contain lead-based paint (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of ASTs and USTs and an inventory of tank contents. At this site, one UST was identified and found to be empty. CON/HTRW observed at the site includes approximately 150 one-gallon cans of Asbestos Retort Cement (previously identified as fire brick paint) located in the water storage building. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

Four potential sources of environmental contamination were identified at this site, including the diesel engine and pump, UST 22-1 and cans and bags of asbestos cement. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils is ADEC Method 2 for all constituents. Soils and sediments around the diesel engine, pump and UST 22-1 were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, SVOC, pesticides and metals. Analytical results are presented in Table 5-36 (for soil) and compared to the cleanup criteria. Isolated areas of site soils and sediments exceed the Soil Cleanup Standards for DRO, antimony, and lead. Because there is an identifiable source of lead and the metal has exceeded the criteria in the only soil sample that tested for metals, it will be retained as a contaminant of concern. Similarly, antimony has been detected in the same sample and will be considered a contaminant of concern.

Subsurface water samples were collected and analyzed for TRPH, DRO, GRO, and BTEX. Analytical results are presented in Table 5-37 and show no constituents above the identified regulatory criteria.

Contaminants of Concern. DRO, antimony, and lead in soil. ACM and lead-based paint incidental to BD/DR.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. No subsurface water remediation warranted. Address elevated levels of metals in the gravel pad as part of the installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: No tundra at this site.

Potential Obstacles to Remediation. None identified at this time.

5.23 SITE 23: POWER AND COMMUNICATION LINE CORRIDORS

Physical Description. The power and communication line corridors run from the main camp to the outlying facilities (Figure 1-4). An empty transformer crib, a downed power pole, and miscellaneous 55-gallon drums are also located at the northwest side of the site (Figure 5-15) near Site 24. Five 55-gallon drums are located at the site due north of the White Alice station, and approximately 1,500 abandoned drums are scattered throughout the site.

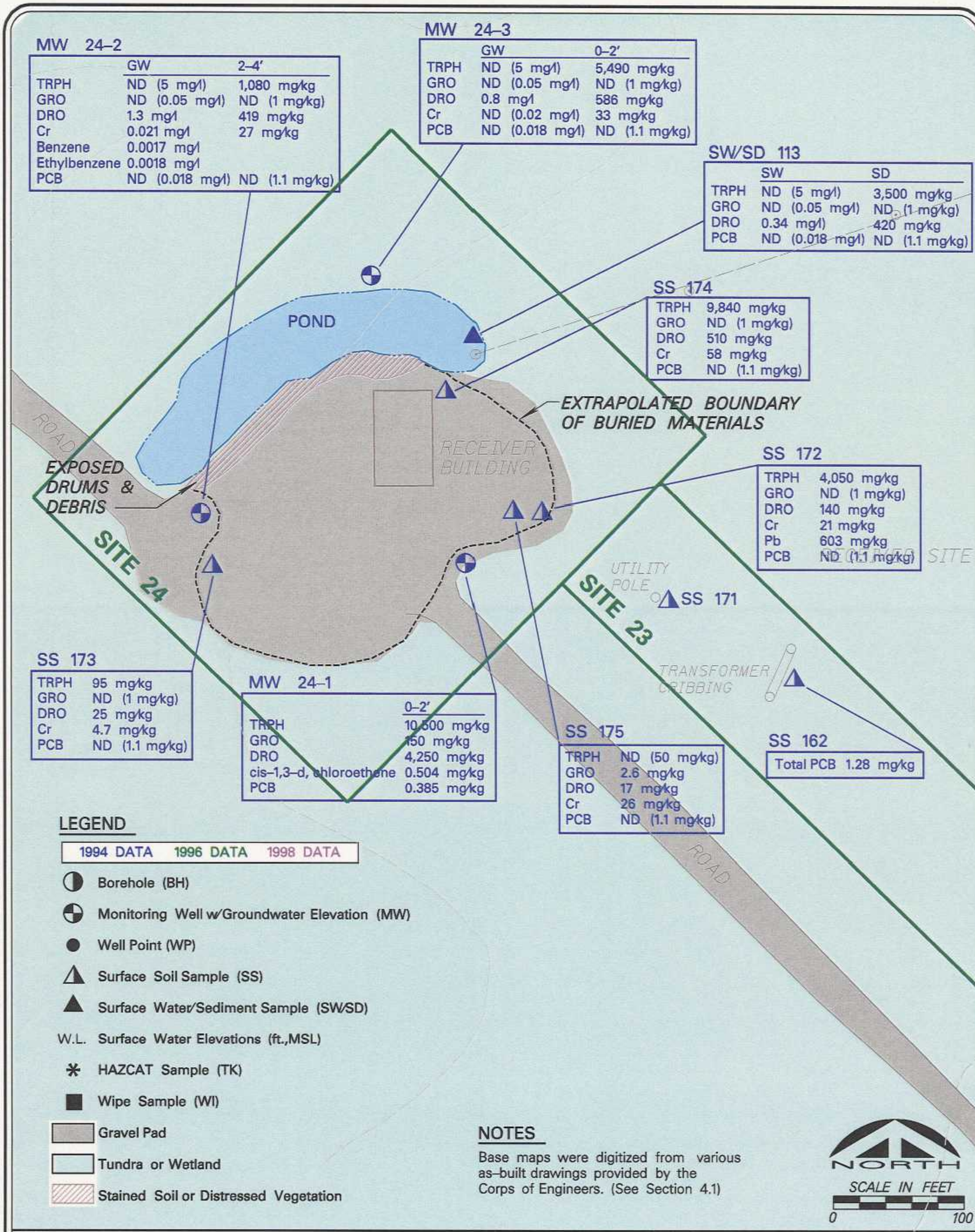
Potential Sources of Contamination. Transformers and crib (now removed), drums.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) and no ASTs or USTs were present at the site. An inventory of the buildings and debris slated for demolition is provided in Section 4.3. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

Two potential sources of environmental contamination were identified at this site, the drums and transformer crib (now removed). Two discrete portions of the corridor were chosen for this investigation. The first is directly adjacent to Site 24 (the Receiver Building), and was selected because of the presence of a stained soils beneath an empty transformer crib, a downed power pole, and miscellaneous 55-gallon drums. The second location is due north of the White Alice station and was selected based on the presence of five 55-gallon drums with unknown contents. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are in accordance with ADEC Method 1 for petroleum and Method 2 for all other constituents. Soils around the transformer crib were sampled and analyzed for PCB. Analytical results are presented in Table 5-38 (for soil) and compared to the cleanup criteria. Soil analytical results exceed the soil cleanup standards for PCB-1260. The contaminated area is in the tundra.

Soil samples from around the abandoned drums were collected and analyzed for TRPH, DRO, GRO, BTEX, PCB, SVOC, pesticides, and metals. No constituents exceed the Soil Cleanup Standards.



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MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 5-15

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 23 & 24 POWER & COMMUNICATION LINE CORRIDORS & RECEIVER BUILDING

Contaminants of Concern. PCB in soil.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: No further action.

Tundra/Wetlands: Remediate isolated areas of PCB-contaminated soil consistent with the PCB cleanup criteria and remedial action identified for the site.

Potential Obstacles to Remediation. None identified at this time.

5.24 SITE 24: RECEIVER BUILDING AREA

Physical Description. The receiver building is located approximately 1.5 miles west of the Housing and Operation Complex (Figure 1-4). It consists of one reinforced concrete building on concrete pillars (Figure 5-15). All equipment associated with the building has been removed and the concrete building burned; only the concrete shell remains. The pad on which the building is located is suspected to consist of empty buried POL drums aligned in rows and covered with gravel. According to E&E (1993) there are approximately 1,000 drums buried at the site.

Potential Sources of Contamination. Buried and scattered drums.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

Site structures (e.g., buildings) were inspected for ACM. At this site, ACM and/or suspected ACM was observed in buildings and surrounding areas (Montgomery Watson, 1995a). The type and location of the ACM is summarized in Table 3-1. Signs warning of asbestos hazards were unnecessary and were not posted, because the asbestos observed at the site is non-friable asbestos. Painted surfaces are assumed to be lead-based paint, based on sampling performed at other sites (Montgomery Watson, 1995a). An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

No ASTs or USTs or CON/HTRW were observed at the site.

The potential source of environmental contamination at this site is the buried and scattered abandoned drums. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are in accordance with ADEC Method 1 Matrix Level C for petroleum and ADEC Method 2 for all other constituents. Soils around the scattered and buried drums were sampled and analyzed for TRPH, DRO, GRO, PCB, VOC, SVOC, pesticides, and metals. Analytical results are presented in Table 5-39 (for soil) and compared to the cleanup criteria. Isolated areas of site soils and sediments exceed the Soil Cleanup Standards for DRO, lead, chromium, and cis-1,3-Dichloroethene. Not a common source of laboratory contamination cis-1,3-Dichloroethene has an identifiable source and is considered a contaminant of concern.

Three monitoring wells were installed and water samples were collected in 1994 and analyzed for TRPH, DRO, GRO, VOC, SVOC, PCB, pesticides, and metals. Analytical results are presented in Table 5-40. Ground Water Cleanup Standards were exceeded for DRO, total nickel, total lead and total zinc. Dissolved concentrations of these constituents are below the Water Cleanup Standards. Metals associated with soils entrained in the water are probably the source of the metals, therefore, these metals are excluded as contaminants of concern.

Surface water and sediment samples were collected from the pond at the site. Samples were analyzed for TRPH, DRO, GRO, PCB, SVOC, and metals. Analytical results are presented in Table 5-39 (sediments) and Table 5-40 (surface water). No Surface Water Cleanup Standards were exceeded.

Contaminants of Concern. DRO, lead, chromium, and cis-1,3-Dichloroethene in soil. DRO in subsurface water. ACM and lead-based paint incidental to BD/DR.

Recommended Remedial Action.

CON/HTRW: None.

BD/DR: Perform BD/DR.

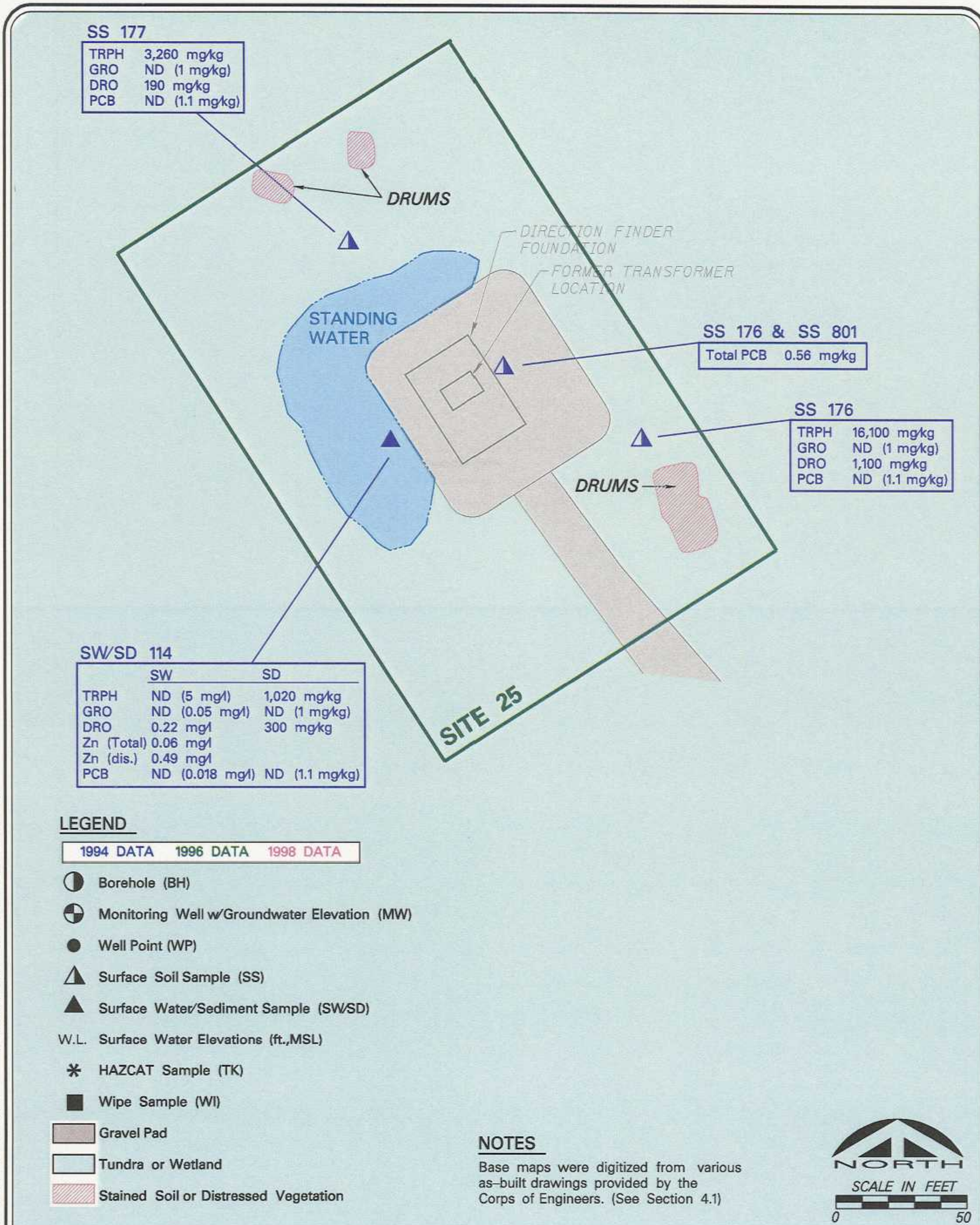
Gravel Pad: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. Remediate subsurface water consistent with installation-wide cleanup criteria and remedial action. Cover suspected drum burial site with clean fill.

Tundra/Wetlands: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action.

Potential Obstacles to Remediation. None identified at this time.

5.25 SITE 25: DIRECTION FINDER AREA

Physical Description. This site is located at the extreme west end of the installation (Figure 1-4). It originally consisted of a small building containing radio equipment. The building has been burned to the concrete foundation and the debris pushed to the sides of the gravel pad (E&E, 1993). There is one empty transformer casing lying on its side on the foundation and several 55-gallon drums scattered around the site (Figure 5-16).



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Anchorage, Alaska

FIGURE 5-16

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 25 DIRECTION FINDER FOUNDATION

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Potential Sources of Contamination. Transformer, 55-gallon drums, by-products of building fire.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) remain at this site. An inventory of the buildings and debris slated for demolition is provided in Section 4.3. No ASTs or USTs were observed at the site. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

Three potential sources of environmental contamination were identified at this site, including the former transformers, 55-gallon drums and by-products of the building fire. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils is ADEC Method 1 for petroleum and ADEC Method 2 for all other constituents. Soils and sediments around the abandoned drums and former transformers casing were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, SVOC, pesticides and metals. Analytical results are presented in Table 5-41 (for soil) and compared to the cleanup criteria. Isolated areas of site soils and sediments exceed the Soil Cleanup Standards for DRO.

One soil sample was collected to analyzed for the dioxins and furans, a potential by-product of burning. Sample locations are shown on Figure 5-16 and laboratory results are presented in Table 5-41. Results showed that the levels of dioxins and furans are below the Soil Cleanup Standards.

A surface water sample was collected off the gravel pad and adjacent to the abandoned drums. Analytical results are presented in Table 5-42 and compared to the cleanup criteria. Water analytical results show the Surface Water Cleanup Standards were exceeded for zinc (total and dissolved) for the only surface water sample. Having an identifiable source, it will be retained as a contaminant of concern.

Contaminants of Concern. DRO in tundra. Zinc in surface water.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: Remediate isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. Cover suspected drum burial site with clean fill.

Tundra/Wetlands: Address elevated levels of zinc in surface water as part of the installation-wide cleanup criteria and remedial action.

Potential Obstacles to Remediation. None identified at this time.

5.26 SITE 26: FORMER CONSTRUCTION CAMP AREA

Physical Description. The former Construction Camp Area is located adjacent to the Main Operations Complex (Figure 1-4). As shown on Figure 5-9. It consists of a flat gravel pad area with no structures or debris remaining. One out-of-service drinking water supply well is located at the site.

Potential Sources of Contamination. None.

Investigation Activities. E&E observed no indications of visible debris or HTRW during the site inspection in 1993. The drinking water supply well was identified later and added to this site. An inventory of the buildings and debris slated for demolition is provided in Section 4.3.

Contaminants of Concern. None.

Recommended Remedial Action.

CON/HTRW: None.

BD/DR: Decommission drinking water supply well.

Gravel Pad: No further action.

Tundra/Wetlands: No further action.

Potential Obstacles to Remediation. None identified at this time.

5.27 SITE 27: DIESEL FUEL PUMP ISLAND

Physical Description. The diesel fuel pump island is located in the Main Operations Complex (Figure 1-4). It consists of a 4 foot by 6 foot fuel pump shed, a 4-foot by 4-foot cement valve box, and buried pipeline from the fuel storage tanks to the east. It is located approximately 100 feet north of the Auto Storage Facility, Building 108 (Figure 5-10). It was originally used to refuel heavy equipment and vehicles; no gasoline was dispensed (Toolie, 1996). Diesel releases from the diesel fuel pump island have impacted the Site 28, the Drainage Basin.

The biota of the site is limited due to the gravel pad on which the site was built. The sparse vegetation (less than 5% coverage) consists primarily of grasses. However, what vegetation does exist appears healthy and unaffected by site conditions. Drainage from the site is north under the perimeter access road, through a culvert, and onto the Drainage Basin. During wet periods, subsurface water surfaces in a small spring immediately southeast of the pump island.

Potential Sources of Contamination. Past diesel releases from the fuel pump and fuel line. Buried drums on the embankment.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that, because of their state of disrepair, could represent physical hazards at the site; containerized hazardous or toxic wastes and potential sources of environmental contamination were also inventoried.

No structures (e.g., buildings) were present at the site. An inventory of the buildings and debris slated for demolition is provided in Section 4.3. No ASTs or USTs were observed at the site. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

In response to concerns raised during a community meeting, a radiological survey was performed as described in Section 2.5. No radioactive materials were detected at this site.

The potential source of environmental contamination at this site is the fuel pump and line. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils is ADEC Method 2 for all constituents. Soils and sediments around the fuel ump and fuel line were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB and metals. Analytical results are presented in Table 5-43 (for soil) and compared to the cleanup criteria. Isolated areas of site soils and sediments exceed the Soil Cleanup Standards for DRO, GRO, benzene, arsenic and chromium. Chromium was detected in one sample at 27 mg/Kg. Because it only exceeded the cleanup criteria by 1 mg/Kg and only in one sample, chromium is not listed as a contaminant of concern.

Subsurface water and surface water around the fuel pump and fuel line were sampled and analyzed for TRPH, DRO, GRO, BTEX, and metals. Analytical results are presented in Table 5-44 (for subsurface water) and compared to the cleanup criteria. Some samples exceed the Ground Water Cleanup Standards for DRO, GRO, total zinc, total lead, total nickel, and benzene. In 1998, the GRO and benzene levels had decreased to below the standard. Dissolved concentrations of zinc, lead, and nickel are below the Water Cleanup Standards. Metals associated with soils entrained in the water are probably the source of the metals, therefore, these metals are excluded as contaminants of concern. It would appear likely that the concentrations of benzene and GRO, comprised of mobile, volatile, and readily-biodegradable constituents, have rapidly attenuated in the environment. Therefore, GRO and benzene were eliminated as constituents of concern in subsurface water at the site.

In 1998, a spring was observed southeast of the pump island and was sampled and analyzed for RRO, DRO, GRO, BTEX and PAH. This subsurface water may be characteristic of the quality of water flowing under the gravel pad into the adjacent tundra. All results were below the Surface Water Cleanup Standards.

This site drains to Site 28, the Drainage Basin, consisting of tundra/wetlands to the northwest. Potential impacts of site contaminants on the Drainage Basin are discussed in Section 5.28, the Drainage Basin.

Contaminants of Concern. DRO, GRO, benzene, and arsenic in soil. DRO in subsurface water.

Recommended Remedial Action.

CON/HTRW: Remove and dispose/recycle CON/HTRW.

BD/DR: Perform BD/DR.

Gravel Pad: Remedial isolated areas of petroleum-contaminated soil consistent with installation-wide cleanup criteria and remedial action. Remediate subsurface water consistent with installation-wide cleanup criteria and remedial action.

Tundra/Wetlands: Remediate isolated areas of petroleum-contaminated tundra consistent with installation-wide cleanup criteria and remedial action.

Potential Obstacles to Remediation. None identified at this time.

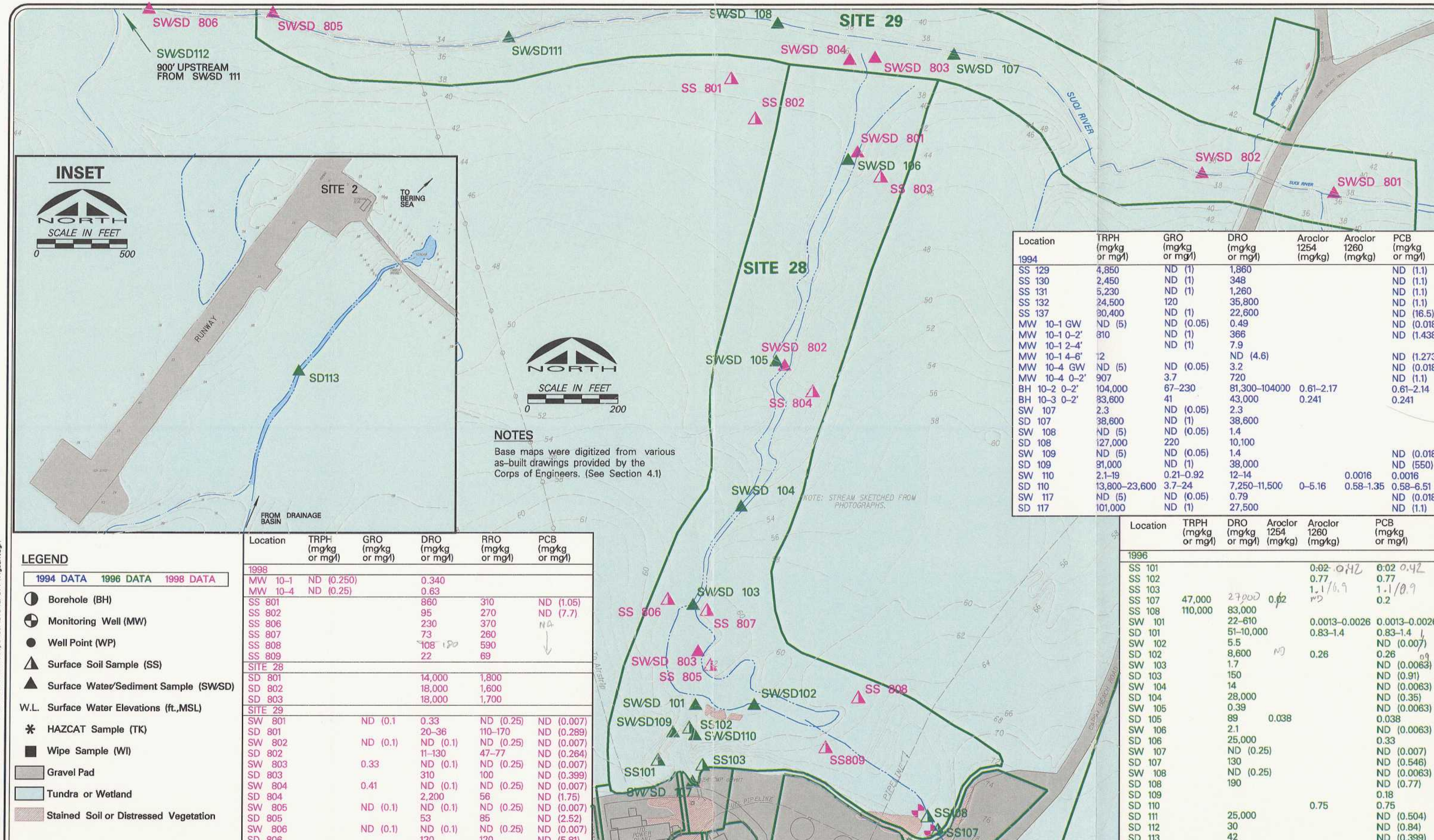
5.28 SITE 28: DRAINAGE BASIN

Physical Description. The Drainage Basin is a tundra/wetland north of the Main Operations Complex. Surface water run-off and subsurface water seeps from the Main Operations Complex gravel pad drains into tundra/wetland. This surface water flows north into the Suqi River (Figure 5-17).

Three discrete drainages originate from the Main Operations Complex gravel pad. The first is adjacent to Site 10 (Buried Drum Field) and Site 11(Fuel Storage Tank Area). The second is adjacent to Site 13 (Heat and Electric Power Building), and the third is adjacent to Site 27 (Diesel Fuel Pump Island). These headwaters areas are identified as the "Site 10 and 11 Headwaters", the "Site 13 Headwaters", and the "Site 27 Headwaters".

The Site 10 and 11 headwaters are west of Site 10 and north of Site 11. Heavy, black staining was observed on the edge of the gravel pad at Site 10. Soil staining was not observed beneath the 400,000-gallon diesel tanks at Site 11, even in the vicinity of the puncture in AST 11-2. However, a 120-foot by 30-foot area of soil staining and distressed vegetation was observed in the tundra at the foot of the gravel pad (Figure 5-17).

The Site 13 headwaters area originates from an artificially-created swale which contains a manhole and small (3-foot by 3-foot) concrete supporting structure. According to Eugene Toolie (1996), this manhole served as the drain for the Heat and Electric Power Buildings (Site 13) (Figure 5-10). North of the manhole is an approximately 10-foot wide by 40-foot long area of surface water, which drains to the north. The surface water has no petroleum sheen, but the sediments in the drainage are stained dark brown and black, and produce a heavy sheen when



NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers. (See Section 4.1)

LEGEND

1994 DATA 1996 DATA 1998 DATA

- Borehole (BH)
- Monitoring Well (MW)
- Well Point (WP)
- Surface Soil Sample (SS)
- Surface Water/Sediment Sample (SW/SD)
- W.L. Surface Water Elevations (ft.,MSL)
- HAZCAT Sample (TK)
- Wipe Sample (WI)
- Gravel Pad
- Tundra or Wetland
- Stained Soil or Distressed Vegetation

Location	TRPH (mg/kg or mg/l)	GRO (mg/kg or mg/l)	DRO (mg/kg or mg/l)	RRO (mg/kg or mg/l)	PCB (mg/kg or mg/l)
1998					
MW 10–1	ND (0.250)		0.340		
MW 10–4	ND (0.25)		0.63		
SS 801			860	310	ND (1.05)
SS 802			95	270	ND (7.7)
SS 806			230	370	NA
SS 807			73	260	
SS 808			~~108~~ 180	590	
SS 809			22	69	
SITE 28					
SD 801			14,000	1,800	
SD 802			18,000	1,600	
SD 803			18,000	1,700	
SITE 29					
SW 801		ND (0.1	0.33	ND (0.25)	ND (0.007)
SD 801			20–36	110–170	ND (0.289)
SW 802		ND (0.1)	ND (0.1)	ND (0.25)	ND (0.007)
SD 802			11–130	47–77	ND (0.264)
SW 803		0.33	ND (0.1)	ND (0.25)	ND (0.007)
SD 803			310	100	ND (0.399)
SW 804		0.41	ND (0.1)	ND (0.25)	ND (0.007)
SD 804			2,200	56	ND (1.75)
SW 805		ND (0.1)	ND (0.1)	ND (0.25)	ND (0.007)
SD 805			53	85	ND (2.52)
SW 806		ND (0.1)	ND (0.1)	ND (0.25)	ND (0.007)
SD 806			120	120	ND (5.81)

Location	TRPH (mg/kg or mg/l)	GRO (mg/kg or mg/l)	DRO (mg/kg or mg/l)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	PCB (mg/kg or mg/l)
1994						
SS 129	4,850	ND (1)	1,860			ND (1.1)
SS 130	2,450	ND (1)	348			ND (1.1)
SS 131	5,230	ND (1)	1,260			ND (1.1)
SS 132	24,500	120	35,800			ND (1.1)
SS 137	80,400	ND (1)	22,600			ND (16.5)
MW 10–1 GW	ND (5)	ND (0.05)	0.49			ND (0.018)
MW 10–1 0–2'	810	ND (1)	366			ND (1.438)
MW 10–1 2–4'		ND (1)	7.9			
MW 10–1 4–6'	12		ND (4.6)			ND (1.273)
MW 10–4 GW	ND (5)	ND (0.05)	3.2			ND (0.018)
MW 10–4 0–2'	907	3.7	720			ND (1.1)
BH 10–2 0–2'	104,000	67–230	81,300–104000	0.61–2.17		0.61–2.14
BH 10–3 0–2'	83,600	41	43,000	0.241		0.241
SW 107	2.3	ND (0.05)	2.3			
SD 107	38,600	ND (1)	38,600			
SW 108	ND (5)	ND (0.05)	1.4			
SD 108	127,000	220	10,100			
SW 109	ND (5)	ND (0.05)	1.4			ND (0.018)
SD 109	81,000	ND (1)	38,000			ND (550)
SW 110	2.1–19	0.21–0.92	12–14		0.0016	0.0016
SD 110	13,800–23,600	3.7–24	7,250–11,500	0–5.16	0.58–1.35	0.58–6.51
SW 117	ND (5)	ND (0.05)	0.79			ND (0.018)
SD 117	101,000	ND (1)	27,500			ND (1.1)

Location	TRPH (mg/kg or mg/l)	DRO (mg/kg or mg/l)	Aroclor 1254 (mg/kg)	Aroclor 1260 (mg/kg)	PCB (mg/kg or mg/l)
1996					
SS 101				~~0.02~~ 0.42	~~0.02~~ 0.42
SS 102				0.77	0.77
SS 103				1.1/0.9	1.1/0.9
SS 107	47,000	27,000	~~0.02~~	ND	0.2
SS 108	110,000	83,000			
SW 101		22–610		0.0013–0.0026	0.0013–0.0026
SD 101		51–10,000		0.83–1.4	0.83–1.4 1
SW 102		5.5			ND (0.007)
SD 102		8,600	ND	0.26	0.26
SW 103		1.7			ND (0.0063) 09
SD 103		150			ND (0.91)
SW 104		14			ND (0.0063)
SD 104		28,000			ND (0.35)
SW 105		0.39			ND (0.0063)
SD 105		89	0.038		0.038
SW 106		2.1			ND (0.0063)
SD 106		25,000			0.33
SW 107		ND (0.25)			ND (0.007)
SD 107		130			ND (0.546)
SW 108		ND (0.25)			ND (0.0063)
SD 108		190			ND (0.77)
SD 109					0.18
SD 110				0.75	0.75
SD 111		25,000			ND (0.504)
SD 112		30			ND (0.84)
SD 113		42			ND (0.399)

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FIGURE 5–17

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SITES 28 & 29 DRAINAGE BASIN & SUQI RIVER

disturbed. Staining is observed about 2 feet up the embankment from the current surface water elevation, possibly from ice damning during the winter. Vegetation consisting of seasonal grasses grows freely in the drainage, and does not appear significantly affected by hydrocarbons.

Site 27 headwaters area originates as a small swale south of the boundary road, which collects surface water run-off from the diesel pump island. The run-off is routed under the road via a culvert to an artificially-created swale north of the perimeter road (Figure 5-10). An approximately 40- by 20-foot area of ponded water immediately north of the culvert outlet. Staining (black) is apparent around the culvert and on the rocks in the standing water. The swale is filled with grasses which are apparently unaffected by hydrocarbon contamination. Near the terminus of this swale on the east side of the fill bank is an approximately 20- by 30-foot area where the soils are stained black, and no vegetation grows. This staining also occurs 40 feet east of the terminus of the swale, where black soil extends 2 to 5 feet up the embankment. An approximately 10- by 20-foot area of buried drums is also evident on the embankment. In general, the area is heavily vegetated with grass, with the exception of the black stained soils at the end of the swale and approximately 800 square feet of soils that appear to have been disturbed by heavy equipment.

Potential Sources of Contamination. Sites 10 through 20 and 27 are potential sources of contamination to the Drainage Basin, because the basin is down slope (surface flow), and downgradient (groundwater flow) of these sites.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that because of their state of disrepair could represent a physical hazard at the site, of containerized hazardous or toxic wastes, and potential sources of environmental contamination.

No structures (e.g., buildings) are present at the site. An inventory of debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of above- and below- ground storage tanks and inventory of the tank contents. At this site, no tanks were identified. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

The potential sources of environmental contamination at this site are Sites 10 through 20 and 27. Soil cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, the petroleum cleanup criteria for soils are the ADEC Method 2 soil cleanup standards for all constituents.

Surface and subsurface soils in the drainage basin were sampled and analyzed for TRPH, RRO, DRO, GRO, PCB, VOC, SVOC, pesticides, priority pollutant metals, and dioxin contamination. Analytical results are presented in Table 5-45 and compared with the cleanup criteria. As shown on Figure 5-17, soil analytical results exceed the Soil Cleanup Standards for DRO, PCB, chromium and methylene chloride. Chromium was maintained as a contaminant of concern at the site, because it was detected in two samples. Methylene chloride was retained as a potential contaminant of concern at the site even though it was detected in two of the three background samples, because it was also detected in 4 site samples.

Five surface soil samples were collected within the drainage basin and analyzed for PCBs. Aroclor 1260 was detected at three locations.

Drainage Basin Surface Soil Sampling Results		
Location	**Sample Number**	**PCB Aroclor 1260 (mg/Kg)**
SS 101	96NEDBSS101	0.42
SS 102	96NEDBSS102	0.77
SS 103	96NEDBSS103	1
	96NEDBSS203 (QC)	0.9
	96NEDBSS303 (QA)	1.1

PCBs were retained as a potential contaminant of concern, because of the potential for migrating into the creek drainage.

Sediments in the drainage basin were sampled and analyzed for TRPH, RRO, DRO, GRO, PCB, VOC, SVOC, pesticides, priority pollutant metals, and dioxin contamination. Analytical results are presented in Table 5-45. RRO, DRO, BTEX, metals, PCB, two SVOC and PAH were detected in the sediment samples. No sediment criteria have been identified for the installation at this time; however, the NOAA Screening Quick Reference Tables (SQUIRT) (Buchman 1998) were used to identify contaminants that may be of concern in sediments.

Constituent	Maximum Detected Site Concentration (mg/Kg)	Range of SQUIRT Values for Freshwater Sediments (mg/Kg)
TRPH	127,000	No criteria
DRO	38,600	No criteria
Total PAH	57.73	0.264 to 12
Total PCB	6.51	0.026 to 0.277
BTEX		No criteria
Metals		
Beryllium	0.63	No criteria
Cadmium	0.87	0.58 to 3.5
Chromium	18	36.2 to 95
Copper	22.5	28 to 197
Lead	63	34 to 127
Nickel	14	19 to 43
Thorium	0.32	No criteria
Zinc	140	94 to 520

PAH = Polynuclear aromatic hydrocarbons (including 2-methyl naphthalene, acenaphthaene, acenaphthylene, anthrecene, benzo(a)anthrecene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene, benzo(k)fluoranthene, crysene, dibenzo(a,h)anthrecene, fluoranthene, fluorene, indo(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene.

PCB = Polychlorinated biphenyls

Based on this analysis, total PAH, total PCB, lead and zinc may be constituents of concern at the site. Although no NOAA SQUIRT criteria are provided, petroleum (DRO) may be a constituent of concern.

Samples SW/SD109 and SW/SD110 were collected to determine the presence or absence of PCBs in sediments between the Main Operations Complex and the drainage basin. Samples SW/SD101 through SW/SD106 were collected within the Drainage Basin. Sample SW/SD 101 was closest to the Main Operations Complex and SW/SD 106 was closest to the junction of the drainage basin with the Suqi River. There does not appear to be any distinct trend with the behavior of the petroleum hydrocarbon contamination in the surface water or sediment of the drainage basin. PCBs are concentrated near the Main Complex Area.

Location	Sample Number	DRO (mg/Kg)	Total PCBs (mg/Kg)
SW/SD 101	96NENASD101	10,000	1.4
SW/SD 101	96NENASD201	19,000	0.83
SW/SD 101	96NENASD301	51	1.3
SW/SD 102	96NENASD102	8,600	0.26
SW/SD 103	96NENASD103	150	-
SW/SD 104	96NENASD104	28,000	-
SW/SD 105	96NENASD105	89	0.038
SW/SD 106	96NENASD106	25,000	0.33
SW/SD 107	96NENASD107	130	-
SW/SD 108	96NENASD108	190	-
SW/SD 109	96NENASD109	-	0.18
SW/SD 110	96NENASD110	-	0.75
SW/SD 111	96NENASD111	25,000	-
SW/SD 112	96NENASD112	30	-
SW/SD 113	96NENASD113	42	-

Surface water and subsurface water in the drainage basin were sampled and analyzed for TRPH, DRO, GRO, BTEX, PCB, VOC, SVOC, pesticides and metals. Analytical results are presented in Table 5-46 and compared with the cleanup criteria. DRO, total chromium, total nickel, total zinc, and total lead in subsurface water exceeded the Ground Water Cleanup Standards selected for this site. Total chromium, total nickel and total lead were eliminated as contaminants of concern in subsurface water because the concentrations in the dissolved phase were below the criteria suggesting that elevated levels of total metals are due to soil/sediment entrained in the water sample.

Eight surface water samples were collected from within the drainage. Results are summarized below.

Drainage Basin Surface Water Results							
Location	**Sample ID**	**DRO (mg/L)**	**Total PCBs (μg/L)**	**EC (umhos)**	**pH**	**Temp. (C°)**	**Dissolved Oxygen**
SW/SD 101	SW101	610	1.3	75	6.29	10	11
SW/SD 101	SW201	41	2.4	75	6.29	10	11
SW/SD 101	SW301	22	2.6	75	6.29	10	11
SW/SD 102	SW102	5.5	-	90	6.66	8	9.8
SW/SD 103	SW103	1.7	-	100	7.13	9.8	7.9
SW/SD 104	SW104	14	-	110	7.15	4	5.7
SW/SD 105	SW105	0.39	-	75	6.98	10	8.1
SW/SD 106	SW106	2.1	-	80	7.03	9	8
SW/SD 107	SW107	2.3	-	50	7.29	9	7.9
SW/SD 108	SW108	1.4	-	50	7.17	9	7.3

DRO, zinc, lead and PCB in surface water exceeds the Water Cleanup Standards for this site. All of these constituents were retained as potential contaminants of concern. The only field measurements which showed a significant difference between the drainage basin and the Suqi River is electrical conductivity (EC) which is lower in the Suqi River.

Contaminants of Potential Concern. DRO, PCB (Aroclor 1260), chromium and methylene chloride in soil. DRO, total PAH, total PCB (Aroclor 1254 and 1260), lead and zinc in sediments. DRO in subsurface water. DRO, zinc, lead and PCB (Aroclor 1260) in surface water.

Recommended Remedial Action. Biological sampling of the drainage basin is planned for July 1999 to investigate the impact of potential contaminants. Remedial action plans will be based on the results. Remediation may include source removal at selected locations at Sites 10 through 20 and 27.

Potential Obstacles to Remediation. The drainage basin is tundra and wetlands. Based on past experience in other arctic locations, intrusive remediation strategies, such as excavation would damage the ecosystem.

5.29 SITE 29: SUQI RIVER

Physical Description. Site 29 (Suqi River) refers to the previously unnamed creek cited in the Phase I RI.

Several small creeks and lakes throughout the Northeast Cape area (Figure 1-3) feed the Suqi River. From the confluence of the Drainage Basin, the river flows to the west for approximately 2,200 feet, then meanders to the north for approximately 2,500 feet, the turns to the northeast. As it flows to the northeast, it crosses under the airport road 400 feet southeast of the terminal building, and flows into a large estuary about 1,300 feet northeast of the road crossing. The total distance from the confluence of the site drainage to the estuary is approximately 1.5 miles (Figure 5-18)

Potential Sources of Contamination. Migration of contaminants from Sites 10 through 20, and 27 via the Drainage Basin (Site 28) is considered the source of contamination for the Suqi River. Site 8, the POL Spill Site, may present a potential source during periods of heavy rainfall, but is not in direct connection with the Suqi River. Consistent with Mr. Toolie's recollection, there is no evidence that diesel-contamination from Site 8 has flowed to the Suqi River.

Investigation Activities. Montgomery Watson field personnel inspected the site and prepared an inventory of buildings and debris that because of their state of disrepair could represent a physical hazard at the site, of containerized hazardous or toxic wastes, and potential sources of environmental contamination.

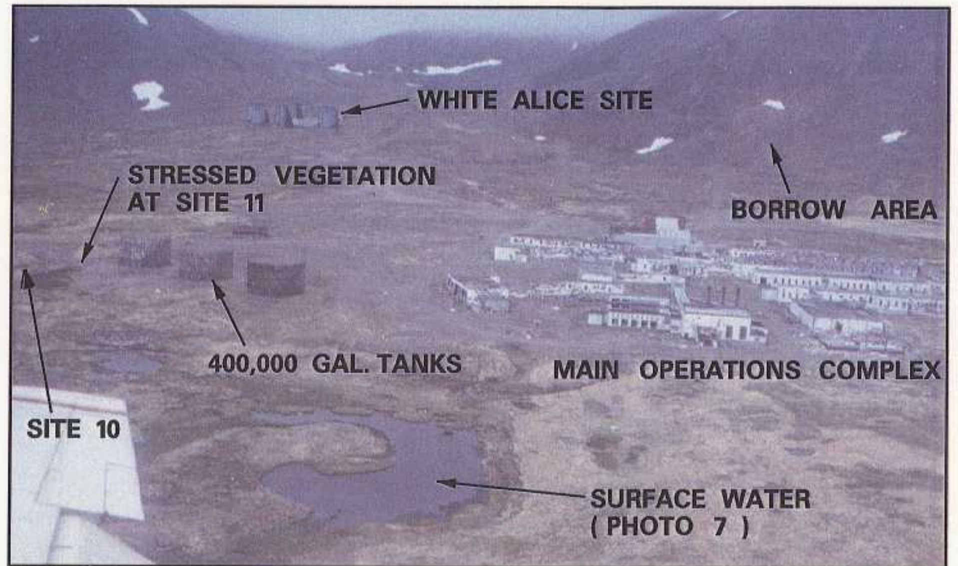
No structures (e.g., buildings) are present at the site. An inventory of debris slated for demolition is provided in Section 4.3.

Montgomery Watson personnel prepared an inventory of above- and below- ground storage tanks and inventory of the tank contents. At this site, no tanks were identified. An inventory of CON/HTRW at the site and plans for removing it are provided in Section 4.2.2.

The potential sources of environmental contamination at this site are contaminants at Sites 10 through 20 and 27, which could migrate to the Suqi River via the Site 28 drainage basin Surface water and sediments were investigated. Cleanup criteria for this site were developed according to the installation-wide methodology presented in Section 1.4.2. Using this methodology, surface water results were compared to the freshwater criteria (18 AAC 70). Sediment criteria are not identified at this time, however, the NOAA Screening Quick Reference Tables (SQUIRT) (Buchman, 1998) were used to identify contaminants that may be of concern in sediments.

Six surface water and sediment samples were collected from Suqi River and analyzed for DRO (Aliphatic, Aromatic), RRO (Aliphatic and Aromatic), PAHs, BTEX, and PCB's. Analytical results are presented in Table 5-48 (in surface water) and compared with cleanup criteria. All constituents were below the Surface Water Standards.

Sediment results were compared to the SQUIRT values. As shown below, total PAH in sediments exceeded the NOAA SQUIRT values. RRO and DRO were added as potential contaminants of concern, because of the elevated levels, evidence of distressed vegetation associated with the diesel-stained areas and the absence of SQUIRT criteria. Analytical results are presented in Table 5-47 (in sediments) and compared with cleanup criteria. As discussed in

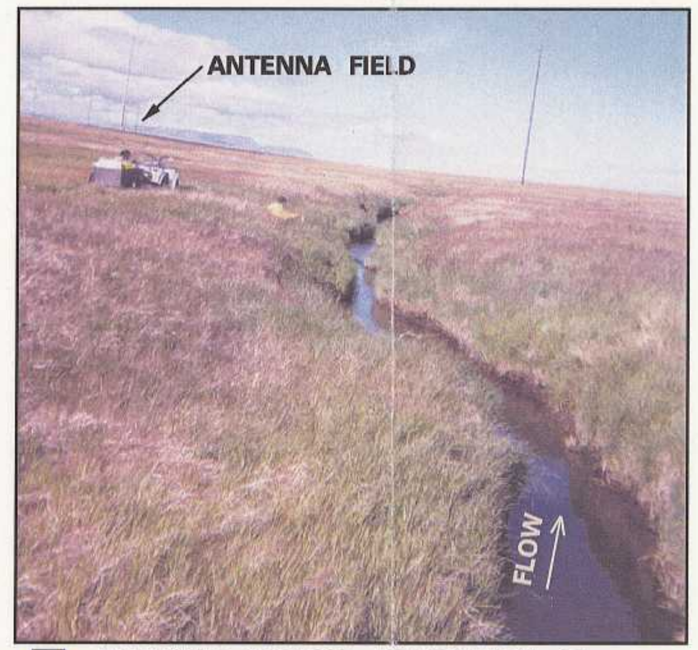


1 AERIAL VIEW – HEADWATERS OF DRAINAGE BASIN

2 DRUMS AND STAINING AT SITE 13 HEADWATERS

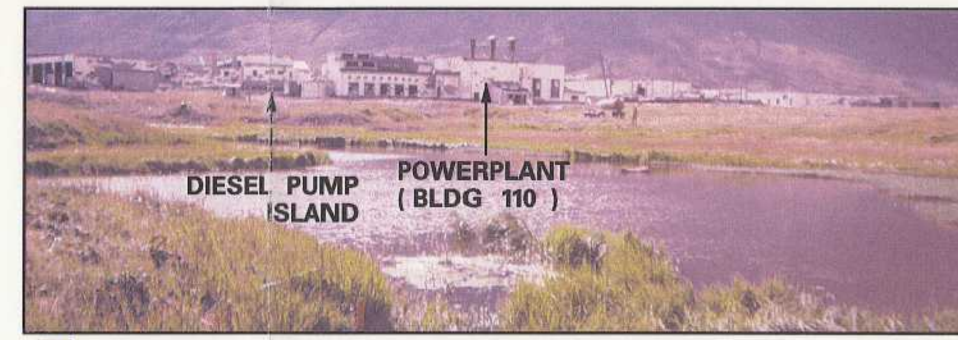
3 400,000 GAL. TANKS ON FILL PAD FROM SITE 27 HEADWATERS AREA

4 INSPECTION OF LOWER REACHES OF THE UNNAMED STREAM



5 UNNAMED STREAM AT LOCATION OF STREAM FLOW MEASUREMENT 3

6 SITE 27 HEADWATERS AREA (CULVERT OUTLET FROM DIESEL PUMP ISLAND)



7 SURFACE WATER IN HEADWATERS OF DRAINAGE BASIN WHICH RECEIVES FLOW FROM SITES 10, 11, 13 & 27

KEY MAP

3 CAMERA LOCATION SHOWING DIRECTION OF PHOTOGRAGH

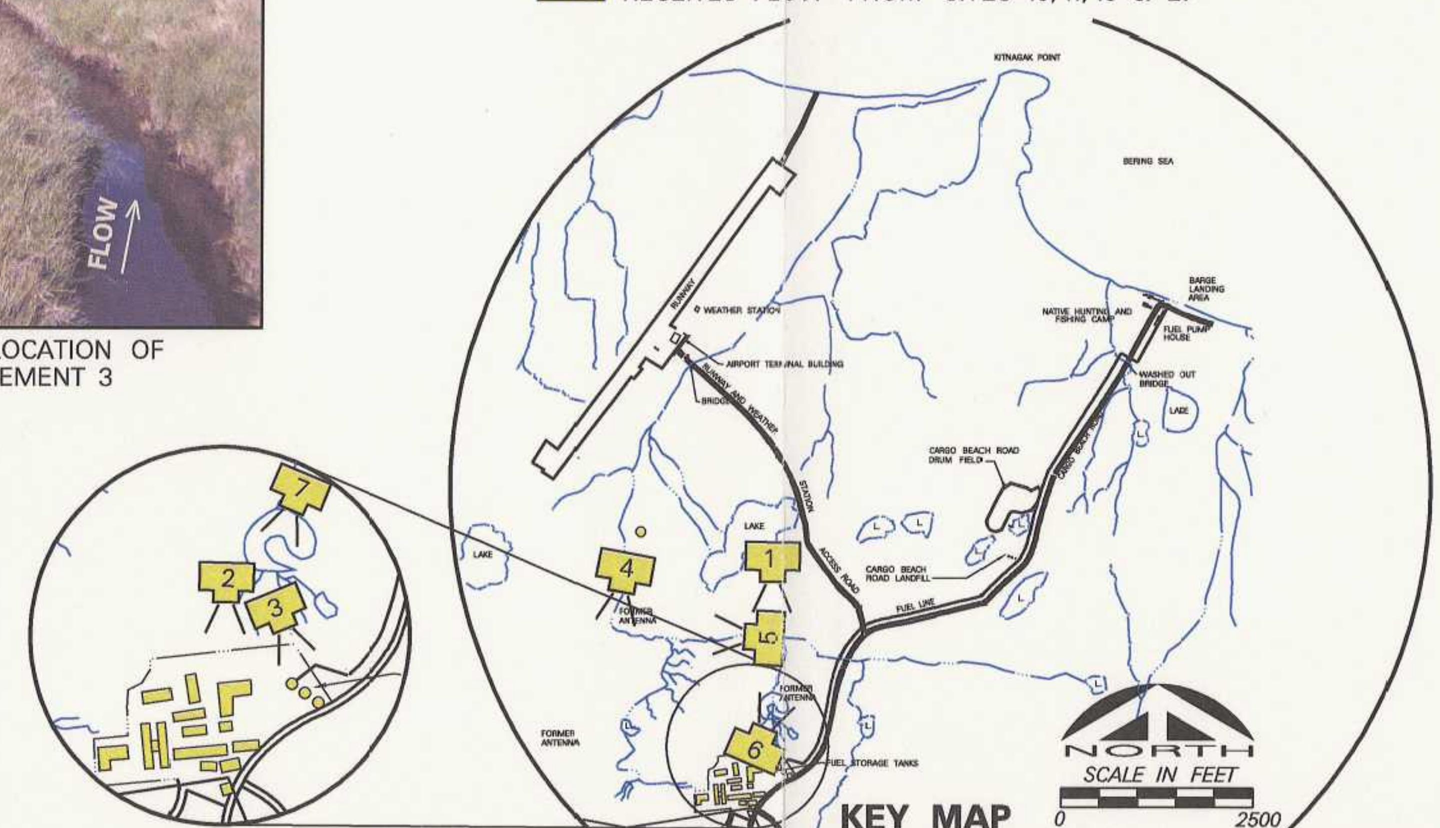


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FIGURE 5–18
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DRAINAGE BASIN PHOTOGRAPHS

Section 1.4, soil cleanup criteria, such as aromatic and aliphatic fractions of RRO and DRO are not considered appropriate screening criteria for sediments.

Constituent	Maximum Detected Site Concentration (mg/Kg)	Range of SQUIRT Values for Freshwater Sediments (mg/Kg)
TRPH	Not analyzed	No criteria
DRO	20 to 25,000	No criteria
Total PAH	0.018 to 0.93	0.264 to 12
Total PCB	Not detected	0.026 to 0.277
BTEX	Not analyzed	No criteria
Metals		
Beryllium	Not analyzed	No criteria
Cadmium	Not analyzed	0.58 to 3.5
Chromium	Not analyzed	36.2 to 95
Copper	Not analyzed	28 to 197
Lead	Not analyzed	34 to 127
Nickel	Not analyzed	19 to 43
Thorium	Not analyzed	No criteria
Zinc	Not analyzed	94 to 520

PAH = Polynuclear aromatic hydrocarbons (including 2-methyl naphthalene, acenaphthaene, acenaphthylene, anthrecene, benzo(a)anthrecene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i) perylene, benzo(k)fluoranthene, crysene, dibenzo(a,h)anthrecene, fluoranthene, fluorene, indo(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene.

PCB = Polychlorinated biphenyls

Sediment sample SW/SD107 was collected east of and prior to the junction of the drainage basin with the Suqi River. It is suspected that petroleum hydrocarbon contamination entered the Suqi River through groundwater infiltration as this is upstream to the creek's confluence with the open channel. No petroleum hydrocarbons were detected in surface water.

Sample SW/SD 108 was collected from the Suqi River downstream of the confluence with the drainage basin. The downstream sample locations, SW/SD 111, SW/SD 112 and SW/SD 113 show elevated DRO concentrations. The extremely high DRO concentration of 25,000 mg/Kg found at sample location SW/SD 111 may be due to the high sediment adsorption characteristics in this portion of the Suqi River. Sample SW/SD 111 was collected in a low flow area with a sandy, organic bottom, while SW/SD 112 and SW/SD 113 had a higher flow with a sand and gravel bottom. No PCBs were detected in any of the surface water or sediment samples collected from the Suqi River.

No sheen, stained soils or distressed vegetation was observed at any sampling locations, except when the organic sediments were disturbed. For example, a sheen was observed in SW/SD 108 and SW/SD 111 upon disruption of the organic sediments. A sheen was observed in SW/SD112 and SW/SD113 when the organic materials in the bank were disturbed but not when the sandy bottom of the river was disturbed. This suggests that most of the petroleum contamination may be contained in the organic portions of the sediment.

DRO and RRO concentrations in the Suqi River sediments do not follow an obvious trend. The sediments in the vicinity of the confluence of the Drainage Basin and the Suqi River, SW/SD803 and SW/SD804, exhibited 310 to 2,200 mg/Kg DRO and 56 to 100 mg/Kg RRO. The remaining samples collected during the 1998 investigation exhibited only slightly lower concentrations; namely, 20 to 130 mg/Kg DRO and 77 to 120 mg/Kg RRO. However, the sediment sample from SW/SD 111 collected in 1996 between SW/SD804 and SW/SD805 exhibited 25,000 mg/Kg DRO. It appears that there may be an interference resulting in low levels of RRO and DRO. As discussed in Section 5.30.3, background sediment samples exhibited DRO concentrations up to 37 mg/Kg and RRO concentration up to 130 mg/Kg.

PAHs were detected in three sediment samples collected during the 1998 investigation SW/SD803, SW/SD804, and SW/SD806.

Contaminants of Concern. RRO, DRO and PAH in sediments.

Recommended Remedial Action. Recommendations for remedial action will be developed after the biological sampling planned for July 1999.

Potential Obstacles to Remediation. The drainage basin is tundra and wetlands. Based on past experience in other arctic locations, intrusive remediation strategies, such as excavation would damage the ecosystem.

5.30 SITE 30: BACKGROUND

5.30.1 Background Levels of Site Contaminants in Soil

Two surface soil samples and one near surface soil sample were collected from locations removed from the site and potential site contaminants. The sample locations are shown on Figure 5-19. Complete analytical results are provided in Table 5-49. As shown in Table 5-51, contaminants detected in background soils were TRPH, RRO, DRO, arsenic, chromium, copper, lead, zinc, and two dioxin congeners (1,2,3,4,6,7,8,9-OCDD and 1,2,3,4,6,7,8-HpCCD).

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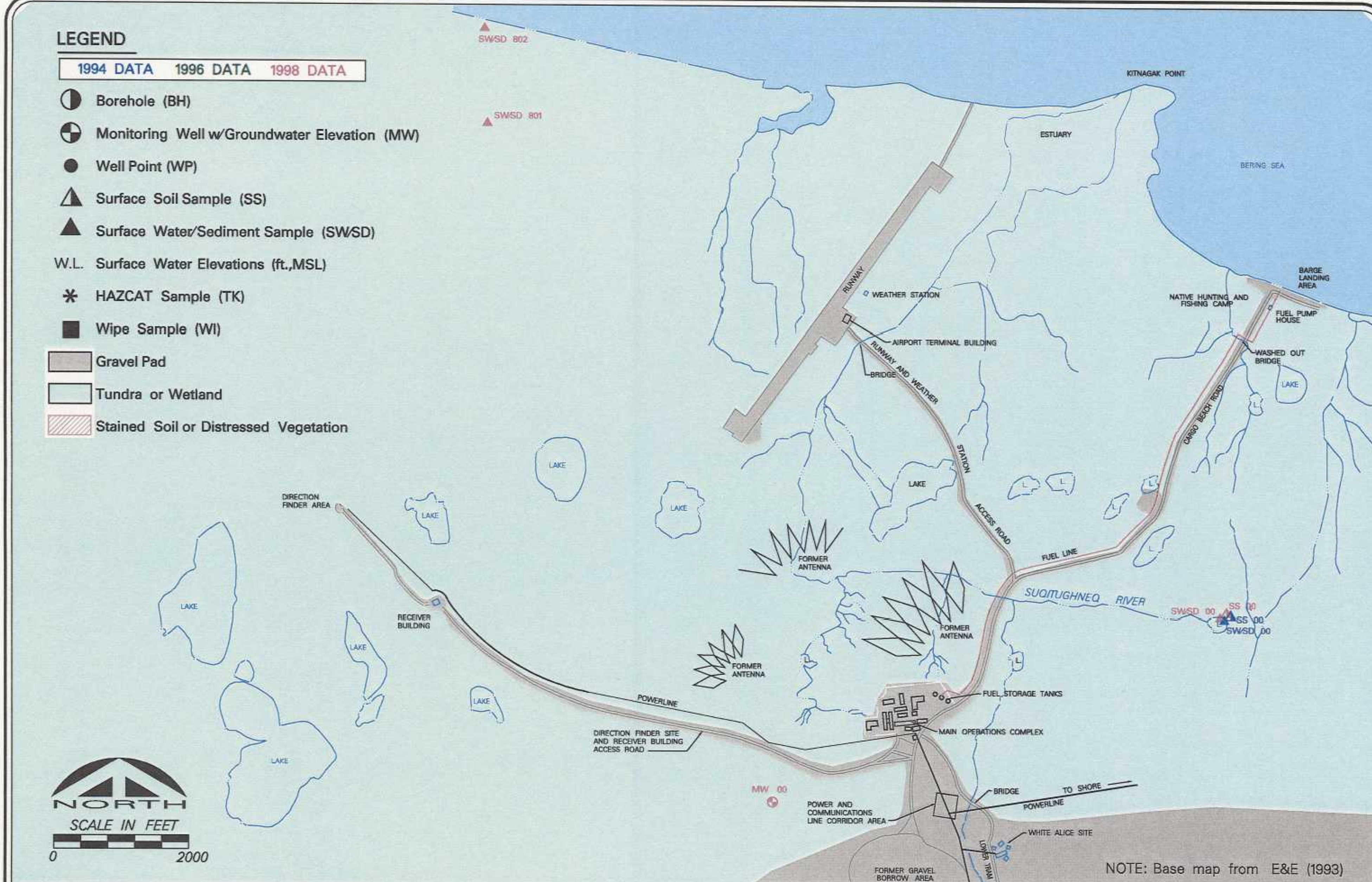

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Anchorage, Alaska

FIGURE 5–19

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SITE 30 BACKGROUND

TABLE 5-51
CONCENTRATIONS OF CONSTITUENTS IN BACKGROUND SOIL SAMPLES

Location	**MW00 (0-2 ft)**	**SS00**	**SS801**
Sample Number	94NEBW158SB	94NE00700SS	98NEC00SS801
TRPH	478 mg/Kg	3,040 mg/Kg	NA
RRO (total)	NA	NA	1,400 mg/Kg
Aromatic	NA	NA	510 mg/Kg
Aliphatic	NA	NA	800 mg/Kg
DRO (total)	120 mg/Kg	190 mg/Kg	13,000 mg/Kg
Aromatic	NA	NA	310 mg/Kg
Aliphatic	NA	NA	1,700 mg/Kg
GRO (total)	ND (1) mg/Kg	ND (3.4) mg/Kg	NA
Aromatic	NA	NA	NA
Aliphatic	NA	NA	NA
Antimony	ND (10) mg/Kg	ND (400) mg/Kg	NA
Arsenic	2.5 mg/Kg	2 mg/Kg	NA
Beryllium	ND (2) mg/Kg	ND (8.1) mg/Kg	NA
Cadmium	ND (2) mg/Kg	ND (8.1) mg/Kg	NA
Chromium	9.2 mg/Kg	9.7 mg/Kg	NA
Copper	18 mg/Kg	10 mg/Kg	NA
Lead	92 mg/Kg	11 mg/Kg	NA
Mercury	ND (0.1) mg/Kg	ND (0.4) mg/Kg	NA
Nickel	ND (5) mg/Kg	ND (20) mg/Kg	NA
Selenium	NA	ND (2) mg/Kg	NA
Silver	ND (2) mg/Kg	ND (8.1) mg/Kg	NA
Thallium	ND (20) mg/Kg	ND (81) mg/Kg	NA
Zinc	84 mg/Kg	24 mg/Kg	NA
1,2,3,4,6,7,8,9 – OCDD	0.038 μg/Kg	0.111 μg/Kg	NA
1,2,3,4,6,7,8-HpCCD	0.00290 μg/Kg	0.0046 μg/Kg	NA
2-Butanone	0.019 mg/Kg	NA	ND (0.034) mg/Kg
Acetone	0.0710 mg/Kg	NA	ND (0.034) mg/Kg
Methylene Chloride	0.016 mg/Kg	NA	0.022 mg/Kg

Key:
NA = Not analyzed

TRPH, RRO, DRO, metals, three volatile organic compounds were detected in background source samples and two dioxin congeners were detected in the background soil samples.

5.30.1.1 Background Levels of Petroleum Constituent in Soil

The background levels of petroleum hydrocarbons are of particular interest. First, levels of TRPH and DRO are unexpectedly high in these samples and exceed regulatory criteria proposed for the site. Second, the aromatic and aliphatic fractions of DRO do not sum to the total DRO found using laboratory method AK 102. Third, DRO levels in background soil samples do not appear to be reproducible. Some of the non-reproducibility may be due to the difference in laboratory methods. Sample 94NE00700SS was analyzed in 1994 by EPA method 8015M, while Sample 98NEC00SS801 was analyzed in 1998 by AK 102. This suggests that site-specific phenomena are influencing detection and analysis of petroleum hydrocarbons.

A peculiar phenomenon was observed at the Northeast Cape installation. In many areas, TRPH levels in soil unexplainably exceeded DRO levels, sometimes by an order of magnitude. This phenomenon was also observed in background soil sample 94NE00700SS, where background levels of 190 mg/Kg DRO and 3,040 mg/Kg TRPH were confirmed by laboratory analysis.

In addition to these two background soil samples, site-specific background soil samples were collected at three sites:

- Site 6 – Cargo Beach Road Drum Field
- Site 9 – Housing and Operations Landfill
- Site 28 – Drainage Basin

At Site 6, a background soil samples adjacent to the site was collected to evaluate whether the elevated levels of TRPH were attributable to RRO. No GRO samples were collected. The data show 370 mg/Kg RRO and 56 mg/Kg DRO. No detectable levels of the four BTEX constituents were found. The sample was not analyzed for PAH. GRO was shown by laboratory analysis not to be a contaminant of concern at the site.

At Site 9, RRO exceeded DRO by a factor of 5.9. The soil sample was analyzed for BTEX and PAH and none were detected. However, levels of both RRO and DRO were low (i.e., below their respective cleanup criteria).

At Site 28, two background soil samples were collected. In the first sample, the level of DRO was 860 mg/Kg and RRO of 310 mg/Kg. The second sample showed 95 mg/Kg DRO and 270 mg/Kg RRO. In both cases, the levels of BTEX were below the method reporting limits. Benzo(g,h,i)perylene and 2-methyl naphthalene were detected in the first sample. Anthracene and fluoranthene were detected in the second sample.

Based on the results of the background soil samples, accurate delineation of petroleum hydrocarbons during investigation and remediation will require development of set procedures to guard against false-positive results.

TRPH (EPA method 418.1) was used extensively in 1994 to evaluate the presence or absence of petroleum hydrocarbons in soil. Because of the limitations of EPA method 418.1, ADEC and the environmental industry have limited use of this method. In ensuing studies at Northeast Cape, TRPH (EPA method 418.1) was replaced with RRO by AK 103, DRO by AK 102 and GRO by AK 101.

To understand and use the 1994 TRPH data to delineate contamination and plan remediation, existing data at each site was reviewed. Sites were divided into three categories: sites with TRPH data averaging 6 to 10 times higher than RRO, DRO, and/or GRO data generated by laboratory analysis (dramatic differences); sites with TRPH data averaging 3 to 5 times higher than RRO, DRO and/or GRO data (moderate differences); and sites with TRPH data averaging 2 to 3 times higher than RRO, DRO, and/or GRO data (minor differences). Table 5-52 summarizes the findings of the evaluation and recommended use of the data.

TABLE 5-52
PROPOSED USE AND LIMITATIONS OF TRPH DATA

Site	Findings	Recommended use of TRPH Data
Dramatic Difference (Factor of 6-10)		
Site 4	Phenomenon observed in isolated samples (two out of three). DRO detected in soils. Laboratory analysis shows GRO is not a contaminant of concern. No RRO data in soil.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6. Use existing DRO and GRO data to evaluate site.
Site 5	Phenomenon observed the only sample. DRO detected in site soils. Laboratory analysis shows GRO is not a contaminant of concern.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6. Use existing DRO and GRO data to evaluate site.
Site 9	Phenomenon observed in four of seven samples. These show TRPH exceeding DRO by a factor of over 8. Site background sample shows RRO exceeding DRO by a factor of 5.9. RRO present in the site sample at a factor of over of 10 above the site background level. DRO was detected in site soils.	Assume part of the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at the site. Use existing DRO and GRO data to evaluate site.
Site 21	Phenomenon observed in all soil samples. The data show TRPH exceeds DRO by a factor of 10 or more. DRO detected in site soils. Laboratory analysis shows GRO is not a contaminant of concern.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.
Moderate Difference (Factor of 3-5)		
Site 3	Phenomenon observed in two out of three samples. GRO was shown not to be a contaminant of concern at the site. No	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background

Site	Findings	Recommended use of TRPH Data
	PAH data in soil.	sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.
Site 6	Phenomenon observed in 7 of 10 site soil samples that TRPH exceeds DRO by factor of about 2 to 6. Some don't exhibit the phenomenon, others range to over a factor of 10. Correlation between TRPH and DRO is inconsistent throughout the site, so not possible to draw conclusion.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.
Site 24	Phenomenon observed in TRPH exceeds DRO in some cases by over a factor of 10. Correlation between TRPH and DRO is inconsistent throughout the site, so not possible to draw conclusion.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.
Minor Difference (Factor of over 2-3)		
Site 7	Phenomenon observed in 6 soil samples. Eighteen showed some levels of TRPH over DRO. Others showed DRO, but no TRPH. Therefore, not typical of the phenomenon.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.
Sites 10 and 11	Phenomenon observed typically at a factor of 0 to 3. 1994 affected more than 1996 data. Some data points where TRPH is less than DRO.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.
Site 22	Phenomenon observed in both samples, which show that TRPH exceeds DRO by a factor of about 2. No GRO detected in either sample.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.
Sites 13, 15,19,27	Phenomenon observed in most samples. Typically, TRPH exceeds DRO by a factor of 2 to 3. Some cases where it exceeds by a factor of about 10. Others where DRO is higher than TRPH values.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.
Site 28 and 29	Phenomenon observed in isolated cases where TRPH is unexpectedly higher than DRO by a factor of 2 to 3 in soil.	Assume the difference between DRO and TRPH is attributable to unidentified site-specific interference, based on background sample collected at Site 6 and 9. Use existing DRO and GRO data to evaluate site.

Additional sampling and evaluation of background levels of petroleum will be performed during the 1999 investigation.

5.30.1.2 Background Levels of Metals in Soil

Arsenic, chromium, copper, lead and zinc were detected in the background soil sample. Except for arsenic, the metal concentrations are well below the proposed cleanup criteria. The concentration of arsenic in background sample of soil is 2.0 mg/Kg that is equivalent to the proposed cleanup criteria.

5.30.1.3 Background Levels of Dioxins and Furans in Soil

The background level of dioxins and furans were well below the proposed cleanup criteria.

5.30.2 Background Levels of Site Contaminants in Subsurface Water

Monitoring Well MW 00 was installed as a background sampling location in an area removed from the installation operations. The location of MW 00 is shown in Figure 5-19. A primary sample, and QC and QA samples from the well were analyzed for TRPH, DRO, GRO, VOC, SVOC, and dioxins. Analytical results are presented in Table 5-50. TRPH and GRO were not detected above the method reporting limit. DRO was not detected above the method reporting limit in two of the three samples. In the third sample, DRO was reported at 0.14 mg/L. Therefore, the contribution of background to TRPH, DRO and GRO in subsurface water is judged to be inconsequential.

Lead was above the selected regulatory criteria in unfiltered samples, but below in filtered samples suggesting that lead in soil entrained in the unfiltered water could exceed regulatory criteria. Several dioxin and furan congeners were reported above the method reporting limit.

5.30.3 Background Levels of Site Contaminants in Surface Water and Sediment

Three background surface water samples were collected. The surface water collected at location SW/SD00 was analyzed for TRPH, DRO, GRO, metals, PCB, VOC and SVOC. Samples collected at SW/SD 801 and SW/SD 802 were analyzed for RRO, DRO, PAH, BTEX and total organic carbon (TOC). Acetone was the only constituent detected. It was detected at 0.0039 mg/L at SW/SD 00. The locations of the three background samples are shown on Figure 5-19.

Three background sediment samples were collected at the location shown in Figure 5-19. The sample at location SW/SD 00 was analyzed for TRPH, DRO, GRO, metals, PCB, VOC, SVOC, dioxins and furans. The samples at SW/SD 801 and SW/SD 802 were analyzed for RRO (aromatic and aliphatic fractions), DRO (aromatic and aliphatic fractions), PAH, BTEX and TOC.

In sample SW/SD00, DRO was detected at 24 mg/Kg, arsenic at 1 mg/Kg, chromium at 2.6 mg/Kg, copper at 2.8 mg/Kg, lead at 4.6 mg/Kg, and zinc at 13 mg/Kg. Also detected was 2-butanone at 0.014 mg/Kg, acetone at 0.055 mg/Kg, methylene chloride at 0.0095 mg/Kg and dioxins at 0.0000039 mg/Kg TEQ 2,3,7,8 - TCDD.

In samples SW/SD 801 and SW/SD 802, the following constituents were detected:

	SW/SD 801	SW/SD 802
RRO	130	100
Aliphatic	33	ND (54)
Aromatic	78	83
DRO	37	31
Aliphatic	20	ND (27)
Aromatic	ND (15)	ND (27)
TOC	1.4%	3.5%

Units: mg/Kg, day weight unless otherwise noted.

This data shows that the aromatic and aliphatic fractions do not add up to the total DRO or RRO.

5.30.4 Uncontaminated Reference Creek

The uncontaminated Reference Creek will be selected by the project biologists during the upcoming field work in July 1999.

Selection criteria for the stream includes:

- located in an area that was not impacted by military operations at NEC, and
- comparable water flow and size.

Data from the reference creek will be used to determine background conditions at the Northeast Cape Installation.

6. REMEDIAL ACTION

6.1 TRENDS IN CONTAMINANT LEVELS IN SUBSURFACE WATER

Sixteen of the monitoring wells installed at the installation in 1994 were resampled in 1998. Table 6-1 shows the results of the 1994 and 1998 sampling events for petroleum constituents.

TABLE 6-1
TRENDS IN CONTAMINANT LEVELS IN SUBSURFACE WATER

Site	Monitoring Well	Analyte (mg/Kg)	1994 Results (mg/Kg)	1998 Results (mg/Kg)
7	MW 7-4	TRPH	ND	NA
		RRO	NA	NA
		DRO	0.62	1.1
		GRO	ND	NA
		Benzene	0.0021	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	ND	ND (0.0030)
9	MW 9-1	TRPH	ND	NA
		RRO	NA	NA
		DRO	0.71	11
		GRO	ND	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	0.0019	ND (0.0030)
	MW 9-2	TRPH	2.2	NA
		RRO	NA	NA
		DRO	0.51	2.2
		GRO	ND	NA
		Benzene	0.0012	ND (0.0010)
		Toluene	0.0014	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	ND	ND (0.0030)
	MW 9-3	TRPH	ND	NA
		RRO	NA	NA
		DRO	0.95	7.7
		GRO	ND	NA
		Benzene	ND	ND (0.0010)
		Toluene	0.0012	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	ND	ND (0.0030)

Site	Monitoring Well	Analyte (mg/Kg)	1994 Results (mg/Kg)	1998 Results (mg/Kg)
11	MW 11-2	TRPH	ND	NA
		RRO	NA	ND (0.2500)
		DRO	1.4	0.34
		GRO	ND	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	ND	ND (0.0030)
	MW 11-3	TRPH	6.6	NA
		RRO	NA	ND (5.0000)
		DRO	6.1	45
		GRO	1.1	NA
		Benzene	0.0100	ND (0.0010)
		Toluene	0.0065	ND (0.0010)
		Ethylbenzene	0.0700	ND (0.0010)
		Xylene	0.0600	0.0150
13	MW 13-1	TRPH	190	NA
		RRO	NA	ND (12.0000)
		DRO	23	100
		GRO	4	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	0.1000	0.0470
		Xylene	0.2100	0.0560
	MW 13-2	TRPH	24	NA
		RRO	NA	0.52
		DRO	22	32
		GRO	3.6	NA
		Benzene	0.1200	ND (0.0010)
		Toluene	0.1700	ND (0.0010)
		Ethylbenzene	0.1500	0.0660
		Xylene	0.5900	0.0880
15	MW 15-1	TRPH	31	NA
		RRO	NA	3.8
		DRO	9.3	960
		GRO	ND	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	ND	0.0260

Site	Monitoring Well	Analyte (mg/Kg)	1994 Results (mg/Kg)	1998 Results (mg/Kg)
16	MW 16-1	TRPH	NA	NA
		RRO	NA	NA
		DRO	NA	NA
		GRO	NA	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	0.0041	ND (0.0010)
		Xylene	0.0100	ND (0.0010)
	MW 16-3	TRPH	NA	NA
		RRO	NA	NA
		DRO	NA	NA
		GRO	NA	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	ND	0.0048
		Xylene	ND	0.0036
19	MW 19-1	TRPH	9.7	NA
		RRO	NA	ND (2.5000)
		DRO	13	18
		GRO	6.1	NA
		Benzene	0.0250	ND (0.0010)
		Toluene	0.0260	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	0.0640	0.0350
	MW 19-2	TRPH	ND	NA
		RRO	NA	ND (1.2000)
		DRO	34	7.3
		GRO	ND	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	0.0008	ND (0.0030)
27	MW 27-1	TRPH	2.6	NA
		RRO	NA	ND (0.2500)
		DRO	3.8	1.4
		GRO	1.9	ND (0.10)
		Benzene	0.0056	ND (0.0010)
		Toluene	0.1760	ND (0.0010)
		Ethylbenzene	0.0170	ND (0.0010)
		Xylene	0.1110	ND (0.0030)

Site	Monitoring Well	Analyte (mg/Kg)	1994 Results (mg/Kg)	1998 Results (mg/Kg)
28	MW 10-1	TRPH	ND	NA
		RRO	NA	ND (0.2000)
		DRO	0.49	0.11
		GRO	ND	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	ND	ND (0.0030)
	MW 10-4	TRPH	ND	NA
		RRO	NA	ND (0.2500)
		DRO	3.2	0.63
		GRO	ND	NA
		Benzene	ND	ND (0.0010)
		Toluene	ND	ND (0.0010)
		Ethylbenzene	ND	ND (0.0010)
		Xylene	ND	ND (0.0030)

Key:
ND = Not detected at or above the method detection limit.
NA = Not analyzed.

TRPH = Total recoverable petroleum hydrocarbons
RRO = Residual range hydrocarbons
DRO = Diesel range petroleum hydrocarbons
GRO = Gasoline range residual hydrocarbons

The results show that, in general, concentrations of short chain hydrocarbons and benzene in subsurface water have decreased in the intervening four years. At Sites 13, 19 and 27, the concentration of benzene in at least one monitoring well exceeded the Ground Water Cleanup Standard in 1994. In 1998, when the monitoring wells were resampled, the benzene concentrations at all three sites were below the Standards. At Site 27, a similar trend was observed for GRO.

In nine of the fourteen monitoring wells sampled for DRO, the concentration of DRO had risen in the intervening four years. In the remaining four monitoring wells, it had decreased. No factors were identified to account for the increase or decrease.

6.2 SUMMARY OF CONTAMINATED ENVIRONMENTAL MEDIA

Based on the information presented in Section 5, contaminated environmental media at the Northeast Cape installation are summarized in Table 6-2.

TABLE 6-2
SUMMARY OF CONTAMINATED ENVIRONMENTAL MEDIA AND DEBRIS ABOVE BACKGROUND AND REGULATORY LEVELS

Site	Site Description	CON/ HTRW	BD/ DR	Buried Waste	Gravel Pad/Soil	Subsurface Water	Tundra Soil and/or Surface Water	No Action
1	Burn Site Southeast of the Landing Strip							✔
2	Airport Terminal and Landing Strip	✔	✔					
3	Fuel Line Corridor and Pumphouse	✔	✔		DRO	DRO		
4	Subsistence Hunting and Fishing Camp	✔	✔			DRO	DRO	
5	Cargo Beach	✔	✔		As			
6	Cargo Beach Road Drumfield	✔	✔		RRO, DRO	DRO	DRO	
7	Cargo Beach Road Landfill	✔	✔	Landfill			DRO, As, Be, Cd, Cr, Ni, Hg, Zn	
8	POL Spill Site	✔					DRO	
9	Housing and Operations Landfill	✔	✔	Landfill		DRO	DRO, As, Be, Cr, Sb	
10	Buried Drum Field		✔	Buried Drums	DRO	DRO		
11	Fuel Storage Tank Area	✔	✔		DRO	DRO, benzene methylene chloride		
12	Gasoline Tank Area	✔			DRO, GRO			
13	Heat and Electrical Power Building	✔	✔		DRO, PCB	DRO, GRO		
14	Emergency Power/Operations Building	✔	✔		PCB			
15	Buried Fuel Line Spill Area	✔			DRO *(RRO)*[a]	RRO, DRO		
16	Paint and Dope Storage Building	✔	✔		As, Cd, Cr, Sb, Pb, Zn, PCB	Bis-(2 ethylhexyl) phthalate		
17	General Supply Warehouse and Mess Hall Warehouse	✔	✔		PCB			
18	Housing Facilities and Squad Headquarters	✔	✔					

TABLE 6-2 (CONTINUED) SUMMARY OF CONTAMINATED ENVIRONMENTAL MEDIA AND DEBRIS ABOVE BACKGROUND AND REGULATORY LEVELS

Site	Site Description	CON/ HTRW	BD/ DR	Buried Waste	Gravel Pad/Soil	Subsurface Water	Tundra Soil and/or Surface Water	No Action
19	Auto Maintenance and Storage Facilities	✔	✔		DRO, GRO, As, Cr	DRO, GRO		
20	Air Force Aircraft Control Warning Building	✔	✔					
21	Wastewater Treatment Facility	✔	✔				DRO, As, Cd, Cr, Hg, Sb, PCB	
22	Water Wells and Water Supply Building	✔	✔		DRO, Sb, Pb			
23	Power and Communication Lines Corridors	✔	✔				PCB	
24	Receiver Building Area		✔	Buried Drums	DRO, Cr, Pb, cis-1,3-Dichloraethane	DRO	DRO	
25	Direction Finder Area	✔	✔				DRO, Zn	
26	Former Construction Camp Area		✔					
27	Diesel Fuel Pump Island	✔	✔	Buried Drums	DRO, GRO, benzene, As	DRO		
28	Drainage Basin Area		✔			DRO	DRO, PCB, PAH, Cr, Pb, Zn, methylene chloride	
29	Suqi River		✔				DRO, PAH	

Footnotes:

a Analyte is included, based on potential for overlapping contaminant plumes from adjacent sites or environmental media.

No further action was identified as the recommended action for two sites. CON/HTRW and/or BD/DR alone was identified as the recommended remedial action for 10 sites. Of the remaining 18 sites, isolated areas of petroleum hydrocarbon contamination in the gravel pad were identified at eleven sites, ten sites were identified where petroleum constituents in subsurface water exceeded the Ground Water Cleanup Standard, and nine sites were identified where the concentration of petroleum constituents in tundra soils and/or surface water exceeds the Cleanup Standards.

Remedial strategies for each of the three environmental media, gravel pad, subsurface water, and tundra (soil and water), and for buried waste are discussed in the following sections.

6.3 POTENTIAL SOURCES OF ON-GOING CONTAMINATION

6.3.1 PCB Contamination in Gravel Pad

PCBs above 1 mg/Kg were detected at Site 13, 14, 16, and 17. PCB concentrations ranged up to 180 mg/Kg in isolated soil samples.

Recommended Remedial Action: Excavate and dispose of PCB-contaminated soil off-site.

Proposed Cleanup Criteria: A PCB cleanup criteria will be proposed in future documents.

6.3.2 Petroleum Contamination in Gravel Pads

Petroleum hydrocarbons above the Soil Cleanup Standard were detected in the gravel pads at 10 sites. The gravel pads are subject to annual periods of freeze and thaw. In winter, when the pad is frozen, migration of petroleum constituents is temporarily arrested. In spring, when the gravel pad starts to thaw, petroleum constituents could potentially migrate to the edge of the pad and into adjacent tundra. Potential sources of petroleum products in gravel pads are identified in Section 5 and summarized in Table 6-2.

Recommended Remedial Action: Develop installation-wide cleanup strategy and procedures.

Proposed Cleanup Criteria: Develop installation-wide cleanup criteria.

6.3.3 Buried Waste

Waste materials are currently buried at five sites at the Northeast Cape installation:

- Site 7, Cargo Beach Road Landfill - Landfilled waste.
- Site 9, Housing and Operations Landfill - Landfilled waste.
- Site 10, Buried Drum Field - Buried drums, contents reported as waste oil.
- Site 24, Receiver Building - Buried POL drums.
- Site 27, Diesel Fuel Pump Island - Partially-buried drums.

Section 5 discussed the investigation at each of these areas and provided interpretation of the results. At each of the five sites, petroleum constituents in excess of the Cleanup Standards were detected in environmental media.

Sites 7 and 9, although disturbed by the landfill operations, are located on tundra. In both areas, surface water samples exceed the Ground Water Cleanup Standards. Subsurface water samples from monitoring wells installed at Site 6, between the Cargo Beach Landfill and the Bering Sea, show petroleum above the cleanup standards.

Vegetation adjacent to the landfills appears healthy, suggesting that any residual petroleum constituents are not adversely impacting the tundra. There are no reports of subsurface water in this area being used as a potable water source.

Sites 10 and 24 contain buried drums that reportedly contained petroleum products. The Site 10 drums were reportedly buried in the gravel pad. Monitoring wells MW 10-1 and MW 10-4 are located between the buried drums and the drainage basin. Water samples collected from these wells show detectable levels of petroleum hydrocarbons, but the levels do not exceed the Ground Water Cleanup Standards. This suggests that the buried drums at Site 10 are not a significant on-going source of petroleum contamination into the Drainage Basin.

At Site 24, the drums appear to be buried in the gravel pad. Soil and water samples collected adjacent to the buried drums show DRO slightly exceeding the Cleanup Criteria. Vegetation at the site appears to be healthy, suggesting that any residual concentrations of DRO in the tundra soil and water not cause an adverse impact. There are no reports that subsurface water at the site has been used as a potable water source.

Recommended Remedial Action: Procedures for closing out the landfills and sites with buried drums include:

- Removal of all of the surface and exposed debris.
- Characterization of the groundwater to determine if leachate is impacting subsurface water.
- Establishment of the landfill boundaries and location and provision of this information to the landowner.
- Capping to minimize the infiltration of water and revegetation to prevent erosion.
- Landfills must meet the substantive requirements of 18 AAC 60 in place at the time the landfill was used.
- Possible institutional controls or monitoring.

6.4 PETROLEUM-IMPACTED TUNDRA AND SUBSURFACE WATER

Section 6.3 identifies the potential sources of on-going release of contaminants to the tundra and plans for removing the potential on-going sources. Once these sources are removed, petroleum constituents should attenuate with time. Between 1994 and 1998, the concentration of benzene and GRO in subsurface soils decreased, suggesting that natural attenuation is rapid at the site. During the same period, DRO increased in some locations and decreased at others. This suggests that petroleum contamination may be mobile periodically, probably seasonally, in the gravel pad. Migration is probably toward the edges of the pad. With removal of the most highly contaminated gravel/soil, RRO and DRO should begin to attenuate with time, similar to the attenuation of GRO and benzene in the past few years.

In some areas, petroleum hydrocarbon concentrations are high, such as areas where diesel was released directly onto the tundra. Some of these areas have remained impacted years after the release. Experience at other Arctic sites has shown that excavation of tundra often causes more environmental damage than the original contamination.

Recommended Remedial Action: The recommended remedial action is a two-pronged approach: first, remove on-going sources of petroleum releases to the tundra, second, amend areas of distressed vegetation and/or stained soil with nutrients to accelerate hydrocarbon biodegradation and assist revegetation with hardy species.

Proposed Cleanup Criteria: Site-specific tundra cleanup levels will be developed in conjunction with ADEC. Visually monitor the tundra for soil staining and distressed vegetation.

6.5 DRAINAGE BASIN AND SUQI RIVER

Remedial plans for the Drainage Basin and Suqi River will be developed on the biological sampling planned for July 1999.

6.6 REMEDIAL PLANNING AND COORDINATION

The site-specific planning and coordination involved in the execution of this project includes:

- Coordination with SHPO on historic significance of military remains
- Requirements for a 30-day advanced notification to EPA for self-implementing disposal criteria for PCB.
- CON/HTRW and BD/DR interaction. In some instances, CON/HTRW activities will precede BD/DR activities. In other cases, the reverse will be true. Therefore, close coordination of the two programs will be critical.
- Building foundations may interfere with soil excavation on other remedial actions. Remedial actions will be detailed in future documents.
- Remedial action for building foundations with suspected PCB contamination will be detailed in future documents.

6.7 DATA GAPS

Data gaps include:

- TRPH, RRO and DRO in soil and sediment were detected in background samples at levels often comparable to or exceeding the selected regulatory criteria. A strategic or analytical procedure to identify and eliminate the contribution of background or site-specific interference will be an important element of a Remedial Action Plan.
- Due to the limited number of samples, the extent of contamination for the purpose of excavation and/or remediation should be verified real time during excavation.
- Remediation is planned based on the information available from past investigation and sampling. Identification of the potential sources of contamination, potential constituents

and appropriate sampling and analysis methods impacts the quantity of information and accuracy of any assessment.

- The extent to which contamination in the Drainage Basin and Suqi River impacts human health and the environment is not adequately measured using the proposed cleanup criteria. Biological sampling will be performed in July 1999 to elucidate the impact of contamination in these two areas.

- Metals concentrations in the Drainage Basin sediments are a potential contaminant of concern, however, metals in the Suqi River sediments have not been quantified.

- The source of PCB, PAH, petroleum and metals in the Drainage Basin cannot be identified with the existing data. It is unclear whether any portions of Sites 10-20 and 27 are currents sources for contaminant migration into the Drainage Basin.

- PCB concentrations in some building foundations are not characterized.

- ADEC requests supporting documentation that the ephemeral ponds at the site do not support benthic or aquatic life, and that these ponds dry up occasionally.

7. RECOMMENDATIONS AND CONCLUSIONS

The 1996 Phase II RI advanced the site toward closure. Other activities performed during the field work were designed to address specific community concerns or to fill data gaps associated with CON/HTRW removal and BD/DR actions. The most significant conclusions in these areas are:

- There is no evidence of elevated radiation levels at Northeast Cape.
- The POL pipeline leak (Site 8) cited as a concern by local residents was investigated and found to be localized.
- Evidence of an asbestos hazard was not found in privately-owned housing at the site as a result use of salvaged military building materials by current residents.
- The fill pad on which the main operations complex is located contains approximately 140,000 cubic yards of what is thought to be usable fill material.
- The borrow area at the site contains at least 50,000 cubic yards of fill material that could be utilized without blasting or additional environmental damage. However, this area should be the subject of a subsurface investigation if a landfill is planned at this location.
- Warning signs are posted on all military-era buildings at Northeast Cape with known or suspected ACM.
- TRPH, RRO and DRO were detected in background samples at levels often comparable to or exceeding selected regulatory criteria. A strategic or analytical procedure to identify and eliminate the contribution of background or site-specific interference is an important element of the Remedial Action Plan.
- As discussed in this report, TRPH exceeds the sum of DRO and GRO by a factor of five to ten in many instances (RRO samples were not collected in the past). Interpretation and use of the 1994 TRPH data will impact the extent of remediation.
- Petroleum constituents, such as GRO and benzene, in the subsurface water at the site appear to be attenuating with time. DRO has in some cases increased and in other cases decreased in the four years between sampling events.

As documented in the Work Plan (Montgomery Watson, 1998), biological sampling will be performed at the site in July 1999 to document the environmental health of the Drainage Basin and Suqi River. The information will be used to evaluate the impact of existing contamination and recommend appropriate remedial action.

Based on the results of the Phase II RI, no further action was identified as the recommended remedial action at one site. CON/HTRW removal and/or BD/DR removal was identified as the recommended remedial action for 10 sites. Of the remaining 18 sites, isolated areas of petroleum hydrocarbon contamination were identified in the gravel beds at eleven sites. Nine sites were identified where petroleum constituents in subsurface water exceeded the Ground Water Cleanup Standard. Eight sites were identified where the concentration of petroleum constituents in tundra soils and/or surface water exceeded the Cleanup Standards.

Recommendations for remediation include:

- Removal and disposal/recycle of CON/HTRW
- Implementation BD/DR
- Excavation and off-site disposal of PCB-contaminated soils
- Excavation or remediation of isolated areas of high levels of petroleum contamination in the gravel pads
- Amendment and revegetation of petroleum-impacted areas of tundra

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Final
Phase II Remedial Investigation
Northeast Cape,
St. Lawrence Island, Alaska

Volume 2: Appendices A and C - H

Contract No. DACA85-93-D-0011
Delivery Order No. 0017
and
Contract No. DACA85-98-D-0007
Delivery Order No. 5
Montgomery Watson Job Number: 1189098.050101

August, 1999

Prepared for:

Department of the Army
United States Army Engineer District, Alaska
Corps of Engineers
P.O. Box 898
Anchorage, Alaska 99506-0898

Prepared by:

Montgomery Watson
4100 Spenard Road
Anchorage, Alaska 99517

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APPENDICES

LIST OF FIGURES

LIST OF TABLES

List of Section 5 Tables (Bound Separately in Appendix B)

LIST OF ACRONYMS

^{0}C	Degrees Celsius
^{0}F	Degrees Fahrenheit
AAC	Alaska Administrative Code
AC&W	Aircraft Control and Warning
ACHP	Advisory Council on Historic Preservation
ACM	asbestos containing materials
AC&WS	Aircraft Control and Warning Station
ADEC	Alaska Department of Environmental Conservation
Air Force	United States Air Force
Alaska District	United States Army Engineer District, Alaska District
ANCSA	Alaska Native Claims Settlement Act
ARAR	applicable or relevant and appropriate requirements
AS	Alaska statute
AST	aboveground storage tank
BD/DR	building demolition and debris removal
BM	benchmark
BTEX	benzene toluene ethylbenzene xylenes
C&D	construction and demolition debris
CDAP	Chemical Data Acquisition Plan
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CON/HTRW	containerized hazardous toxic and radioactive waste
COPEC	chemicals of potential ecological concern
CQAR	Chemical Quality Assurance Report
DERP	Defense Environmental Restoration Program
DNR	Department of Natural Resources
DOD	United States Department of Defense
DOT	Department of Transportation
DRO	diesel range organics
DS-2	Decontamination Agent Number 2
E&E	Ecology and Environment, Inc.
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
FR	Federal Register
FUDS	Formerly Used Defense Sites
gpm	gallons per minute
GPS	geographical positioning system
GRO	gasoline range organics
IDW	investigative-derived wastes
mg/g	milligrams per gram
mg/Kg	milligrams per kilogram
mg/L	milligrams per liter
MK	Morrison Knudsen
mR/h	millirads per hour
MSL	mean sea level

MW	monitoring well
NA	not applicable or not analyzed
NAVY	United States Department of the Navy
ND	not detected
NES	Northwest EnviroService, Inc.
NHPA	National Historic Preservation Act of 1966
NOAA	National Oceanographic and Atmospheric Administration
NPDL	North Pacific Division Laboratory
NR	not regulated
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyls
pH	hydrogen ion activity
PL	public law
PLO	Public Land Order
POL	petroleum, oil, and lubricants
ppm	parts per million
QA	quality Assurance
QA/QC	quality assurance/quality control
QC	quality control
RAAM	Remedial Action Alternatives Technical Memorandum
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI	Remedial Investigation and Feasibility Study
RRO	residual range organics
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Office
SQUIRT	Screening Quick Reference Tables
STB	super tropical bleach
SVOC	semivolatile organic compounds
TCLP	toxicity characteristic leachate procedure
TRPH	total recoverable petroleum hydrocarbons
TSCA	Toxic Substance Control Act
μmho	(micro ohms)$^{-1}$
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
UST	underground storage tank
VOC	volatile organic compound

APPENDIX A

Site Photographs

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996
BORROW SITE SOUTH OF MAIN COMPLEX

BORROW AREA
LOOKING SOUTH

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

BORROW AREA- SOUTH OF THE MAIN COMPLEX

LOOKING SW FROM WHITE ALICE ROAD

SPRING AT BASE OF
COLLUVIAL SLOPE

LOADING DOCK
MAIN COMPLEX
IN BACKGROUND

LOOKING WEST,
COLLUVIAL SLOPE

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 8, FUEL LINE LEAK

LOOKING SW TOWARD MAIN COMPLEX

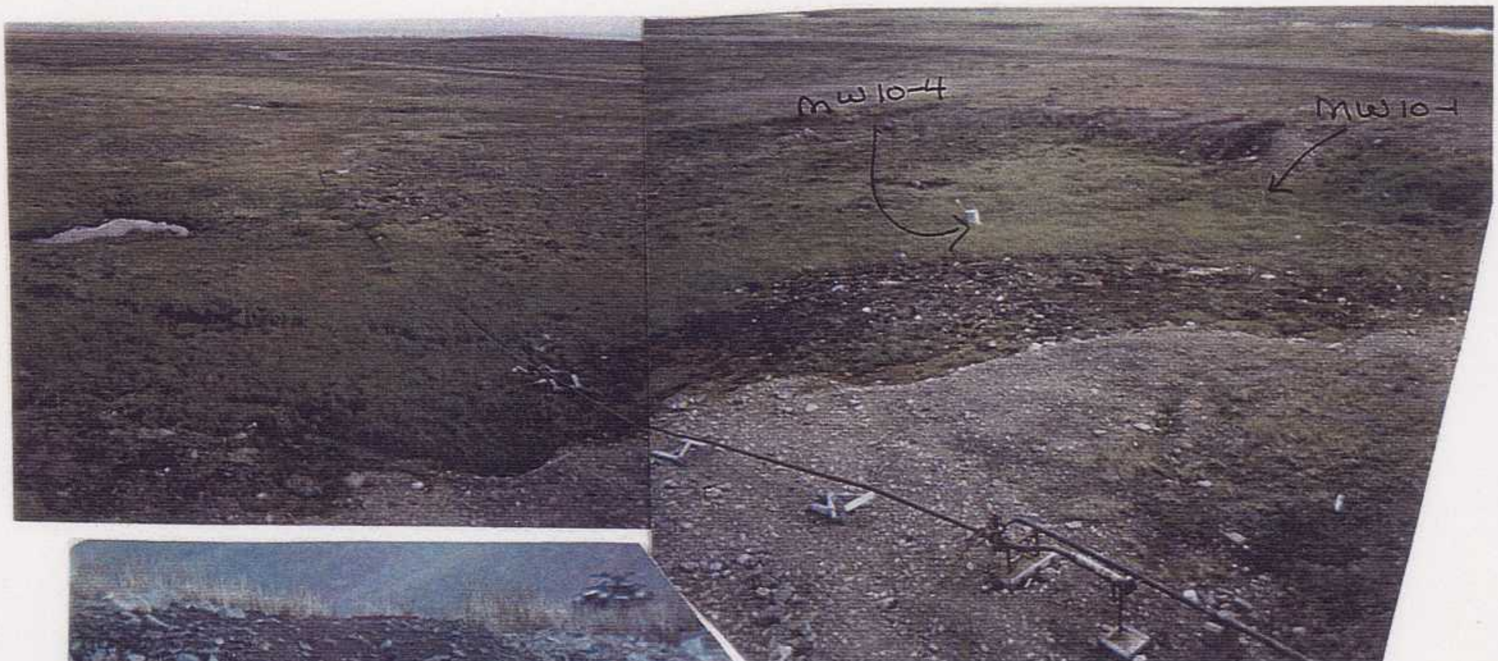
LOOKING NW

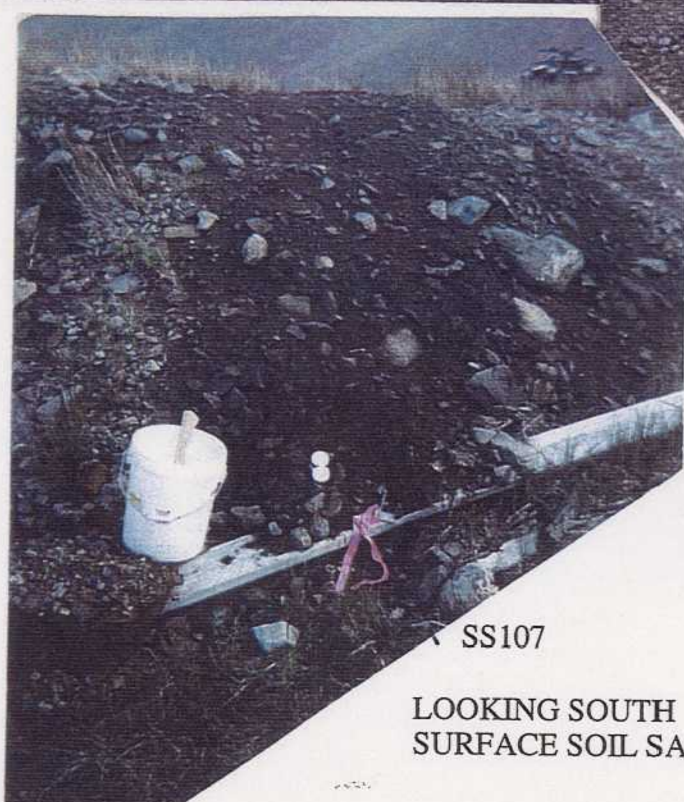
UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 10, FROMER DRUM STORAGE

LOOKING SOUTHEAST
SITE 10 AT RIGHT

LOOKING FROM SITE 10





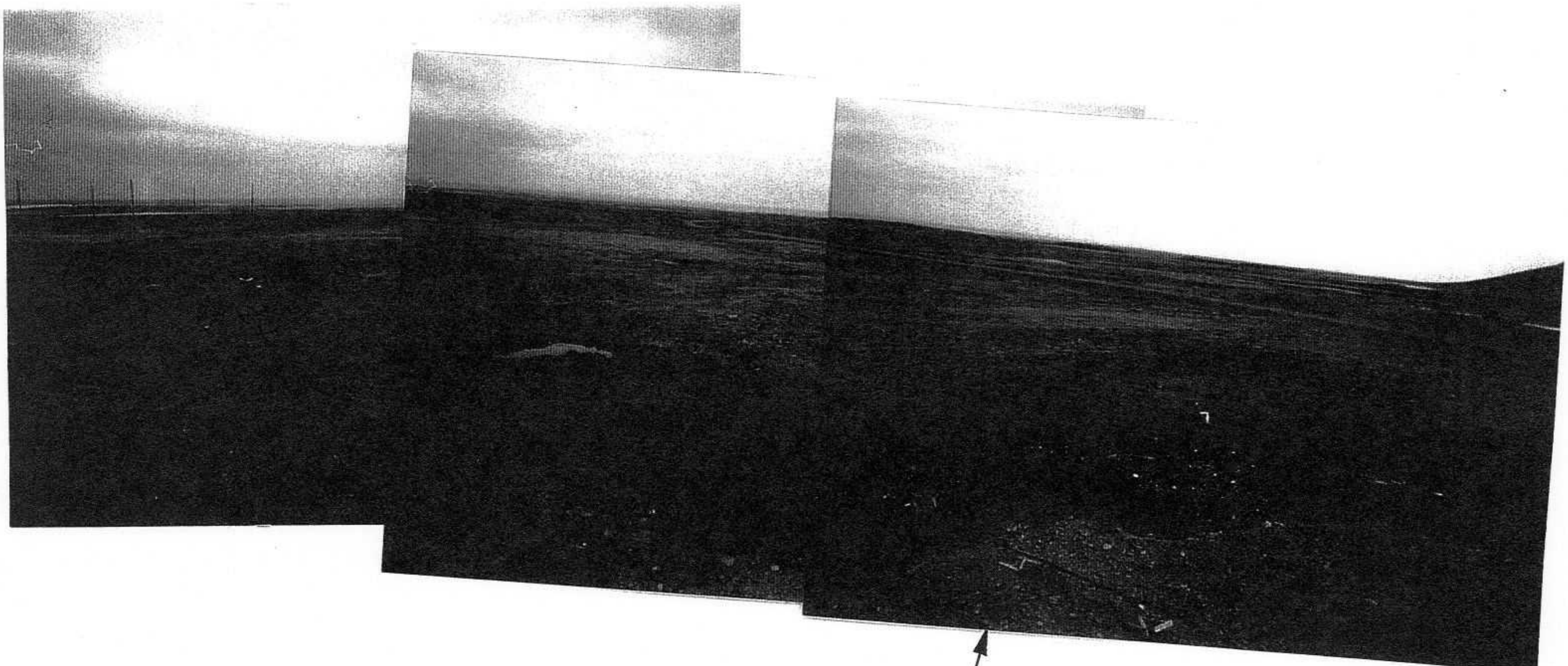
SS107

SS 108

LOOKING SOUTH
SURFACE SOIL SAMPLES

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 11, FUEL STORAGE



SITE 11 LOOKING NORTH TO EAST
NOTE: SURFACE SOIL STAINING

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 13, HEAT AND ELECTRIC POWER

LOOKING WEST, EAST SIDE

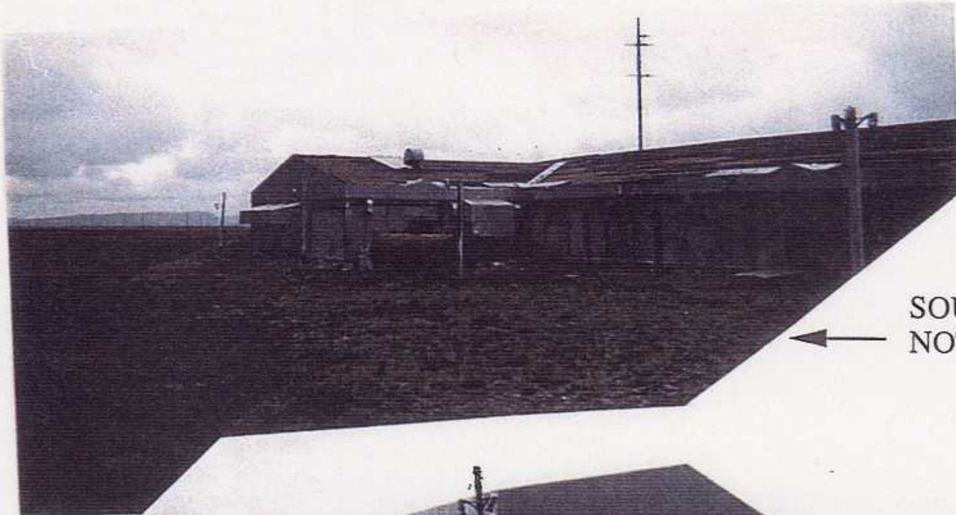
SOUTH SIDE

SE CORNER
NOTE: STAINED SOILS

NE CORNER
SURFACE
SOIL SAMPLE

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 14, EMERGENCY POWER PLANT / OPERATIONS, BLDG. 98



SOUTH SIDE
NOTE: TANK 14-1

SOUTH END
NOTE: FULL 55-gal.
DRUM ANTIFREEZE

N. SIDE

ELECTRIC CONDUIT BOX

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 16, PAINT DOPE STORAGE, BLGD. 112

LOOKING SOUTH
REPORTED FUEL BURNING AREA IN FOREGROUND

LOOKING SOUTH
TANK 16-1 AT RIGHT

LOOKING NORTH.
MW 16-1 AT RIGHT

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 18, HOUSING COMPLEX

BLDG. 99 - LOOKING NORTH - BLDG. 102

LOOKING SOUTH
N. END B. 101 E

B. 106, E. END
MESS HALL

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 21, WASTEWATER TREATMENT FACILITY

LOOKING EAST

LOOKING EAST
METAL PIPING

WASTEWATER
HOLDING TANKS

LOOKING WEST
WOODEN PIPE
TO LEACHFIELD

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 27, FUEL PUMP ISLAND

VIEW SE TO SW : SITE 11 (TANKS), SITE 19 (BLGD. 108), SITE13 (BLDG. 110)

SURFACE SOIL STAINING

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

SITE 27, FUEL PUMP ISLAND

LOOKING SOUTH
SITE 13, B. 110 ON RIGHT
NOTE: STAINED SOIL
AT CULVERT

LOOKING SOUTH
MW 27-1 FOREGROUND
NOTE: STAINED SOIL

LOOKING NORTH

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

TANK AND MECHANIC PIT SAMPLING

TANK 16-1

TANK 13-2

TANK 14-1

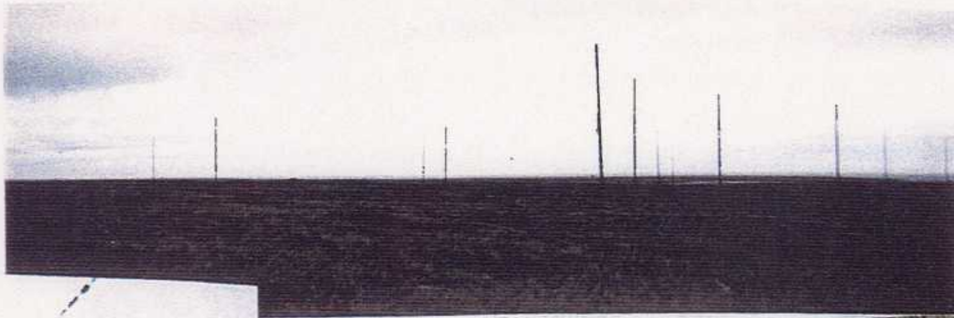
TANK 19-1

MECHANIC PIT

DRUM 14-2

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

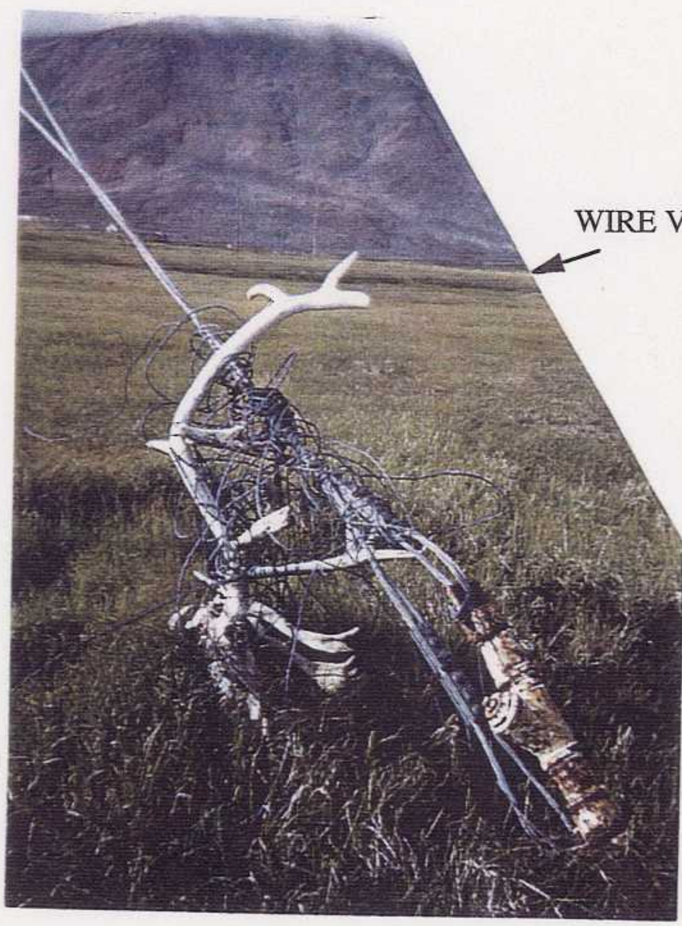
GROUNDED WIRE



ANTENNA FIELD

ROLL COATED WIRE

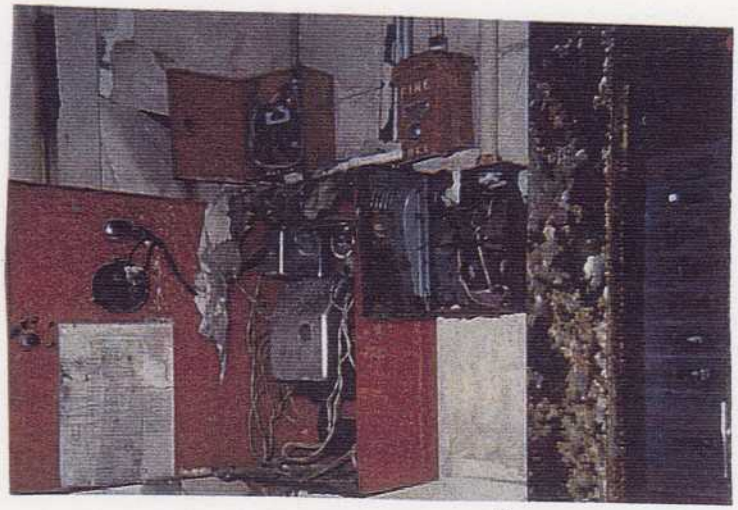
MULTI-STRAND GROUNDED COPPER WIRE



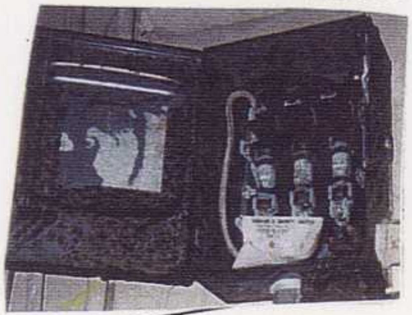
WIRE VICTIMS

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

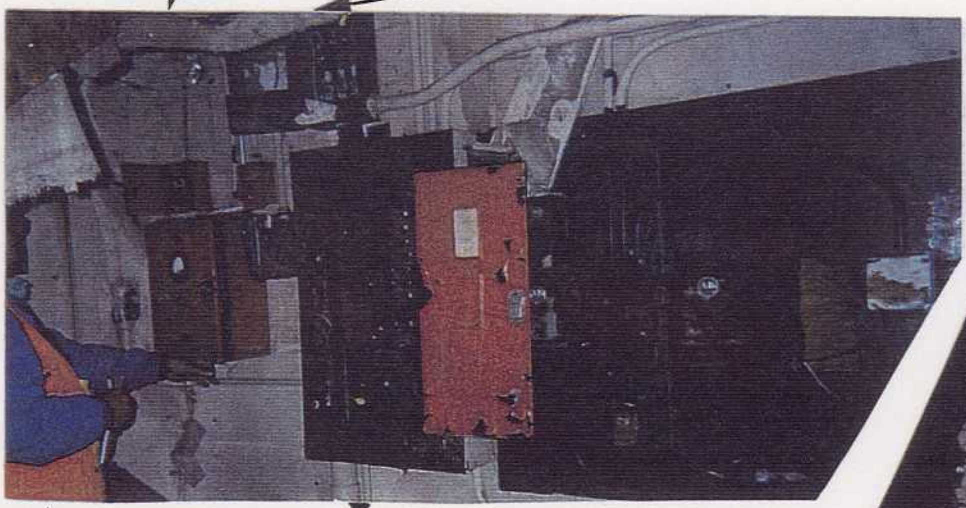
FIRE ALARM AND SWITCH BOX, BLDG. 99, NORTH SIDE



SQUARE D
SAFETY SWITCH
SINGLE THROW



FIRE PULL, FIRE ALARM
RIGHT SIDE OF MAIN GROUP



EAST WALL GROUP
WASTINGHOUSE PANEL BOX-
15 BREAKERS

WEST WALL SWITCH BOX

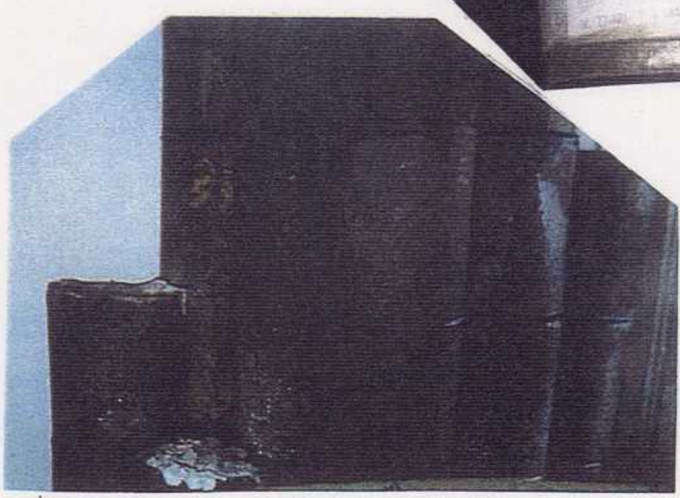
UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

ADDITIONAL CON/HTW

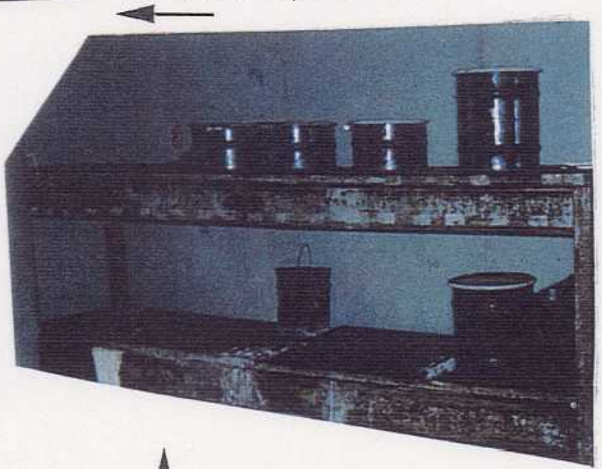
#1. MILITARY CHEMICAL
DECONTAMINATION AGENTS:
STB & DS2, BLDG.101W

#2. ASBESTOS RETORT CEMENT, 1 GAL. CANS
BLDG.113, WATER STORAGE

#3. MILITARY DISHWASHER
COMPOUND, BLDG. 111



#4. MILITARY AIRCRAFT
WASHING POWDER, BLGD. 109



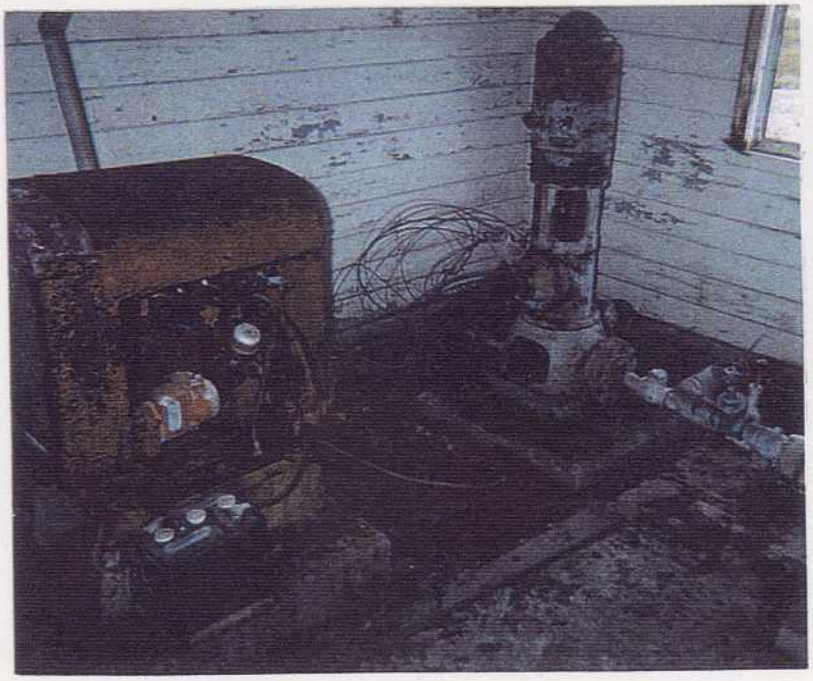
#5. REPACKAGED LIQUIDS
NO MARKINGS, BLDG. 112

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

MILITRARY WATER WELLS, SITE 22

WELL #1, SOUTH OF BLDG. 113

WELL #3, NORTH OF BLDG. 113



WELL # 2, BLDG. 114

WELL #4, SE OF
MAIN COMPLEX

UNITED STATES ARMY ENGINEER DISTRICT,
ALASKA
NORTHEAST CAPE, ALASKA
PHASE II REMEDIAL INVESTIGATION
AUGUST 1996

Site 16: Paint and Dope Storage Building, View from East side of building. MW 16-1 in foreground
Note: Paint spill (solidified)

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA
PHASE II REMEDIAL INVESTIGATION
AUGUST 1996

Stream Flow Measurement #8, Near bridge at Site #2
Victor Harris (Montgomery Watson)

Main Complex looking South

Looking Southeast - Main Camp, Building 98 at right

Aerial view of Bering Sea, looking Northeast

Site 4 Native Camp, looking North

Site 2 looking South, runway in foreground

Station access road running North to South. (View looking North)

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

DRAINAGE BASIN, RUNNING NORTH TO EAST

FLOWING FROM SITE 11 AND 27,
NORTH,
NORTHEAST TO THE BERING SEA

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA   PHASE II REMEDIAL INVESTIGATION,
AUGUST 1996

Stream Flow Measurement #8, Near Bridge at Site #2
Note Flotilla - used to time flow avg. of three clockings

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA PHASE II REMEDIAL INVESTIGATION,
AUGUST 1996

Drainage Basin; view from North, located just North of Site 27.
Stream Flow measurement #6
Note empty 55 gal. drum, manhole in center.
Site 13 in background

Stream Flow Measurement #2, Stream leads to unnamed creek, View from South
Doug Quist (Montgomery Watson)

Stream Flow Measurement #2, Top View

Drainage Basin; view from North, located just North of Site 27.
Stream Flow measurement #5
Note: drums and surface soil staining
Site 11 in left background

Stream Flow Measurement #1, Unnamed creek upstream from confluence of Drainage basin; Victor Harris (Montgomery Watson)

Streamflow measurement #2, Stream leads to unnamed creek, view from North
Doug Quist (Montgomery Watson)

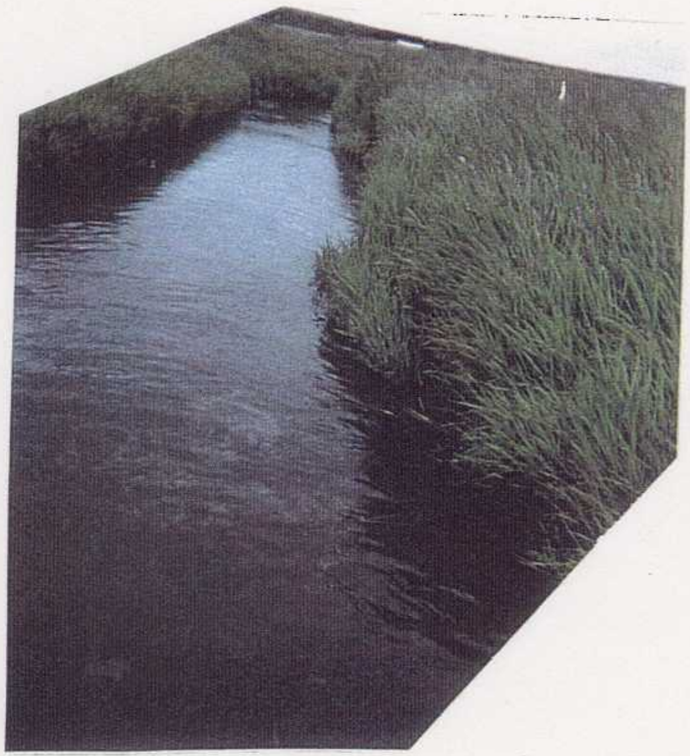
Stream Flow Measurement #8, Near Bridge at Site #2
Note Flotilla - used to time flow avg. of three clockings

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

DRAINAGE BASIN, RUNNING NORTH TO EAST

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

DRAINAGE BASIN, RUNNING NORTH TO EAST



FLOWING FROM SITE 11 AND 27,
NORTH,
NORTHEAST TO THE BERING SEA

UNITED STATES ARMY ENGINEER DISTRICT, ALASKA
NORTHEAST CAPE, ALASKA AUGUST 1996

DRAINAGE BASIN, RUNNING NORTH TO EAST

LOOKING SOUTH ; 1. HEADWATERS AT CULVERT, 2. HEADWATER AT MANHOLE

LOOKING S. CULVERT DRAINAGE

PONDING S. of MAIN CAMP

MANHOLE DRAINING NORTH

USACE - Northeast Cape DO5, - Photo CD "B"
1189098.050101
There are 3 folders on this CD. The FIRST is BGM #1 NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.

BGM #1 NEC


Frame 001


Frame 002


Frame 004


Frame 005


Frame 006


Frame 007


Frame 008


Frame 010


Frame 011


Frame 012


Frame 013


Frame 014

USACE - Northeast Cape DO5, - Photo CD "B"
1189098.050101
There are 3 folders on this CD. The SECOND is HARRIS 01 NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.

HARRIS 01 NEC


Frame 0


Frame 00


Frame 001


Frame 002


Frame 003


Frame 004


Frame 005


Frame 006


Frame 007


Frame 008


Frame 009


Frame 010


Frame 011


Frame 012


Frame 013


Frame 014


Frame 015


Frame 016

USACE - Northeast Cape DO5, - Photo CD "B"
1189098.050101
There are 3 folders on this CD. The FIRST is BGM #1 NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.


Frame 015


Frame 016


Frame 017


Frame 018


Frame 019


Frame 020


Frame 021


Frame 022


Frame 023


Frame 024


Frame 025

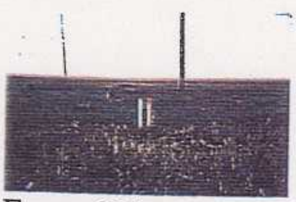
USACE - Northeast Cape DO5, - Photo CD "B"
1189098.050101
There are 3 folders on this CD. The SECOND is HARRIS 01 NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.


Frame 017


Frame 018


Frame 019


Frame 020


Frame 021


Frame 022


Frame 023


Frame 024


Frame 025

USACE - Northeast Cape DO5, - Photo CD "B"
1189098.050101
There are 3 folders on this CD. The THIRD is VICTOR 04 NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.

VICTOR 04 NEC


Frame 001


Frame 002


Frame 003


Frame 004


Frame 005


Frame 007


Frame 00a


Frame 013


Frame 014


Frame 015


Frame 016


Frame 017


Frame 018


Frame 019


Frame 020


Frame 021

There are 3 folders on this CD. The THIRD is VICTOR 04 NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.


Frame 022


Frame 023


Frame 024


Frame 025


Frame 0a

USACE - Northeast Cape DO5, - Photo CD "C"
1189098.050101
There are 3 folders on this CD. The FIRST is MISC NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.


Frame 021


Frame 022

Frame 024


Frame 025

USACE - Northeast Cape DO5, - Photo CD "C"
1189098.050101
There are 3 folders on this CD. The SECOND is VICTOR ROLL02 NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.

VICTOR ROLL02 NEC


Frame 00a


Frame 01a


Frame 02a


Frame 03a


Frame 04


Frame 05


Frame 06


Frame 07


Frame 08


Frame 09


Frame 0a


Frame 10


Frame 11


Frame 12


Frame 13


Frame 14


Frame 15

USACE - Northeast Cape DO5, - Photo CD "C"
1189098.050101
There are 3 folders on this CD. The SECOND is VICTOR ROLL02 NEC
Pictures are not mis-numbered. The sequence is directly from the Photo CD.


Frame 16


Frame 17


Frame 18


Frame 19


Frame 20


Frame 21


Frame 22


Frame 23


Frame 24


Frame 25

There are 3 folders on this CD. The THIRD is VICTOR ROLL02 NEC 091398
Pictures are not mis-numbered. The sequence is directly from the Photo CD.


Frame 025

USACE - Northeast Cape DO5, - Photo CD "C"
1189098.050101
There are 3 folders on this CD. The THIRD is VICTOR ROLL02 NEC 091398
Pictures are not mis-numbered. The sequence is directly from the Photo CD.

VICTOR ROLL02 NEC 091398


Frame 005


Frame 006


Frame 007


Frame 009

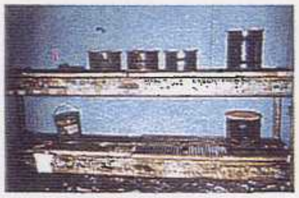

Frame 010


Frame 011


Frame 012


Frame 013


Frame 014


Frame 015


Frame 016


Frame 018


Frame 019


Frame 020


Frame 021


Frame 022


Frame 023


Frame 024

There are 3 folders on this CD. The THIRD is VICTOR ROLL02 NEC 091398
Pictures are not mis-numbered. The sequence is directly from the Photo CD.


Frame 025

APPENDIX C

Data Validation Report

MONTGOMERY WATSON

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2C Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

LDC Project#: 3417

U.S. Army Corps of Engineers
Alaska District
BLDG 21-702
Elmondorf AFB, AK 99506
Attn: Mr. Bret Walters

February 1, 1999

Subject: **Northeast Cape**
Project#: **99-094**

Dear Mr. Walters,

Enclosed is our EPA Level 3 Data Review Report for the "Northeast Cape" project. The analyses were performed by Quanterra Environmental Services in Anchorage Alaska. The laboratory data was received on December 15, 1998 under Sample Delivery Group Nos. 063161, 063183, 063188, 063189, 0631910, 063191, 063195, 063197, and 063336. Also received on December 15, 1998 was the referee laboratory QA split sample data performed by Analytica Alaska, Inc. in Anchorage Alaska. The Sample Delivery Group numbers are A809082, A809083, A809093, and 9809136.

Please feel free to call me at (760) 634-0437 if you have any questions.

Sincerely,

Richard M. Amano
President/Principal Chemist

3417COV.ARM

Attachment 1

LDC #3417 (USACE-Alaska / Northeast Cape)

R1 RFQ 99-094

LDC	SDG#	DATE REC'D	DATE DUE	VOA (8260B)		PAHs (SIM)		PCBs (8082)		Pb (6010)		Mn (6010)		GRO (101)		DRO RRO (102/3)		BTEX (8021)		Aromatic DRO RRO		Aliphatic DRO RRO		Dioxins (8290)		TOC (WB)		CH_4											
Matrix:	Water/Solid			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	A8-09-082	12-14-98	1-13-99	-	-	-	-	-	-	-	-	-	-	-	-	5	0	8	0	1	0	1	0	-	-	-	-	-	-										
B	A8-09-083	12-14-98	1-13-99	-	-	-	-	-	-	-	-	-	-	-	-	0	4	0	4	0	4	0	4	-	-	-	-	-	-										
C	A8-09-093	12-14-98	1-13-99	-	-	-	-	-	-	-	-	-	-	-	-	0	1	-	-	-	-	-	-	-	-	-	-	-	-										
D	98-09-136	12-14-98	1-13-99	4	0	1	4	1	4	3	0	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
E	063161	12-15-98	1-13-99	-	-	7	0	-	-	-	-	1	0	2	0	7	0	9	0	-	-	-	-	-	-	-	-	-	-										
F	063183	12-15-98	1-13-99	10	0	9	6	9	6	5	0	-	-	8	0	21	6	21	6	1	6	1	6	0	1	-	-	-	-										
G	063188	12-15-98	1-13-99	-	-	0	5	0	2	-	-	-	-	-	-	0	9	0	5	0	9	0	9	-	-	0	3	-	-										
H	063189	12-15-98	1-13-99	-	-	0	2	0	2	-	-	-	-	-	-	0	2	-	-	0	2	0	2	-	-	-	-	-	-										
I	063190	12-15-98	1-13-99	-	-	-	-	-	-	-	-	-	-	-	-	3	0	4	0	-	-	-	-	-	-	-	-	-	-										
J	063191	12-15-98	1-13-99	-	-	-	-	0	4	-	-	-	-	-	-	0	7	0	4	0	2	0	2	-	-	0	2	-	-										
K	063195	12-15-98	1-13-99	-	-	1	0	-	-	-	-	-	-	2	0	1	0	1	0	-	-	-	-	-	-	-	-	-	-										
L	063197	12-15-98	1-13-99	-	-	2	3	-	-	-	-	1	0	1	0	3	6	3	5	0	3	0	3	-	-	2	6	1	0										
M	063336	12-15-98	1-13-99	-	-	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
Total				14	0	20	21	10	18	8	0	5	0	13	0	40	35	46	24	2	26	2	26	0	1	2	11	1	0	0	0	0	0	0	0	0	0	0	0

Shaded cells indicate Level IV validation (all other cells are Level III validation)

CHEMICAL DATA QUALITY REVIEW

Northeast Cape
USACE-Alaska Project # RFQ 99-094/LDC Project # 3417

This report details the findings of an EPA Level 3 documentation review of analytical chemistry results generated in support of the Northeast Cape project. Analyses were performed by Quanterra Environmental Services in Anchorage, Alaska (primary) and Analytica Alaska, Inc. in Anchorage, Alaska (referee). Samples were analyzed for GC/MS Volatiles by EPA SW 846 Method 8260B, GC/MS Polynuclear Aromatic Hydrocarbons by EPA SW 846 Method 8270-SIM, GC Polychlorinated Biphenyls by EPA SW 846 Method 8082, Metals by EPA SW 846 Methods 6010 and 7000, Gasoline Range Organics by Method AK101, Diesel Range Organics by Method AK102, Residual Range Organics by Method AK103, Total Organic Carbon by Walkley/Black Method, HRGC/HRMS Dioxins/Dibenzofurans by EPA SW 846 Method 8290, Aromatic Volatile Organics by EPA SW 846 Method 8021, and GC Methane by Method RSK175. Samples are referenced under the following Sample Delivery Groups: 063161, 063183, 063188, 063189, 063190, 063191, 063195, 063197, and 063336 for the sample identifications and analyses for the primary samples and A8-09-082, A8-09-083, A8-09-093, and 98-09-136 for the sample identifications and analyses for the referee lab QA split samples. See the Sample Analysis Table (Attachment 1) for the number of samples reviewed and the Sample Validation Table (Attachment 2) for the sample identifications and analyses for the samples.

The QC criteria used for review purposes is that specified in the National Functional Guidelines for Organic Data Review and the National Functional Guidelines for Inorganic Data Review, February 1994. Where specific guidance is not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience. The following items were evaluated during the review:

- Holding Times
- Sample Preservation
- Cooler Temperatures
- Initial Calibration
- Continuing Calibration
- Blanks
- Surrogates
- Matrix Spike/Matrix Spike Duplicates
- Duplicates
- Laboratory Control Samples
- Detection and Quantitation Limits

- Field QC Samples
- Referee Laboratory QA Split Sample Data

Only issues which require comment or action are discussed in this report. Data deficiencies are arranged by method, and presented as numbered findings. Potential effects of data anomalies have been described where possible.

I. Overall Data Assessment

Out-of-control events experienced by the laboratory have warranted the qualification of a portion of the data set as estimated (J), some detectable results were qualified as estimated (J), and some results reported as nondetectable were qualified as rejected (R) and are discussed in detail by finding. Based upon the information reviewed, the overall data quality is considered acceptable with the noted limitations.

The instrument performance check data, initial and continuing calibration data, and internal standard data were not provided for the GC/MS volatiles and the GC/MS polynuclear aromatic hydrocarbons analyses for SDG 98-09-136 and therefore were not reviewed.

The initial calibration data were not provided for the GC/MS polynuclear aromatic hydrocarbons analysis for SDG 063336 and therefore were not reviewed.

The GC/ECD instrument performance check data and initial and continuing calibration data were not provided for the GC PCB analysis for SDG 98-09-136 and therefore were not reviewed.

The initial and continuing calibration data, calibration blank data, and MSA data were not provided for the metals analysis for SDG 98-09-136 and therefore were not reviewed.

II. Chain of Custody/Cooler Temperatures/Preservation

The chain-of-custodies were reviewed for documentation of cooler temperatures and sample preservation. All appropriate samples were preserved and all cooler temperatures met validation criteria.

III. GC/MS Volatiles by EPA SW 846 Method 8260B

For GC/MS volatiles analysis, holding times, instrument performance checks, instrument calibrations, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: All technical holding time requirements were met with the following exceptions:

Sample	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag
98NEC16GW801RE 98NEC16GW201RE 98NEC16GW802RE 98NECTB006RE 98NEC16GW801REMS 98NEC16GW801REMSD	18	14	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Finding 2: Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
9/21/98-BLK	9/21/98	Methylene chloride	2.3 ug/L	All samples in SDG 98-09-136

Action: Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Compound TIC (RT in minutes)	Reported Concentration	Modified Final Concentration
98NEC16GW301	Methylene chloride	4.7 ug/L	10U ug/L
98NECTB005	Methylene chloride	5.9 ug/L	10U ug/L

Samples 98NECTB006, 98NECTB006RE, and 98NECTB005 were identified as trip blanks. No volatile contaminants were found in these blanks with the following exceptions:

Trip Blank ID	Compound	Concentration (ug/L)
98NECTB006	Naphthalene	1.3
98NECTB005	Methylene chloride	5.9

Finding 3: Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
98NEC16GW801 98NEC16GW201 98NEC16GW802 98NECTB006	All TCL compounds except 1,1-Dichloroethene Trichloroethene Benzene Toluene Chlorobenzene	The MS/MSD associated with these samples was not spiked with the required full list of target compounds.	The MS/MSD must be performed according to the QAPP.	None
98NEC16GW801RE 98NEC16GW201RE 98NEC16GW802RE 98NECTB006RE	2-Chloroethylvinyl ether	The MS/MSD associated with these samples was not spiked with the required full list of target compounds.	The MS/MSD must be performed according to the QAPP.	None

For the samples listed in the table above, surrogate, laboratory control sample and laboratory control sample duplicates were used to assess precision and accuracy. Since these were acceptable, the sample results were not qualified based on this finding. This is considered a protocol violation.

Finding 4: The MS/MSD percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NEC16GW801REMS/MSD (98NEC16GW801RE 98NEC16GW201RE 98NEC16GW802RE 98NECTB006RE)	Carbon disulfide Acetone	- -	36.5 (70-130) -	65 (≤20) 38 (≤20)	J J

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NEC16GW301MS/MSD (All samples in SDG 98-09-136)	2-Hexanone 4-Methyl-2-pentanone	- -	- -	42.1 (≤20) 27.0 (≤20)	J J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NEC16GW801MS/MSD (98NEC16GW801 98NEC16GW201 98NEC16GW802 98NECTB006)	1,1-Dichloroethene	103 (72-102)	104 (72-102)	-	J (all detects)

Action: Sample results reported as detectable were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NEC16GW301MS/MSD (All samples in SDG 98-09-136)	2-Chloroethylvinyl ether	0.00 (60-140)	0.00 (60-140)	-	J (all detects) R (all non-detects)

Action: Sample results reported as detectable were qualified as estimated (J) and results reported as nondetectable were qualified as unusable (R) as indicated above. This is considered a technical deficiency.

Finding 5: Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag
9/21/98-LCS/LCSD (All samples in SDG 98-09-136)	Dichlorodifluoromethane	55.0 (60-140)	-	24.0 (≤20)	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Finding 6: All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
All samples in SDG 063183	Bromoethane Chloroethane Chloromethane Dichlorodifluoromethane Vinyl chloride	Laboratory reporting limit reported at 2.0 ug/L	Reporting limit should be reported at 1.0 ug/L per the QAPP.	None
All samples in SDG 98-09-136	All TCL compounds except Trichlorofluoromethane Trichlorotrifluoromethane 1,2-Dibromo-3-chloropropane Acetone Acrylonitrile 2-Butanone Carbon disulfide trans-1,4-Dichloro-2-buten 2-Chloroethylvinyl ether 2-Hexanone Iodomethane 4-Methyl-2-pentanone tert-Butyl methyl ether	Laboratory reporting limit was higher than the QAPP.	QAPP reporting limits should be used.	None None None None None None None None None None None None None None

Action: Sample results were not qualified based on this finding. This is considered a protocol violation.

Samples 98NEC16GW801 and 98NEC16GW201, samples 98NEC16GW801RE and 98NEC16GW201RE, samples 98NEC16GW801 and 98NEC16GW201RE, and samples 98NEC16GW201 and 98NEC16GW801RE were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW801		98NEC16GW201			
	Dilution: 1.0 Prep Date: 9/26/98 Analysis date: 9/27/98		Dilution: 1.0 Prep Date: 9/26/98 Analysis date: 9/27/98			
Naphthalene	4.2	1.0U	2.8	1.0U	2X	-

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW801		98NEC16GW201			
	Dilution: 1.0 Prep Date: 9/26/98 Analysis date: 9/27/98		Dilution: 1.0 Prep Date: 9/26/98 Analysis date: 9/27/98			
1,2,4-Trimethylbenzene	1.1	1.0U	1.0U	1.0U	1X	-

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW801RE		98NEC16GW201RE			
	Dilution: 1.0 Prep Date: 10/1/98 Analysis date: 10/1/98		Dilution: 1.0 Prep Date: 10/1/98 Analysis date: 10/1/98			
Naphthalene	2.6	1.0U	4.3	1.0U	2X	-

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW801		98NEC16GW201RE			
	Dilution: 1.0 Prep Date: 9/26/98 Analysis date: 9/27/98		Dilution: 1.0 Prep Date: 10/1/98 Analysis date: 10/1/98			
Naphthalene	4.2	1.0U	4.3	1.0U	1X	-
1,2,4-Trimethylbenzene	1.1	1.0U	1.0U	1.0U	1X	-

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW201		98NEC16GW801RE			
	Dilution: 1.0 Prep Date: 9/26/98 Analysis date: 9/27/98		Dilution: 1.0 Prep Date: 10/1/98 Analysis date: 10/1/98			
Naphthalene	2.8	1.0U	2.6	1.0U	1X	-

The comparability of the field duplicate sample data was considered technically acceptable.

Sample pairs 98NEC16GW201 (original) and 98NEC16GW301 (referee), samples 98NEC16GW801 (original) and 98NEC16GW301 (referee), samples 98NEC16GW801RE (original) and 98NEC16GW301 (referee), and samples 98NEC16GW201RE (original) and 98NEC16GW301 (referee) were compared. No volatiles were detected in the samples with the following exceptions:

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW801		98NEC16GW301			
	Dilution: 1.0 Prep Date: 9/26/98 Analysis date: 9/27/98		Dilution: 1.0 Prep Date: 9/21/98 Analysis date: 9/21/98			
Methylene chloride	1.0U	1.0U	4.7	10U	<5X	-
1,2,4-Trimethylbenzene	1.1	1.0U	1.4	2.0U	1X	-
4-Isopropyltoluene	1.0U	1.0U	0.92	2.0U	NC	-
Naphthalene	4.2	1.0U	4.9	2.0U	1X	-

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW201		98NEC16GW301			
	Dilution: 1.0 Prep Date: 9/26/98 Analysis date: 9/27/98		Dilution: 1.0 Prep Date: 9/21/98 Analysis date: 9/21/98			
Methylene chloride	1.0U	1.0U	4.7	10U	<5X	-
1,2,4-Trimethylbenzene	1.0U	1.0U	1.4	2.0U	1X	-
4-Isopropyltoluene	1.0U	1.0U	0.92	2.0U	1X	-
Naphthalene	2.6	1.0U	4.9	2.0U	2X	-

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW801RE		98NEC16GW301			
	Dilution: 1.0 Prep Date: 9/8/98 Analysis date: 9/10/98		Dilution: 1 Prep Date: 9/8/98 Analysis date: 9/25/98			
Methylene chloride	1.0U	1.0U	4.7	10U	<5X	-
1,2,4-Trimethylbenzene	1.0U	1.0U	1.4	2.0U	1X	-
4-Isopropyltoluene	1.0U	1.0U	0.92	2.0U	1X	-
Naphthalene	2.6	1.0U	4.9	2.0U	2X	-

Compound	Concentration (Detection limit) (ug/L)				Difference	Disagreement /Major Disagreement (D/MD)
	98NEC16GW201RE		98NEC16GW301			
	Dilution: 1.0 Prep Date: 10/1/98 Analysis date: 10/1/98		Dilution: 1.0 Prep Date: 9/21/98 Analysis date: 9/21/98			
Methylene chloride	1.0U	1.0U	4.7	10U	<5X	-
1,2,4-Trimethylbenzene	1.0U	1.0U	1.4	2.0U	1X	-
4-Isopropyltoluene	1.0U	1.0U	0.92	2.0U	1X	-
Naphthalene	4.3	1.0U	4.9	2.0U	1X	-

The comparability of the QA split sample referee data was considered technically acceptable. In cases where the detection limit of a non-detect result is greater than a detected result, the comparison of the data is not technically significant. These cases are flagged with a "NC" (not calculable) notation.

IV. GC/MS Polynuclear Aromatic Hydrocarbons (PAHs) by EPA SW 846 Method 8270-SIM

For GC/MS polynuclear aromatic hydrocarbons analysis, holding times, instrument performance checks, instrument calibrations, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: All technical holding time requirements were met with the following exceptions:

Sample	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag
98NEC02SS801	46	14	J (all detects) R (all non-detects)

Action: Sample results reported as detectable were qualified as estimated (J) and results reported as nondetectable were qualified as unusable (R) as indicated above. This is considered a protocol violation.

Finding 2: Initial calibration was performed using required standard concentrations. Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds with the following exceptions:

Date	Compound	%RSD	Associated Samples	Flag
10/24/98	2-Methylnaphthalene	45.670	98NECRCSD804 98NECDBSD801 98NECDBSD802 98NECDBSD803 98NEC09SS801 9/29/98-BLK	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Finding 3: Continuing calibration was performed at the required frequencies. All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

Date	Compound	%D	Associated Samples	Flag
10/25/98	2-Methylnaphthalene	25.7	98NECRCSD804	J

Date	Compound	%D	Associated Samples	Flag
10/22/98	2-Methylnaphthalene	47.3	98NECRCSD803 98NECRCSD802 98NECRCSD202 98NECRCSD801 98NECRCSD201 9/27/98-BLK	J
9/26/98	Chrysene	28.8	All samples in SDG 063195 All water samples in SDG 063197	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Finding 4: No polynuclear aromatic hydrocarbon contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Extraction Date	Compound	Concentration	Associated Samples
9/27/98-BLK	9/27/98	Phenanthrene	5.4 ug/Kg	All soil samples in SDG 063183
9/17/98-BLK	9/17/98	Naphthalene	0.023 ug/L	All water samples in SDG 98-09-136

Action: Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks. No data required qualification.

Surrogates were diluted out in samples 98NECDBSD801, 98NECDBSD802, 98NECDBSD803, 98NECRCSD804, and 98NEC03GW801. No data qualifications were performed based on diluted surrogate results.

Finding 5: Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
All water samples in SDG 98-09-136 All soil samples in SDG 063183 All samples in SDGs 063188, 063181, 063189, 063195, 063197, and 063336	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None

For the samples listed in the table above, surrogate, laboratory control sample and laboratory control sample duplicates were used to assess precision and accuracy. Since these were acceptable, the sample results were not qualified based on this finding. This is considered a protocol violation.

Finding 6: The MS/MSD percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NECRCSW802MS/MSD (All water samples in SDG 063183)	Benzo(g,h,i)perylene Dibenz(a,h)anthracene Indeno(1,2,3-cd)pyrene	- - -	- - -	18 (≤14) 18 (≤15) 18 (≤15)	J J J
98NECRC302MS/MSD (All soil samples in SDG 98-09-136)	Benzo(b)fluoranthene Benzo(k)fluoranthene	- -	- -	46.8 (≤40) 47.7 (≤40)	J J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

The spike compounds Benzo(g,h,i)perylene, Phenanthrene, Anthracene, Fluoranthene, and Dibenz(a,h)anthracene were diluted out in the 98NECRC302MS/MSD sample. No data qualifications were performed based on diluted spike results.

Finding 7: Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag
9/17/98-LCS/LCSD (All water samples in SDG 98-09-136)	Naphthalene	33.5 (45-136)	35.5 (45-136)	-	J
	Acenaphthylene	44.0 (48-133)	32.0 (48-133)	-	J
	Acenaphthene	42.0 (48-121)	-	-	J
	Fluorene	46.0 (58-133)	-	54.0 (≤40)	J
	Phenanthrene	34.0 (54-140)	38.0 (54-140)	-	J
	Anthracene	34.0 (59-131)	26.0 (59-131)	-	J
	Fluoranthene	38.0 (51-140)	40.0 (51-140)	-	J
	Benzo(a)anthracene	54.0 (58-118)	34.0 (58-118)	-	J
	Chrysene	50.0 (55-139)	-	-	J
	Benzo(k)fluoranthene	54.0 (60-160)	560 (60-160)	165 (≤40)	J
	Pyrene	-	34.0 (46-135)	-	J
	Benzo(b)fluoranthene	-	480 (41-133)	166 (≤40)	J
	Indeno(1,2,3-cd)pyrene	-	170 (48-125)	106 (≤40)	J
	Dibenz(a,h)anthracene	-	280 (50-129)	139 (≤40)	J
	Benzo(g,h,i)perylene	-	168 (50-125)	105 (≤40)	J
	Benzo(a)pyrene	-	-	90.1 (≤40)	J
9/22/98-LCS/LCSD (All samples in SDG 063195 All water samples in SDG 063197)	Benzo(b)fluoranthene	-	-	20 (≤14)	J
	Dibenz(a,h)anthracene	-	-	20 (≤15)	J
	Indeno(1,2,3-cd)pyrene	-	-	20 (≤15)	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

LCS ID	Compound	%R (Limits)	Associated Samples	Flag
9/27/98-LCS	Anthracene	110 (35-104)	All soil samples in SDG 063183	J (all detects)
9/29/98-LCS	Dibenz(a,h)anthracene Pyrene	139 (20-126) 144 (29-134)	All soil samples in SDG 063197	J (all detects) J (all detects)

Action: Sample results reported as detectable were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Finding 8: All internal standard areas and retention times were within QC limits with the following exceptions:

Sample	Internal Standards	Area (Limits)	Compound	Flag
98NECDBSD802	Acenaphthene-d10	2929 (3052-12208)	Naphthalene Acenaphthylene Acenaphthene Fluorene	J J J J
98NEC09SS801	Acenaphthene-d10	2388 (2442-9766)	Naphthalene Acenaphthylene Acenaphthene Fluorene	J J J J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Sample	Internal Standards	Area (Limits)	Compound	Flag
98NECRCSD801	Acenaphthene-d10	7478 (7806-31224)	Naphthalene Acenaphthylene Acenaphthene Fluorene	J J J J
98NECDBSD803	Phenanthrene-d10	3888 (4055-16220)	Phenanthrene Anthracene Fluoranthene Pyrene	J J J J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a protocol violation.

Sample	Internal Standards	Area (Limits)	Compound	Flag
98NECRCSD805	Phenanthrene-d10	58120 (12617-50466)	Phenanthrene Anthracene Fluoranthene Pyrene	J (all detects) J (all detects) J (all detects) J (all detects)
98NECBKSD801	Acenaphthene-d10	34510 (8203-32810)	Naphthalene Acenaphthylene Acenaphthene Fluorene	J (all detects) J (all detects) J (all detects) J (all detects)

Sample	Internal Standards	Area (Limits)	Compound	Flag
98NECBKSD802	Acenaphthene-d10	34681 (8203-32810)	Naphthalene Acenaphthylene Acenaphthene Fluorene	J (all detects) J (all detects) J (all detects) J (all detects)

Action: Sample results reported as detectable were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Sample	Internal Standards	Area (Limits)	Compound	Flag
98NECRCSW806	Benzo(a)pyrene-d12	36125 (9023-36090)	Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene Indeno(1,2,3-cd)pyrene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)
98NECBDSS802	Benzo(a)pyrene-d12	8721 (1848-7390)	Benzo(a)anthracene Chrysene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(a)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene Indeno(1,2,3-cd)pyrene	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)
98NEC02SS801	Acenaphthene-d10	81144 (18215-72858)	Naphthalene Acenaphthylene Acenaphthene Fluorene	J (all detects) J (all detects) J (all detects) J (all detects)

Action: Sample results reported as detectable were qualified as estimated (J) as indicated above. This is considered a protocol violation.

No field blanks were identified in these SDGs.

Samples 98NECRCSD802 and 98NECRCSD202, samples 98NECRCSD801 and 98NECRCSD201, and samples 98NECRCSW802 and 98NECRCSW202 were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (Detection limit) (ug/Kg)				Difference	Disagreement /Major Disagreement (D/MD)
	98NECRCSD801		98NECRCSD201			
	Dilution: 1.0 Prep Date: 9/27/98 Analysis date: 10/22/98		Dilution: 1.0 Prep Date: 9/27/98 Analysis date: 10/22/98			
2-Methylnaphthalene	11U	11U	18	13U	2X	-
Naphthalene	11U	11U	14	13U	1X	-

The comparability of the field duplicate sample data was considered technically acceptable.

Sample pairs 98NECRCSD802 (original) and 98NECRC302 (referee), samples 98NECRCSD202 (original) and 98NECRC302 (referee), samples 98NECRCSD801 (original) and 98NECRC301 (referee), samples 98NECRCSD201 (original) and 98NECRC301 (referee), samples 98NECRCSW802 (original) and 98NECRCSW302 (referee), and samples 98NECRCSW202 (original) and 98NECRCSW302 (referee) were compared. No polynuclear aromatic hydrocarbons were detected in the samples with the following exceptions:

Compound	Concentration (Detection limit) (ug/Kg)				Difference	Disagreement /Major Disagreement (D/MD)
	98NECRCSD801		98NECRC301			
	Dilution: 1.0 Prep Date: 9/27/98 Analysis date: 10/22/98		Dilution: 1.0 Prep Date: 9/18/98 Analysis date: 10/23/98			
Naphthalene	11U	11U	4.9	3.5U	NC	-
2-Methylnaphthalene	11U	11U	8.5	3.5U	NC	-
Phenanthrene	11U	11U	13	3.5U	1X	-
Fluoranthene	11U	11U	3.5	3.5U	NC	-
Pyrene	-	11U	8.5	3.5U	Not calculable	-

Compound	Concentration (Detection limit) (ug/Kg)				Difference	Disagreement /Major Disagreement (D/MD)
	98NECRCSD201		98NECRC301			
	Dilution: 1.0 Prep Date: 9/27/98 Analysis date: 10/22/98		Dilution: 1.0 Prep Date: 9/18/98 Analysis date: 10/23/98			
Naphthalene	14	13U	4.9	3.5U	3X	-
2-Methylnaphthalene	18	13U	8.5	3.5U	2X	-
Phenanthrene	13U	13U	13	3.5U	1X	-
Fluoranthene	13U	13U	3.5	3.5U	NC	-
Pyrene	13U	13U	8.5	3.5U	NC	-

Compound	Concentration (Detection limit) (ug/Kg)				Difference	Disagreement /Major Disagreement (D/MD)
	98NECRCSD802		98NECRC302			
	Dilution: 1.0 Prep Date: 9/27/98 Analysis date: 10/22/98		Dilution: 1.0 Prep Date: 9/18/98 Analysis date: 10/23/98			
Naphthalene	9.3U	9.3U	3.6	3.0U	NC	-
2-Methylnaphthalene	9.3U	9.3U	6.0	3.0U	NC	-
Phenanthrene	9.3U	9.3U	3.0	3.0U	NC	-

Compound	Concentration (Detection limit) (ug/Kg)				Difference	Disagreement /Major Disagreement (D/MD)
	98NECRCSD202		98NECRC302			
	Dilution: 1.0 Prep Date: 9/27/98 Analysis date: 10/22/98		Dilution: 1.0 Prep Date: 9/18/98 Analysis date: 10/23/98			
Naphthalene	9.6U	9.6U	3.6	3.0U	NC	-
2-Methylnaphthalene	9.6U	9.6U	6.0	3.0U	NC	-

Compound	Concentration (Detection limit) (ug/Kg)				Difference	Disagreement /Major Disagreement (D/MD)
	98NECRCSD202		98NECRC302			
	Dilution: 1.0 Prep Date: 9/27/98 Analysis date: 10/22/98		Dilution: 1.0 Prep Date: 9/18/98 Analysis date: 10/23/98			
Phenanthrene	9.6U	9.6U	3.0	3.0U	NC	-

The comparability of the QA split sample referee data was considered technically acceptable. In cases where the detection limit of a non-detect result is greater than a detected result, the comparison of the data is not technically significant. These cases are flagged with a "NC" (not calculable) notation.

V. GC Polychlorinated Biphenyls (PCBs) by EPA SW 846 Method 8082

For GC polychlorinated biphenyls analysis, holding times, instrument calibrations, instrument performance checks, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag
10/16/98	CCV	Not Specified	Aroclor-1260	15.7	All water samples in SDG 063183	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Surrogates were diluted out in samples 98NEC13SS801, 98NEC13SS803, and 98NECRCSD806. No data qualifications were performed based on diluted surrogate results.

Finding 2: Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
All samples in SDGs 063191 and 98-09-136	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None

For the samples listed in the table above, surrogate and laboratory control samples were used to assess precision and accuracy. Since these were acceptable, the sample results were not qualified based on this finding. This is considered a protocol violation.

Finding 3: The MS/MSD percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NECRCSD802MS/MSD (All soil samples in SDGs 063183, All samples in SDGs 063188, 063189, and 063191)	PCB-1016	-	-	25 (≤21)	J
98NECRC302MS/MSD (All soil samples in SDG 98-09-136)	PCB-1260 PCB-1016	- -	- -	75.9 (≤50) 92.7 (≤50)	J J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Although the percent recoveries were out for PCB-1260 and PCB-1016, no data qualifications were performed because of the high native concentration of these compounds in the unspiked sample.

Samples 98NECRCSW802 and 98NECRCSW202, samples 98NECRCSD802 and 98NECRCSD202, and samples 98NECRCSD801 and 98NECRCSD201 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples.

Sample pairs 98NECRCSW802 (original) and 98NECRCSW302 (referee), 98NECRCSD802 (original) and 98NECRC302 (referee), 98NECRCSD801 (original) and 98NECRC301 (referee), 98NECRCSW202 (original) and 98NECRCSW302 (referee), 98NECRCSD202 (original) and 98NECRC302 (referee), and 98NECRCSD201 (original) and 98NECRC301 (referee) were compared. No polychlorinated biphenyls were detected in the samples.

VI. Metals by EPA SW 846 Methods 6010 and 7000

For metals analysis, holding times, instrument calibrations, instrument performance checks, blanks, internal standards, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: Matrix spike (MS) analyses were reviewed for each matrix as applicable with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag
All samples in SDGs 063197 and 063161	Manganese	No MS associated with these samples.	MS required.	None

For the samples listed in the table above, laboratory control sample were used to assess accuracy. Since these were acceptable, the sample results were not qualified based on this finding. This is considered a protocol violation.

Finding 2: The MS/MSD percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NEC16GW801MS/MSD (All samples in SDG 063183)	Lead	32.5 (75-125)	45.0 (75-125)	-	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Finding 3: Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

Sample	Analyte	Finding	Criteria	Flag
All samples in SDG 063197 and 063161	Manganese	No DUP associated with these samples.	DUP required.	None

Action: Sample results were not qualified based on this finding. This is considered a protocol violation.

Samples 98NEC16GW801 and 98NEC16GW201 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (Detection limit, mg/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC16GW801		98NEC16GW201			
	Dilution: 5 Prep Date: 9/29/98 Analysis date: 9/30/98		Dilution: 5 Prep Date: 9/29/98 Analysis date: 9/30/98			
Lead	0.026	0.006U	0.026	0.006U	1X	-

Sample pairs 98NEC16GW801 (original) and 98NEC16GW301 (referee) and 98NEC16GW201 (original) and 98NEC16GW301 (referee) were compared. Metals were detected in the samples as follows:

Analyte	Concentration (Detection limit, mg/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC16GW801		98NEC16GW301			
	Dilution: 5 Prep Date: 9/29/98 Analysis date: 9/30/98		Dilution: 5 Prep Date: 9/29/98 Analysis date: 9/30/98			
Lead	0.026	0.006U	0.022	0.001U	1X	-
Manganese	NR	NR	0.0015	0.00001U	-	-

Analyte	Concentration (Detection limit, mg/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC16GW201		98NEC16GW301			
	Dilution: 5 Prep Date: 9/29/98 Analysis date: 9/30/98		Dilution: 5 Prep Date: 9/29/98 Analysis date: 9/30/98			
Lead	0.026	0.006U	0.022	0.001	1X	-
Manganese	NR	NR	0.0015	0.00001U	-	-

NR = Not reported by the laboratory

The comparability of the QA split sample referee data was considered technically acceptable.

VII. Gasoline Range Organics by Alaska Method AK101

For gasoline range organic analysis, holding times, instrument calibrations, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
All samples in SDGs 063161, 063195, and 063197	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None

For the samples listed in the table above, surrogate, laboratory control sample and laboratory control sample duplicates were used to assess precision and accuracy. Since these were acceptable, the sample results were not qualified based on this finding. This is considered a protocol violation.

Finding 2: Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound	Concentration	Associated Samples
LB980929N1	9/29/98	Gasoline range organics	0.14 mg/L	All samples in SDGs 063195 and 063197

Action: Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks.

Samples 98NECTB001 and 98NECTB007 were identified as trip blanks. No gasoline range organic contaminants were found in these blanks.

No field duplicates were identified in this SDG.

No QA split sample referee data samples were identified in this SDG.

VII. Diesel Range Organics and Residual Range Organics by Alaska Methods AK102 and AK103

*Indicates sample was analyzed for Aromatics
**Indicates sample was analyzed for Aliphatics

For diesel range analysis and residual range analysis, holding times, instrument calibrations, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: All technical holding time requirements were met with the following exceptions:

Sample	Total Days From Sample Collection Until Analysis	Required Holding Time (In Days) From Sample Collection Until Analysis	Flag
98NECBKSD801** 98NECBKSD801* 98NECBKSD802** 98NECBKSD802* 98NEC10SS801** 98NEC10SS801*	37	14	J (all detects) R (all non-detects)
98NEC14SS802* 98NEC14SS802** 98NEC00SS801* 98NEC00SS801**	43	14	J (all detects) R (all non-detects)
98NECDBSD801* 98NECDBSD801** 98NECDBSD802* 98NECDBSD802** 98NECDBSD803* 98NECDBSD803** 98NECDBSS806* 98NECDBSS806** 98NECBDSS801* 98NECBDSS801**	33	14	J (all detects) R (all non-detects)

Sample	Total Days From Sample Collection Until Analysis	Required Holding Time (in Days) From Sample Collection Until Analysis	Flag
98NECDBSS807* 98NECDBSS807** 98NECDBSS808* 98NECDBSS808** 98NECDBSS809* 98NECDBSS809** 98NECBDSS802* 98NECBDSS802**	34	14	J (all detects) R (all non-detects)
98NECRCSW302* 98NECRCSW302**	52	14	J (all detects) R (all non-detects)

Action: Sample results reported as detectable were qualified as estimated (J) and results reported as nondetectable were qualified as unusable (R) as indicated above. This is considered a technical deficiency.

Finding 2: Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag
98NEC27SW801	Tricontane	17 (50-150)	Residual range organics	J
98NECBKSW802	Tricontane	13 (50-150)	Residual range organics	J
98NECDBSD801**	Tricontane	23 (50-150)	Residual range organics	J
98NECRC302*	o-Terphenyl	36 (50-150)	Diesel range organics Residual range organics	J J
98NECRC302**	Squalene	44 (50-150)	Diesel range organics Residual range organics	J J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Sample	Surrogate	%R (Limits)	Compound	Flag
98NEC10GW801	o-Terphenyl Tricontane	0 (50-150) 0 (50-150)	Diesel range organics Residual range organics	J (all detects) R (all non-detects) J (all detects) R (all non-detects)
98NEC10GW201	o-Terphenyl Tricontane	0 (50-150) 0 (50-150)	Diesel range organics Residual range organics	J (all detects) R (all non-detects) J (all detects) R (all non-detects)
98NEC10GW802	o-Terphenyl Tricontane	0 (50-150) 0 (50-150)	Diesel range organics Residual range organics	J (all detects) R (all non-detects) J (all detects) R (all non-detects)
98NEC07GW801	o-Terphenyl	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NEC09GW801	o-Terphenyl	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NEC09GW802	o-Terphenyl	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NEC00GW801	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD806*	o-Terphenyl	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NEC13GW802	Tricontane	7.3 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NEC10SS801**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECDBSD801*	o-Terphenyl	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECDBSS806*	o-Terphenyl	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)

Sample	Surrogate	%R (Limits)	Compound	Flag
98NECDBSS808**	Pentacosane	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECDBSS809**	Pentacosane	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECDBSD802*	Phenanthrene-d10	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECDBSD803*	Phenanthrene-d10	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECDBSS807	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECDBSS808	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECDBSS809	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECBDSS802	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECBDSS802**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECBDSS801	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECBDSS801**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECDBSS806	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NEC14SS802*	o-Terphenyl	9.1 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NEC00SS801*	o-Terphenyl	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)

Sample	Surrogate	%R (Limits)	Compound	Flag
98NEC02SS801	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NEC02SS201	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NEC14SS802	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NEC14SS802**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NEC00SS801**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSW801*	o-Terphenyl	3.1 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECRCSD804*	o-Terphenyl	0 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECRCSD803*	o-Terphenyl	1.5 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECRCSD802	o-Terphenyl Tricontane	0 (50-150) 0 (50-150)	Diesel range organics Residual range organics	J (all detects) R (all non-detects) J (all detects) R (all non-detects)
98NECRCSD802*	o-Terphenyl	3.9 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECRCSD202*	o-Terphenyl	3.1 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECRCSD801*	o-Terphenyl	5.3 (50-150)	Diesel range organics	J (all detects) R (all non-detects)
98NECRCSD201*	o-Terphenyl	3.5 (50-150)	Diesel range organics	J (all detects) R (all non-detects)

Sample	Surrogate	%R (Limits)	Compound	Flag
98NEC27GW001	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD804	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD803	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD803**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD802**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD202	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD202**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD801	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD801**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD201	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)
98NECRCSD201**	Tricontane	0 (50-150)	Residual range organics	J (all detects) R (all non-detects)

Action: Sample results reported as detectable were qualified as estimated (J) and results reported as nondetectable were qualified as unusable (R) as indicated above. This is considered a technical deficiency.

Surrogates were diluted out in samples 98NEC06SS802, 98NEC10SS801, 98NEC13GW802, 98NECDBSD801, 98NECDBSD801**, 98NECDBSD802, 98NECDBSD802*, 98NECDBSD802**, 98NECDBSD803, 98NECDBSD803*, 98NECDBSD803**, 98NEC00SS801, and 98NECRC301, 98NECRC302, 98NEC11GW802, 98NEC13GW001, 98NEC15GW801, 98NEC19GW801, 98NEC19GW201, 98NEC19GW802, 98NECRCSD804, and 98NECRCSD804**. No data qualifications were performed based on diluted surrogate results.

Finding 3: Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
All samples in SDGs 063190, 063161, 063189, 063195, 063197, and 063188	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None

For the samples listed in the table above, surrogate, laboratory control sample and laboratory control sample duplicates were used to assess precision and accuracy. Since these were acceptable with the exceptions noted in the previous and following tables, sample results were not qualified based on this finding. This is considered a protocol violation.

Finding 4: The MS/MSD percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
K809083-02BMS/MSD (98NECRC301** 98NECRC302**)	Aliphatics: Diesel range organics Residual range organics	- -	- -	40.1 (≤20) 49.1 (≤20)	J J
K809083-02BMS/MSD (98NECRC301* 98NECRC302*)	Aromatics: Diesel range organics Residual range organics	- -	49.2 (50-150 46.9 (50-150)	- -	J J
98NEC19GW301MS/MSD (All samples in SDG A8-09-082)	Diesel range organics	-	-	152 (≤20)	J
98NEC19GW801MS/MSD (All water samples in SDG 063183)	Diesel range organics	-	-	300 (≤20)	J
98NEC19GW201MS/MSD (All water samples in SDG 063183)	Diesel range organics Residual range organics	- -	- -	100 (≤20) 64 (≤20)	J J

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NECRCSD802MS/MSD (All soil samples in SDG 063183)	Residual range organics	-	-	67 (≤20)	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Although the percent recoveries were out for Residual range organics in 98NEC02SS801MS/MSD, Diesel range organics in 98NEC19GW301MS/MSD and 98NEC19GW801MS/MSD, and Diesel range organics and Residual range organics in 98NEC19GW201MS/MSD and 98NECRCSD802MS/MSD, no data qualifications were performed because of the high native concentration of these compounds in the unspiked sample.

Finding 5: Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Flag
LCS/LCSD (All water samples in SDG 063183)	Residual range organics	59.8 (60-120)	-	-	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Samples 98NEC1GW801 and 98NEC10GW201, samples 98NEC19GW801 and 98NEC19GW201, samples 98NECRCSD802 and 98NECRCSW202, samples 98NECRCSD802 and 98NECRCSD202, samples 98NECRCSD801 and 98NECRCSD201, samples 98NECRCSD801** and 98NECRCSD201**, samples 98NECRCSD802** and 98NECRCSD202**, samples 98NECRCSD802* and 98NECRCSD202*, and samples 98NECRCSD801* and 98NECRCSD201* were identified as field duplicates. No total petroleum hydrocarbons as diesel were detected in any of the samples with the following exceptions:

Compound	Concentration (Detection limit, ug/l)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC10GW801		98NEC10GW201			
	Dilution: 1 Prep Date: 9/18/98 Analysis date: 9/30/98		Dilution: 1 Prep Date: 9/18/98 Analysis date: 9/30/98			
Diesel range organics	100U	100U	110	100U	1X	-

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC19GW801		98NEC19GW201			
	Dilution: 10 Prep Date: 9/19/98 Analysis date: 10/22/98		Dilution: 10 Prep Date: 9/19/98 Analysis date: 10/22/98			
Diesel range organics	16000	1000U	18000	1000U	1X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRCSD802		98NECRCSW202			
	Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98			
Residual range organics	77	19U	47	19U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRCSD802		98NECRCSD202			
	Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98			
Diesel range organics	130	7.4U	11	7.7U	12X	MD
Residual range organics	77	19U	47	19U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRCSD801		98NECRCSD201			
	Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98			
Diesel range organics	20	8.5U	36	11U	2X	-
Residual range organics	110	21U	170	26U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRCSD801**		98NECRCSD201**			
	Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aliphatic: Diesel range organics	21U	21U	28	26U	1X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRCSD802**		98NECRCSD202**			
	Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aliphatic: Diesel range organics	110	19U	19U	19U	6X	MD

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRCSD802*		98NECRCSD202*			
	Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aromatic: Residual range organics	81	37U	44	38U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRCSD801*		98NECRCSD201*			
	Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aromatic: Residual range organics	93	43U	180	53U	2X	-

The comparability of the field duplicate sample data was considered technically acceptable with the following exceptions of Diesel range organics in sample pairs 98NECRCSD802 and 98NECRCSD202 and 98NECRCSD802** and 98NECRCSD202**. No specific reason for this difference was identified during the review of QA/QC results. Sample homogeneity or subsampling could possibly account for this problem. In cases where the detection limit of a non-detect result is greater than a detected result, the comparison of the data is not technically significant. These cases are flagged with a "NC" (not calculable) notation.

Sample pairs 98NEC10GW801 (original) and 98NEC10GW301 (referee), 98NEC10GW201 (original) and 98NEC10GW301 (referee), 98NEC10GW801 (original) and 98NEC19GW301 (referee), 98NEC10GW201 (original) and 98NEC19GW301 (referee), 98NECRCSD801** (original) and 98NECRC301 (referee), 98NECRCSD801* (original) and 98NECRC301 (referee), 98NECRCSD801 (original) and 98NECRC301 (referee), 98NECRCSD201 (original) and 98NECRC301 (referee), 98NECRCSD201* (original) and 98NECRC301 (referee), 98NECRCSD201** (original) and 98NECRC301 (referee), 98NECRCSD802* (original) and 98NECRC302 (referee), 98NECRCSD802** (original) and 98NECRC302 (referee), 98NECRCSD202* (original) and 98NECRC302 (referee), 98NECRCSD202** (original) and 98NECRC302 (referee), 98NECRCSD802 (original) and 98NECRC302 (referee), and 98NECRCSD202 (original) and 98NECRC302 (referee) were compared. Gasoline range organics were detected in the samples as follows:

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC10GW801		98NEC10GW301			
	Dilution: 1 Prep Date: 9/18/98 Analysis date: 9/30/98		Dilution: 1 Prep Date: 9/18/98 Analysis date: 10/12/98			
Diesel range organics	100U	100U	270	190U	3X	D
Residual range organics	200U	200U	300	190U	2X	-

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC10GW201		98NEC10GW301			
	Dilution: 1 Prep Date: 9/18/98 Analysis date: 9/30/98		Dilution: 1 Prep Date: 9/18/98 Analysis date: 10/12/98			
Diesel range organics	110	100U	270	190U	2X	-
Residual range organics	200U	200U	300	190U	2X	-

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC19GW801		98NEC19GW301			
	Dilution: 10 Prep Date: 9/19/98 Analysis date: 10/22/98		Dilution: 1 Prep Date: 9/18/98 Analysis date: 10/13/98			
Diesel range organics	16000	1000U	14000	190U	1X	-
Residual range organics	2500U	2500U	930	190U	NC	-

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC19GW201		98NEC19GW301			
	Dilution: 10 Prep Date: 9/19/98 Analysis date: 10/22/98		Dilution: 1 Prep Date: 9/18/98 Analysis date: 10/13/98			
Diesel range organics	18000	1000U	14000	190U	1X	-
Residual range organics	2500U	2500U	930	190U	NC	-

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC301		98NECRCSD801**			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aliphatic: Diesel range organics	29	10U	21U	21U	1X	-

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC301		98NECRCSD801**			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aliphatic: Residual range organics	66	26U	43U	43U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC301		98NECRCSD801*			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aromatic: Residual range organics	60	26U	93	43U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC301		98NECRCSD801			
	Dilution: 5 Prep Date: 9/23/98 Analysis date: 10/19/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98			
Diesel range organics	210	52U	20	8.5U	11X	MD
Residual range organics	1600	52U	110	21U	15X	MD

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC301		98NECRCSD201			
	Dilution: 5 Prep Date: 9/23/98 Analysis date: 10/19/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98			
Diesel range organics	210	52U	36	11U	6X	MD
Residual range organics	1600	52U	170	26U	9X	MD

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC301		98NECRCSD201**			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aliphatic: Diesel range organics	29	10U	28	26U	1X	-
Aliphatic: Residual range organics	66	26U	53U	53U	1X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC301		98NECRCSD201*			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aromatic: Residual range organics	60	26U	180	53U	3X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC302		98NECRCSD802**			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aliphatic: Diesel range organics	15	7.3U	110	19U	7X	MD
Aliphatic: Residual range organics	32	18U	37U	37U	NC	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC302		98NECRCSD802*			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aromatic: Residual range organics	26	18U	81	37U	3X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC302		98NECRCSD202**			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aliphatic: Diesel range organics	15	7.3U	19U	19U	NC	-
Aliphatic: Residual range organics	32	18U	38U	38U	NC	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC302		98NECRCSD202*			
	Dilution: 1 Prep Date: 9/25/98 Analysis date: 11/3/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/31/98			
Aromatic: Residual range organics	26	18U	44	38U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC302		98NECRCSD802			
	Dilution: 5 Prep Date: 9/23/98 Analysis date: 10/17/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98			
Diesel range organics	64	37U	130	7.4U	2X	-
Residual range organics	380	37U	77	19U	5X	D

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NECRC302		98NECRCSD202			
	Dilution: 5 Prep Date: 9/23/98 Analysis date: 10/17/98		Dilution: 1 Prep Date: 9/27/98 Analysis date: 10/29/98			
Diesel range organics	64	37U	11	7.7U	6X	MD
Residual range organics	380	37U	47	19U	8X	MD

The comparability of the QA split sample referee data was considered technically acceptable with the following exceptions of Diesel range organics in sample pairs 98NEC10GW301 and 98NEC10GW801, Diesel range organics and Residual range organics in sample pair 98NECRC301 and 98NECRCSD801, sample pair 98NECRC301 and 98NECRCSD201, and sample pair 98NECRC302 and 98NECRCSD202, and Residual range organics in sample pair 98NECRC302 and 98NECRCSD802. No specific reason for this difference was identified during the review of QA/QC results. Sample homogeneity or subsampling could possibly account for this problem. In cases where the detection limit of a non-detect result is greater than a detected result, the comparison of the data is not technically significant. These cases are flagged with a "NC" (not calculable) notation.

IX. GC Aromatic Volatile Organics (Benzene, Ethylbenzene, Toluene, & Xylenes) by EPA SW 846 Method 8021

For GC BTEX analysis, holding times, instrument calibrations, instrument performance checks, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Column	Compound	%D	Associated Samples	Flag
9/25/98	Not specified	Benzene	36.5	98NECRCSW806 98NECRCSW805 98NECRCSW804 98NECRCSW803 98NECRCSW802 98NECRCSW801 98NECRCSW802MS 98NECRCSW802MSD	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Samples 98NECTB001, 98NECTB002, 98NECTB003, 98NECTB004, and 98NECTB007 were identified as trip blanks. No aromatic volatile organic contaminants were found in these blanks.

Surrogates were diluted out in samples 98NECRC301 and 98NECRC302. No data qualifications were performed based on diluted surrogate results.

Finding 2: Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
All samples in SDGs 063161, 063195, 063188, and 063190	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None

For the samples listed in the table above, surrogate, laboratory control sample and laboratory control sample duplicates were used to assess precision and accuracy. Since these were acceptable with the exceptions noted in the previous and following tables, sample results were not qualified based on this finding. This is considered a protocol violation.

Finding 3: The MS/MSD percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NEC19GW801MS/MSD (All water samples in SDG 063183)	Benzene Toluene Xylene	- - -	- - -	13 (≤6) 7.9 (≤6) 9.0 (≤6)	J J J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Samples 98NEC10GW801 and 98NEC10GW201, samples 98NEC15GW801 and 98NEC15GW201, and samples 98NEC19GW801 and 98NEC19GW201 were identified as field duplicates. No aromatic volatile organics were detected in any of the samples with the following exceptions:

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC15GW801		98NEC15GW201			
	Dilution: 1 Prep Date: N/A Analysis date: 9/25/98		Dilution: 1 Prep Date: N/A Analysis date: 9/25/98			
Xylene, total	23	3.0U	26	3.0U	1X	-

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC19GW801		98NEC19GW201			
	Dilution: 1 Prep Date: N/A Analysis date: 9/25/98		Dilution: 1 Prep Date: N/A Analysis date: 9/25/98			
Xylene, total	35	1.0U	34	1.0U	1X	-

The comparability of the field duplicate sample data was considered technically acceptable.

Sample pairs 98NEC15GW801 (original) and 98NEC15GW301 (referee), 98NEC19GW801 (original) and 98NEC19GW301 (referee), 98NEC19GW201 (original) and 98NEC19GW301 (referee), 98NECRCSD801 and 98NECRC301, 98NECRCSD201and 98NECRC301, 98NECRCSD802 and 98NECRC302, 98NECRCSD202 and 98NECRC302 were compared. No aromatic volatile organics were detected in the samples with the following exceptions:

Compound	Concentration (Detection limit, ug/L)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC15GW801		98NEC15GW301			
	Dilution: 1 Prep Date: N/A Analysis date: 9/25/98		Dilution: 1 Prep Date: N/A Analysis date: 9/29/98			
Xylene, total	23	3.0U	5.0	1.0U	5X	MD
Ethylbenzene	1.0U	1.0U	1.5	1.0U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC15GW201		98NEC15GW301			
	Dilution: 1 Prep Date: N/A Analysis date: 9/25/98		Dilution: 1 Prep Date: N/A Analysis date: 9/29/98			
Xylene, total	26	3.0U	5.0	1.0U	5X	MD
Ethylbenzene	1.0U	1.0U	1.5	1.0U	2X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC19GW801		98NEC19GW301			
	Dilution: 1 Prep Date: N/A Analysis date: 9/25/98		Dilution: 1 Prep Date: N/A Analysis date: 9/29/98			
Toluene	1.0U	1.0U	1.4	1.0U	1X	-
Xylene, total	35	1.0U	32	1.0U	1X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC19GW801		98NEC19GW301			
	Dilution: 1 Prep Date: N/A Analysis date: 9/25/98		Dilution: 1 Prep Date: N/A Analysis date: 9/29/98			
Toluene	1.0U	1.0U	1.4	1.0U	1X	-

Compound	Concentration (Detection limit, mg/Kg)				Difference Factor (X)	Disagreement /Major Disagreement (D/MD)
	98NEC19GW801		98NEC19GW301			
	Dilution: 1 Prep Date: N/A Analysis date: 9/25/98		Dilution: 1 Prep Date: N/A Analysis date: 9/29/98			
Xylene, total	34	1.0U	32	1.0U	1X	-

The comparability of the QA split sample referee data was considered technically acceptable with the following exceptions of Xylene, total in sample pair 98NEC15GW801 and 98NEC15GW301 and 98NEC15GW201 and 98NEC15GW301. No specific reason for this difference was identified during the review of QA/QC results. Sample homogeneity or subsampling could possibly account for this problem. In cases where the detection limit of a non-detect result is greater than a detected result, the comparison of the data is not technically significant. These cases are flagged with a "NC" (not calculable) notation.

X. HRGC/HRMS Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by EPA SW 846 Method 8290

For HRGC/HRMS Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans analysis, holding times, instrument performance checks, instrument calibrations, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
All samples in SDG 063183	All TCL compounds	Cooler temperature was reported at 21°C upon receipt by the laboratory.	Cooler temperature must be ≤10°C .	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

No field blanks were identified in this SDG.

No field duplicates were identified in this SDG.

No QA split samples were identified in this SDG.

XI. Total Organic Carbon by Walkley/Black Method

For Total organic carbon analysis, holding times, instrument calibrations, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: All technical holding time requirements were met with the following exceptions:

Sample	Analyte	Total Days From Sample Collection Until Analysis	Required Holding Time (In Days) From Sample Collection Until Analysis	Flag
98NECBKSW801 98NECBKSW802 98NECBKSW801MS 98NECBKSW801MSD	Total organic carbon	31	28	J

Action: Samples were qualified as estimated (J) as indicated above. This is considered a protocol violation.

Finding 2: Matrix spike (MS) and matrix spike duplicate (MSD) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Flag
98NECBKSW801MS/MSD (All water samples in SDG 063197)	Total organic carbon	0 (75-125)	0 (75-125)	-	J (all detects) R (all non-detects)

Action: Sample results reported as detectable were qualified as estimated (J) and results reported as nondetectable were qualified as unusable (R) as indicated above. This is considered a technical deficiency.

No field blanks were identified in these SDGs.

No field duplicates were identified in these SDGs.

No QA split samples were identified in these SDGs.

XII. GC Methane by Method SOP RSK175

For GC Methane analysis, holding times, instrument calibrations, instrument performance checks, blanks, field QC, and all accuracy and precision results were within validation criteria with the following exceptions:

Finding 1: All of the routine calibration percent differences (%D) between the initial calibration RRF and the routine calibration RRF were less than or equal to 20.0% for unlabeled compounds and less than or equal to 30.0% for labeled compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
10/17/98	2,3,7,8-TCDD	25	LB1009A	J	A
	1,2,3,7,8-PeCDF	22		J	
	2,3,4,7,8-PeCDF	22		J	
	2,3,4,6,7,8-HxCDF	24		J	
	1,2,3,7,8,9-HxCDF	33		J	
	1,2,3,4,7,8-HxCDD	21		J	
	1,2,3,4,7,8,9-HpCDF	22		J	
	^{13}C-1,2,3,7,8-PeCDF	33		J	
	^{13}C-1,2,3,4,6,7,8-HpCDF	36		J	

Action: Samples were qualified as estimated (J) as indicated above. This is considered a technical deficiency.

Finding 2: Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable with the following exceptions:

Sample	Compound	Finding	Criteria	Flag
All samples in SDG 063197	All TCL compounds	No MS/MSD associated with these samples.	MS/MSD required.	None

For the samples listed in the table above, laboratory control sample and laboratory control sample duplicates were used to assess precision and accuracy. Since these were acceptable with the exceptions noted in the previous and following tables, sample results were not qualified based on this finding. This is considered a protocol violation.

No field blanks were identified in these SDGs.

No field duplicates were identified in these SDGs.

No QA split samples were identified in these SDGs.

R1

LDC #3417 (USACE-Alaska / Northeast Cape)

RFQ 99-094

LDC	SDG#	DATE REC'D	DATE DUE	VOA (8260B)		PAHs (SIM)		PCBs (8082)		Pb (6010)		Mn (6010)		GRO (101)		DRO RRO (102/3)		BTEX (8021)		Aromatic DRO RRO		Aliphatic DRO RRO		Dioxins (8290)		TOC (WB)		CH_4											
Matrix:	Water/Solid			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	A8-09-082	12-14-98	1-13-99	-	-	-	-	-	-	-	-	-	-	-	-	5	0	8	0	1	0	1	0	-	-	-	-	-	-										
B	A8-09-083	12-14-98	1-13-99	-	-	-	-	-	-	-	-	-	-	-	-	0	4	0	4	0	4	0	4	-	-	-	-	-	-										
C	A8-09-093	12-14-98	1-13-99	-	-	-	-	-	-	-	-	-	-	-	-	0	1	-	-	-	-	-	-	-	-	-	-	-	-										
D	98-09-136	12-14-98	1-13-99	4	0	1	4	1	4	3	0	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
E	063161	12-15-98	1-13-99	-	-	7	0	-	-	-	-	1	0	2	0	7	0	9	0	-	-	-	-	-	-	-	-	-	-										
F	063183	12-15-98	1-13-99	10	0	9	6	9	6	5	0	-	-	8	0	21	6	21	6	1	6	1	6	0	1	-	-	-	-										
G	063188	12-15-98	1-13-99	-	-	0	5	0	2	-	-	-	-	-	-	0	9	0	5	0	9	0	9	-	-	0	3	-	-										
H	063189	12-15-98	1-13-99	-	-	0	2	0	2	-	-	-	-	-	-	0	2	-	-	0	2	0	2	-	-	-	-	-	-										
I	063190	12-15-98	1-13-99	-	-	-	-	-	-	-	-	-	-	-	-	3	0	4	0	-	-	-	-	-	-	-	-	-	-										
J	063191	12-15-98	1-13-99	-	-	-	-	0	4	-	-	-	-	-	-	0	7	0	4	0	2	0	2	-	-	0	2	-	-										
K	063195	12-15-98	1-13-99	-	-	1	0	-	-	-	-	-	-	2	0	1	0	1	0	-	-	-	-	-	-	-	-	-	-										
L	063197	12-15-98	1-13-99	-	-	2	3	-	-	-	-	1	0	1	0	3	6	3	5	0	3	0	3	-	-	2	6	1	0										
M	063336	12-15-98	1-13-99	-	-	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-										
otal				14	0	20	21	10	18	8	0	5	0	13	0	40	35	46	24	2	26	2	26	0	1	2	11	1	0	0	0	0	0	0	0	0	0	0	0

Shaded cells indicate Level IV validation (all other cells are Level III validation)

3417ST.ARM

SDG#: A8-09-093 | VALIDATION SAMPLE TABLE | LDC#: 3417C

Project Name: Northeast Cape | Parameters/Analytical Method | RFQ 99-094

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	BTEX (8021)	DRO RRO (102)	Aromatic DRO RRO	Aliphatic DRO RRO
98NEC02SS301	A809093-01	split	soil	9-14-98		X		

TB = Trip Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL = Dilution, RE = Reanalysis/Reextraction

Attachment 2

SDG#: 063183 — **VALIDATION SAMPLE TABLE** — **LDC#: 3417F**

Project Name: Northeast Cape — Parameters/Analytical Method — **RFQ 99-094**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)			
98NEC11GW801	0631830001		water	9-13-98						X	X						
98NEC11GW802	0631830002		water	9-13-98						X	X						
98NEC13GW001	0631830003		water	9-13-98						X	X						
98NEC15GW801	0631830004	DUP	water	9-13-98						X	X						
98NEC15GW201	0631830005	DUP	water	9-13-98							X						
98NEC16GW801	0631830006	DUP	water	9-13-98	X			X									
98NEC16GW201	0631830007	DUP	water	9-13-98	X			X									
98NEC16GW802	0631830008		water	9-13-98	X			X									
98NEC19GW801	0631830009	DUP	water	9-13-98						X	X						
98NEC19GW201	0631830010	DUP	water	9-13-98						X	X						
98NEC19GW802	0631830011		water	9-13-98						X	X						
98NEC27GW001	0631830012		water	9-13-98						X	X						
98NECTB006	0631830013	TB	water	9-13-98	X												
98NEC25SS801	0631830014		soil	9-13-98										X			
98NECRCSD804	0631830015		soil	9-13-98		X	X			X	X						
98NECRCSD804*	0631830015*		soil	9-13-98								X					
98NECRCSD804**	0631830015**		soil	9-13-98									X				
98NECRCSD803	0631830016		soil	9-13-98		X	X			X	X						
98NECRCSD803*	0631830016*		soil	9-13-98								X					
98NECRCSD803**	0631830016**		soil	9-13-98									X				
98NECRCSD802	0631830017	DUP	soil	9-13-98		X	X			X	X						
98NECRCSD802*	0631830017*	DUP	soil	9-13-98								X					
98NECRCSD802**	0631830017**	DUP	soil	9-13-98									X				
98NECRCSD202	0631830018	DUP	soil	9-13-98		X	X			X	X						

TB = Trip Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL = Dilution, RE = Reanalysis/Reextraction

SDG#: 063183 — **VALIDATION SAMPLE TABLE** — **LDC#: 3417F**

Project Name: Northeast Cape — Parameters/Analytical Method — RFQ 99-094

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)			
98NECRCSD202*	0631830018*	DUP	soil	9-13-98								X					
98NECRCSD202**	0631830018**	DUP	soil	9-13-98									X				
98NECRCSD801	0631830019	DUP	soil	9-13-98		X	X			X	X						
98NECRCSD801*	0631830019*	DUP	soil	9-13-98								X					
98NECRCSD801**	0631830019**	DUP	soil	9-13-98									X				
98NECRCSD201	0631830020	DUP	soil	9-13-98		X	X			X	X						
98NECRCSD201*	0631830020*	DUP	soil	9-13-98								X					
98NECRCSD201**	0631830020**	DUP	soil	9-13-98									X				
98NECRCSW806	0631830021		water	9-13-98		X	X		X	X	X						
98NECRCSW805	0631830022		water	9-13-98		X	X		X	X	X						
98NECRCSW804	0631830023		water	9-13-98		X	X		X	X	X						
98NECRCSW803	0631830024		water	9-13-98		X	X		X	X	X						
98NECRCSW802	0631830025	DUP	water	9-13-98		X	X		X	X	X						
98NECRCSW202	0631830026	DUP	water	9-13-98		X	X			X							
98NECRCSW801	0631830027		water	9-13-98		X	X		X	X	X						
98NECRCSW801*	0631830027*		water	9-13-98								X					
98NECRCSW801**	0631830027**		water	9-13-98									X				
98NEC16GW801RE	0631830028	DUP	water	9-13-98	X												
98NEC16GW201RE	0631830029	DUP	water	9-13-98	X												
98NEC16GW802RE	0631830030	DUP	water	9-13-98	X												
98NECTB006RE	0631830031	TB	water	9-13-98	X												
98NEC16GW801MS	0631830006MS	MS	water	9-13-98	X			X									
98NEC16GW801MSD	0631830006MSD	MSD	water	9-13-98	X			X									
98NEC19GW801MS	0631830009MS	MS	water	9-13-98						X	X						
98NEC19GW801MSD	0631830009MSD	MSD	water	9-13-98						X	X						

TB = T ank, R = Rinsate, EB nent Blank, FB = Field Blank, FD = Field Dup MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL

SDG#: 063183 | **VALIDATION SAMPLE TABLE** | **LDC#: 3417F**

Project Name: Northeast Cape | Parameters/Analytical Method | **RFQ 99-094**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)			
98NEC19GW201MS	0631830010MS	MS	water	9-13-98						X	X						
98NEC19GW201MSD	0631830010MSD	MSD	water	9-13-98						X	X						
98NECRCSW802MS	0631830025MS	MS	water	9-13-98		X	X		X	X	X						
98NECRCSW802MSD	0631830025MSD	MSD	water	9-13-98		X	X		X	X	X						

TB = Trip Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL - Dilution,
RE = Reanalysis/Reextraction

Attachment 2

SDG#: 063188 | **VALIDATION SAMPLE TABLE** | **LDC#: 3417G**

Project Name: Northeast Cape | Parameters/Analytical Method | **RFQ 99-094**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)	TOC (W/B)		
98NECDBSD801	0631880001		soil	9-12-98		X				X	X						
98NECDBSD801*	0631880001*		soil	9-12-98								X					
98NECDBSD801**	0631880001**		soil	9-12-98									X				
98NECDBSD802	0631880002		soil	9-12-98		X				X	X						
98NECDBSD802*	0631880002*		soil	9-12-98								X					
98NECDBSD802**	0631880002**		soil	9-12-98									X				
98NECDBSD803	0631880003		soil	9-12-98		X				X	X						
98NECDBSD803*	0631880003*		soil	9-12-98								X					
98NECDBSD803**	0631880003**		soil	9-12-98									X				
98NECDBSS803	0631880004		soil	9-12-98											X		
98NECDBSS804	0631880005		soil	9-12-98											X		
98NECDBSS805	0631880006		soil	9-12-98											X		
98NECDBSS806	0631880007		soil	9-12-98						X							
98NECDBSS806*	0631880007*		soil	9-12-98								X					
98NECDBSS806**	0631880007**		soil	9-12-98									X				
98NECDBSS807	0631880008		soil	9-12-98						X							
98NECDBSS807*	0631880008*		soil	9-12-98								X					
98NECDBSS807**	0631880008**		soil	9-12-98									X				
98NECDBSS808	0631880009		soil	9-12-98						X							
98NECDBSS808*	0631880009*		soil	9-12-98								X					
98NECDBSS808**	0631880009**		soil	9-12-98									X				
98NECDBSS809	0631880010		soil	9-12-98						X							
98NECDBSS809*	0631880010*		soil	9-12-98								X					
98NECDBSS809**	0631880010**		soil	9-12-98									X				

TB = T Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Dup MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL = n,
RE = alysis/Reextraction

SDG#: 063188					VALIDATION SAMPLE TABLE											LDC#: 3417G	
Project Name: Northeast Cape					Parameters/Analytical Method											RFQ 99-094	
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)	TOC (W/B)		
98NECBDSS802	0631880011		soil	9-12-98		X	X			X	X						
98NECBDSS802*	0631880011*		soil	9-12-98								X					
98NECBDSS802**	0631880011**		soil	9-12-98									X				
98NECBDSS801	0631880012		soil	9-12-98		X	X			X	X						
98NECBDSS801*	0631880012*		soil	9-12-98								X					
98NECBDSS801**	0631880012**		soil	9-12-98									X				

TB = Trip Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP - Duplicate, DL Dilution, RE = Reanalysis/Reextraction

Attachment 2

SDG#: 063189	VALIDATION SAMPLE TABLE	LDC#: 3417H
Project Name: Northeast Cape	Parameters/Analytical Method	RFQ 99-094

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)	TOC (W/B)		
98NECRCSD805	0631890001		soil	9-12-98		X	X			X							
98NECRCSD805*	0631890001*		soil	9-12-98								X					
98NECRCSD805**	0631890001**		soil	9-12-98									X				
98NECRCSD806	0631890002		soil	9-12-98		X	X			X							
98NECRCSD806*	0631890002*		soil	9-12-98								X					
98NECRCSD806**	0631890002**		soil	9-12-98									X				

TB = T Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Du[illegible], MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL [illegible]
RE = [illegible]alysis/Reextraction

Attachment 2

SDG#: 063190 | **VALIDATION SAMPLE TABLE** | **LDC#: 3417I**

Project Name: Northeast Cape | Parameters/Analytical Method | RFQ 99-094

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)	TOC (W/B)		
98NEC10GW801	0631900001	DUP	water	9-12-98						X	X						
98NEC10GW201	0631900002	DUP	water	9-12-98						X	X						
98NEC10GW802	0631900003		water	9-12-98						X	X						
98NECTB003	0631900004		water	9-12-98							X						

TB = Trip Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL = Dilution,
RE = Reanalysis/Reextraction

Attachment 2

SDG#: 063191 — **VALIDATION SAMPLE TABLE** — **LDC#: 3417J**

Project Name: Northeast Cape — Parameters/Analytical Method — **RFQ 99-094**

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)	TOC (W/B)		
98NEC02SS801	0631910001	DUP	soil	9-14-98						X	X						
98NEC02SS802	0631910002		soil	9-14-98						X	X						
98NEC02SS201	0631910003	DUP	soil	9-14-98						X							
98NEC14SS801	0631910004		soil	9-14-98			X										
98NEC14SS802	0631910005		soil	9-14-98						X	X				X		
98NEC14SS802*	0631910005*		soil	9-14-98								X					
98NEC14SS802**	0631910005**		soil	9-14-98									X				
98NEC13SS801	0631910006		soil	9-14-98			X										
98NEC13SS802	0631910007		soil	9-14-98			X										
98NEC13SS803	0631910008		soil	9-14-98			X										
98NEC00SS801	0631910009		soil	9-14-98						X	X				X		
98NEC00SS801*	0631910009*		soil	9-14-98								X					
98NEC00SS801**	0631910009**		soil	9-14-98									X				
98NEC02SS801MS	0631910001MS	MS	soil	9-14-98						X							
98NEC02SS801MSD	0631910001MSD	MSD	soil	9-14-98						X							

TB = Trip Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL = D'
RE = Reanalysis/Reextraction

Atta. .ent 2

SDG#: 063195 | **VALIDATION SAMPLE TABLE** | **LDC#: 3417K**

Project Name: Northeast Cape | Parameters/Analytical Method | RFQ 99-094

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Lead (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)	TOC (W/B)		
98NEC27SW801	0631950001		water	9-16-98		X			X	X	X						
98NECTB007	0631950002	TB	water	9-16-98					X								

TB = Trip Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL = Dilution, RE = Reanalysis/Reextraction

Attachment 2

SDG#: 063197									VALIDATION SAMPLE TABLE								LDC#: 3417L
Project Name: Northeast Cape									Parameters/Analytical Method								RFQ 99-094
Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Mn (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)	TOC (W/B)	CH_4	
98NECBKSW801	0631970001		water	9-15-98		X				X	X				X		
98NECBKSW802	0631970002		water	9-15-98		X				X	X				X		
98NEC13GW802	0631970003		water	9-15-98						X	X						
98NEC27GW801	0631970004		water	9-15-98				X	X								
98NEC00GW801	0631970005		water	9-15-98												X	
98NECBKSD801	0631970006		soil	9-15-98		X				X	X				X		
98NECBKSD801*	0631970006*		soil	9-15-98								X					
98NECBKSD801**	0631970006**		soil	9-15-98									X				
98NECBKSD802	0631970007		soil	9-15-98		X				X	X				X		
98NECBKSD802*	0631970007*		soil	9-15-98								X					
98NECBKSD802**	0631970007**		soil	9-15-98									X				
98NEC06SS801	0631970008		soil	9-15-98						X	X				X		
98NEC06SS802	0631970009		soil	9-15-98						X							
98NEC07SS802	0631970010		soil	9-15-98											X		
98NEC09SS801	0631970011		soil	9-15-98		X				X	X						
98NEC09SS802	0631970012		soil	9-15-98											X		
98NEC10SS801	0631970013		soil	9-15-98						X	X				X		
98NEC10SS801*	0631970013*		soil	9-15-98								X					
98NEC10SS801**	0631970013**		soil	9-15-98									X				

TB = Tr-- Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Dup MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP Duplicate, DL n,
RE = alysis/Reextraction

Atta ent 2

SDG#: 063336 — **VALIDATION SAMPLE TABLE** — **LDC#: 3417M**

Project Name: Northeast Cape — Parameters/Analytical Method — RFQ 99-094

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (8260B)	PAHs (SIM)	PCBs (8082)	Mn (6010)	GRO (101)	DRO RRO (102/3)	BTEX (8021B)	Aromatic DRO RRO	Aliphatic DRO RRO	Dioxins (8290)	TOC (W/B)	CH_4	
98NEC02SS801	0633360001	DUP	soil	9-14-98		X											

TB = Trip Blank, R = Rinsate, EB = Equipment Blank, FB = Field Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate, DL = Dilution, RE = Reanalysis/Reextraction

LDC #: 3417D1 **VALIDATION COMPLETENESS WORKSHEET** Date: 9/21/98

SDG #: 98-09-136 ____EPA Level III X NFESC Level C Page: 1 of 1

Laboratory: Analytica Alaska, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/13/98
II.	GC/MS Instrument performance check	N	not provided, not reviewed
III.	Initial calibration	N	
IV.	Continuing calibration	N	
V.	Blanks	SW	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS/LCSD
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	N	not provided, not reviewed
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	D=98NEC16GW201,1 (from 106063183)
XIV.	System performance	N	D=98NEC16GW801,1 ~~D=98NECTB006,2~~
XV.	Overall assessment of data	A	D=98NECTB006RE,2
XVI.	Field duplicates [illegible] 063183	~~A~~ SW	D=98NEC16GW201RE,1 D=98NEC16GW801RE,1
XVII.	Field blanks	SW	TB=2

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: all H_2O

1	98NEC16GW301	11		21	
2	98NECTB005	12		22	
3	98NEC16GW301MS	13		23	
4	98NEC16GW301MSD	14		24	
5	9/21/98-blk	15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

LDC #: 34171D1
SDG #: 98-09-136

TARGET COMPOUND WORKSHEET

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

A. Chloromethane*	P. Bromodichloromethane	EE. Ethylbenzene**	TT. 1,2-Dibromoethane	III. n-Butylbenzene
B. Bromomethane	Q. 1,2-Dichloropropane**	FF. Styrene	UU. 1,1,1,2-Tetrachloroethane	JJJ. 1,2-Dichlorobenzene
C. Vinyl chloride**	R. cis-1,3-Dichloropropene	GG. Xylene, total	VV. Isopropylbenzene	KKK. 1,2,4-Trichlorobenzene
D. Chloroethane	S. Trichloroethene	HH. Vinyl acetate	WW. Bromobenzene	LLL. Hexachlorobutadiene
E. Methylene chloride	T. Dibromochloromethane	II. 2-Chloroethylvinyl ether	XX. 1,2,3-Trichloropropane	MMM. Naphthalene
F. Acetone	U. 1,1,2-Trichloroethane	JJ. Dichlorodifluoromethane	YY. n-Propylbenzene	NNN. 1,2,3-Trichlorobenzene
G. Carbon disulfide	V. Benzene	KK. Trichlorofluoromethane	ZZ. 2-Chlorotoluene	OOO. 1,3,5-Trichlorobenzene
H. 1,1-Dichloroethene**	W. trans-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	AAA. 1,3,5-Trimethylbenzene	PPP.
I. 1,1-Dichloroethane*	X. Bromoform*	MM. 1,2-Dibromo-3-chloropropane	BBB. 4-Chlorotoluene	QQQ.
J. 1,2-Dichloroethene	Y. 4-Methyl-2-pentanone	NN. Diethyl ether	CCC. tert-Butylbenzene	RRR.
K. Chloroform**	Z. 2-Hexanone	OO. 2,2-Dichloropropane	DDD. 1,2,4-Trimethylbenzene	SSS.
L. 1,2-Dichloroethane	AA. Tetrachloroethene	PP. Bromochloromethane	EEE. sec-Butylbenzene	TTT.
M. 2-Butanone	BB. 1,1,2,2-Tetrachloroethane*	QQ. 1,1-Dichloropropene	FFF. 1,3-Dichlorobenzene	UUU.
N. 1,1,1-Trichloroethane	CC. Toluene**	RR. Dibromomethane	GGG. p-Isopropyltoluene	VVV.
O. Carbon tetrachloride	DD. Chlorobenzene*	SS. 1,3-Dichloropropane	HHH. 1,4-Dichlorobenzene	WWW.

= System performance check compounds (SPCC) for RF ; ** = Calibration check compounds (CCC) for %RSD.

Notes:

LDC #: 3417D1
SDG #: 98-09-136

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Blanks

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 9/21/98
Conc. units: ug/L
Associated Samples: All (1-2)

Compound	Blank ID	Sample Identification								
	9/21/98 blk	1	2							
Methylene chloride	2.3	4.7	5.9							
Acetone										
CRQL		10U	10U							
TICs:										
Hexamethyl-cyclotrisiloxane										
Octamethyl-cyclotetrasiloxane										

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 34 D1
SDG #: 98-09-136

Reviewer: JR
2nd Reviewer: Q

VALIDATION FIN IGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

METHOD : GC/MS VOA (EPA SW 846 Method 8240/8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A   Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.
Y N N/A   Was a MS/MSD analyzed every 20 samples of each matrix?
Y N N/A   Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? lab limits (RPD ≤ 2x)

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		314	II	0.00 (60-140)	0.00 (60-140)	(20)	all	J dets & R ND / A
			Z	75.0 (80-120)	( )	42.1 (~~≤ 28~~)		J / A
			Y	( )	( )	27.0 (↓)		↓
			~~JJ~~	( )	( )	~~24.0 (≤ 20)~~		~~J / A~~
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	≤ 22%	61-145%	≤ 14%
S.	Trichloroethene	62-137%	≤ 24%	71-120%	≤ 14%
V.	Benzene	66-142%	≤ 21%	76-127%	≤ 11%
CC.	Toluene	59-139%	≤ 21%	76-125%	≤ 13%
DD.	Chlorobenzene	60-133%	≤ 21%	75-130%	≤ 13%

MSD.IS

LDC #: 3417D1
SDG #: 98-09-136

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

lab limits (RPD ≤ 25)

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		9/21/98-LCS/LCSD	JJ	35.0 (60-140)	( )	24.0 (≤ 20)	All Blank	J / A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene				
S.	Trichloroethene				
V.	Benzene				
CC.	Toluene				
DD.	Chlorobenzene				

LDC #: 3415w1
SDG #: 9809-136

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		all	1-chlorohexane not analyzed as required by QAPP		none/P
2		all	lab RL > QAPP RL		none/P
			lab RL (ug/L)	QAPP (ug/L)	
		Dichlorodifluoromethane	5.0	1.0	
		Chloromethane	5.0	1.0	
		Bromomethane	5.0	1.0	
		Chloroethane	5.0	1.0	
		Methylene Chloride	10	5.0	
			All analytes except those listed above and the following analytes - lab RL = 2.0 ug/L and QAPP RL = 1.0 ug/L: Trichlorofluoromethane, Trichlorotrifluoroethane, 1,2-Dibromo-3-chloropropane, Acetone, Acrylonitrile, 2-Butanone, Carbon Disulfide, 2-Hexanone, Iodomethane, 4-methyl-2-pentanone, Vinyl Acetate, tert-Butyl methyl ether, trans-1,4-Dichloro-2-butene, 2-Chloroethyl vinyl ether		

Comments: See sample calculation verification worksheet for recalculations

QA/QC REPORT

METHOD BLANK SUMMARY

CLIENT: USACE_AK

10/27/98

PAGE: 3

ORDER#: [illegible]

SAMPLE ID	ANALYTE	UNITS	ANAL DATE	RESULT	LIMIT	SPIKE	%REC FLAG	QC SPECS LOW	QC SPECS UPPER
[illegible]	Volatiles by GC MS	ug/L	09/21/98						
	Dichlorodifluoromethane			ND	* 5.0 <1				
	Chloromethane			ND	* 5.0 <1				
	Vinyl Chloride			ND	[illegible] <1				
	Bromomethane			ND	* 5.0 <1				
	Chloroethane			ND	* 5.0 <1				
	Trichlorofluoromethane			ND	2.0				
	1,1-Dichloroethene			ND	2.0 <1				
	Trichlorotrifluoroethane			ND	2.0				
	Methylene Chloride			[illegible]	* [illegible] * <5				
	trans-1,2-Dichloroethene			ND	2.0 <1				
	1,1-Dichloroethane			ND	2.0 <1				
	2,2-Dichloropropane			ND	2.0 <1				
	cis-1,2-Dichloroethene			ND	2.0 <1				
	Bromochloromethane			ND	2.0 <1				
	Chloroform			ND	2.0 <1				
	1,1,1-Trichloroethane			ND	2.0 <1				
	Carbon Tetrachloride			ND	2.0 <1				
	1,1-Dichloropropene			ND	2.0 <1				
	Benzene			ND	2.0 <1				
	1,2-Dichloroethane			ND	2.0 <1				
	Trichloroethene			ND	2.0 <1				
	1,2-Dichloropropane			ND	2.0 <1				
	Dibromomethane			ND	2.0 <1				
	Bromodichloromethane			ND	2.0 <1				
	cis-1,3-Dichloropropene			ND	2.0 <1				
	Toluene			ND	2.0 <1				
	trans-1,3-Dichloropropene			ND	2.0 <1				
	1,1,2-Trichloroethane			ND	2.0 <1				
	Tetrachloroethene			ND	2.0 <1				
	1,3-Dichloropropane			ND	2.0 <1				
	Dibromochloromethane			ND	2.0 <1				
	1,2-Dibromoethane			ND	2.0 <1				
	Chlorobenzene			ND	2.0 <1				
	Ethylbenzene			ND	2.0 <1				
	1,1,1,2-Tetrachloroethane			ND	2.0 <1				
	m,p-Xylenes			ND	2.0 <1				
	o-Xylene			ND	2.0 <1				
	Styrene			ND	2.0 <1				
	Bromoform			ND	2.0 <1				
	Isopropylbenzene			ND	2.0 <1				
	Bromobenzene			ND	2.0 <1				
	n-Propylbenzene			ND	2.0 <1				
	1,1,2,2-Tetrachloroethane			ND	2.0 <1				
	1,2,3-Trichloropropane			ND	2.0 <1				
	2-Chlorotoluene			ND	2.0 <1				
	1,3,5-Trimethylbenzene			ND	2.0 <1				
	4-Chlorotoluene			ND	2.0 <1				

= Limit OK

QA/QC REPORT

METHOD BLANK SUMMARY

PAGE: 4

CLIENT: USACE_AK

10/27/98

ORDER#: 9809136

SAMPLE ID	ANALYTE	UNITS	ANAL DATE	RESULT	LIMIT	SPIKE	REC FLAG	QC SPECS LOW	QC SPECS UPPER
MB0921_86F1	Volatiles by GC/MS	ug/L	09/21/98						
	tert-Butylbenzene			ND	2.0 <1				
	1,2,4-Trimethylbenzene			ND	2.0 <1				
	sec-Butylbenzene			ND	2.0 <1				
	4-Isopropyltoluene			ND	2.0 <1				
	1,3-Dichlorobenzene			ND	2.0 <1				
	1,4-Dichlorobenzene			ND	2.0 <1				
	n-Butylbenzene			ND	2.0 <1				
	1,2-Dichlorobenzene			ND	2.0 <1				
	1,2-Dibromo-3-chloropropan			ND	10				
	1,2,4-Trichlorobenzene			ND	2.0 <1				
	Hexachlorobutadiene			ND	2.0 <1				
	Napthalene			ND	2.0 <1				
	1,2,3-Trichlorobenzene			ND	2.0 <1				
	Acetone			ND	50				
	Acrylonitrile			ND	10				
	2-Butanone			ND	50				
	Carbon Disulfide			ND	2.0				
	trans-1,4-Dichloro-2-buten			ND	10				
	2-Chloroethyl Vinyl Ether			ND	10				
	2-Hexanone			ND	20				
	Iodomethane			ND	2.0				
	4-Methyl-2-pentanone			ND	20				
	Vinyl Acetate			ND	5.0				
	tert-Butyl methyl ether			ND	2.0				
	Dibromofluoromethane			47		50	94.0	80	120
	Toluene d-8			50		50	100	88	110
	p-Bromofluorobenzene			49		50	98.0	86	115

1-chlorohexane

LDC #: 71101
SDG #: 98-09-B6

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Sample: 2 Field Blank / Trip Blank / Rinsate / Other ____ (circle one)

Compound	Concentration Units (ug/L)
Methylene chloride	5.9

Sample: ____ Field Blank / Trip Blank / Rinsate / Other ____ (circle one)

Compound	Concentration Units ( )

Sample: ____ Field Blank / Trip Blank / Rinsate / Other ____ (circle one)

Compound	Concentration Units ( )

LDC #: 3417F1 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/21/98

SDG #: 063183 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: DE

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9/13/98
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD, $r^2 \geq 0.990$
IV.	Continuing calibration	A	
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	SW	
XIII.	Tentatively identified compounds (TICs)	N	~~D=5, 98NEC16GW301 (from SDG 98-09-136)~~ D=6, 98NEC16GW301
XIV.	System performance	N	D=2, 98NEC16GW301 (from SDG 98-09-130) D=1, 98NEC16GW301
XV.	Overall assessment of data	A	~~D=1,2~~ D=8 98NECTB005
XVI.	Field duplicates	~~[illegible]~~ SW	D= 4, ~~98NECTB005 (from SDG 98-09-136)~~ D=1,2 D=5,6
XVII.	Field blanks	SW	TB=4,8* *ND D=1,6 ~~D~~=2,5

Note: A = Acceptable ND = No compounds detected D = Duplicate
N = Not provided/applicable R = Rinsate TB = Trip blank
SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples: all H2O

1	98NEC16GW801	1	11	9/26/98-Blk	1	21	
2	98NEC16GW201	1	12	10/1/98-Blk	2	22	
3	98NEC16GW802	1	13	98NEC16GW801REMS	2	23	
4	98NECTB006	1	14	98NEC16GW801REMSD	2	24	
5	98NEC16GW801RE	2	15			25	
6	98NEC16GW201RE	2	16			26	
7	98NEC16GW802RE	2	17			27	
8	98NECTB006RE	2	18			28	
9	98NEC16GW801MS	1	19			29	
10	98NEC16GW801MSD	1	20			30	

LDC #: [illegible]
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD : GC MS VOA (EPA SW 846 Method 8240/8260)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	~~Analysis date~~	Total # of Days	~~Qualifier~~ J/A
5	H_2O	Y	9/13/98	NA	10/1/98	18	~~[illegible]~~
6							
7							
8							
13							
14							

TECHNICAL HOLDING TIME CRITERIA

Water unpreserved:	Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved:	Both within 14 days of sample collection.
Soil:	Both within 14 days of sample collection.

LDC #: 3417F1
SDG #: 0621183

TARGET COMPOUND WORKSHEET

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

A. Chloromethane*	P. Bromodichloromethane	EE. Ethylbenzene**	TT. 1,2-Dibromoethane	III. n-Butylbenzene
B. Bromomethane	Q. 1,2-Dichloropropane**	FF. Styrene	UU. 1,1,1,2-Tetrachloroethane	JJJ. 1,2-Dichlorobenzene
C. Vinyl choride**	R. cis-1,3-Dichloropropene	GG. Xylene, total	VV. Isopropylbenzene	KKK. 1,2,4-Trichlorobenzene
D. Chloroethane	S. Trichloroethene	HH. Vinyl acetate	WW. Bromobenzene	LLL. Hexachlorobutadiene
E. Methylene chloride	T. Dibromochloromethane	II. 2-Chloroethylvinyl ether	XX. 1,2,3-Trichloropropane	MMM. Naphthalene
F. Acetone	U. 1,1,2-Trichloroethane	JJ. Dichlorodifluoromethane	YY. n-Propylbenzene	NNN. 1,2,3-Trichlorobenzene
G. Carbon disulfide	V. Benzene	KK. Trichlorofluoromethane	ZZ. 2-Chlorotoluene	OOO. 1,3,5-Trichlorobenzene
H. 1,1-Dichloroethene**	W. trans-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	AAA. 1,3,5-Trimethylbenzene	PPP.
I. 1,1-Dichloroethane*	X. Bromoform*	MM. 1,2-Dibromo-3-chloropropane	BBB. 4-Chlorotoluene	QQQ.
J. 1,2-Dichloroethene	Y. 4-Methyl-2-pentanone	NN. Diethyl ether	CCC. tert-Butylbenzene	RRR.
K. Chloroform**	Z. 2-Hexanone	OO. 2,2-Dichloropropane	DDD. 1,2,4-Trimethylbenzene	SSS.
L. 1,2-Dichloroethane	AA. Tetrachloroethene	PP. Bromochloromethane	EEE. sec-Butylbenzene	TTT.
M. 2-Butanone	BB. 1,1,2,2-Tetrachloroethane*	QQ. 1,1-Dichloropropene	FFF. 1,3-Dichlorobenzene	UUU.
N. 1,1,1-Trichloroethane	CC. Toluene**	RR. Dibromomethane	GGG. p-Isopropyltoluene	VVV.
O. Carbon tetrachloride	DD. Chlorobenzene*	SS. 1,3-Dichloropropane	HHH. 1,4-Dichlorobenzene	WWW.

= System performance check compounds (SPCC) for RF ; ** = Calibration check compounds (CCC) for %RSD.

Notes:

LDC #: 3417F1
SDG #: 0631B3

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JR
2nd Reviewer: Q

METHOD : GC/MS VOA (EPA SW 846 Method 8240/8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

(Y) N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y (N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		9/10	H	103 (72-102)	104 (72-102)	( )	~~ALL~~ 1-4	J dets/A
2		9/10	all except * (below)	full list of analytes not spiked as req'd by QAPP (only cmpds listed below as spiked *)			1-4	none/P
3		13/14	II	analytes not spiked as req'd by QAPP			5-8	none/P
4		13/14	G	( )	365 (70-130)	65 (≤20)	5-8	J/A
			F	( )	( )	38 (≤20)		↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene *	59-172%	≤ 22%	61-145%	≤ 14%
S.	Trichloroethene *	62-137%	≤ 24%	71-120%	≤ 14%
V.	Benzene *	66-142%	≤ 21%	76-127%	≤ 11%
CC.	Toluene *	59-139%	≤ 21%	76-125%	≤ 13%
DD.	Chlorobenzene *	60-133%	≤ 21%	75-130%	≤ 13%

LDC #: 34511
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and CRQLs

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?
Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		all	lab RL > QAPP RL		none / P
			lab RL (ug/L)	QAPP RL (ug/L)	
		Bromoethane	2.0	1.0	
		Chloroethane	2.0	1.0	
		Chloromethane	2.0	1.0	
		Dichlorodifluoromethane	2.0	1.0	
		Vinyl Chloride	2.0	1.0	

Comments: See sample calculation verification worksheet for recalculations

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

(Y) N N/A Were field duplicate pairs identified in this SDG?

(Y) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/L)		Difference	Disagreement /Major Disagreement (D MD)
	4	98NECT8005		
	Dilution 1.0 Prep Date 9/26/98 Analysis date 9/27/98	Dilution 1.0 Prep Date NA Analysis date 9/21/98		
Naphthalene	1.3 (1.0U)	2.0U	NC	
Methylene Chloride	1.0U	5.9 (~~2.00~~)(10U)	6	MD
Number of TICs: ∅	Sum of Concentration: ∅	Sum of Concentration: ∅		

Compound	Concentration (Detection limit) (units ug/L)		Difference	Disagreement /Major Disagreement (D / MD)
	8(RE)	98NECT8005		
	Dilution 1.0 Prep Date 10/1/98 Analysis date 10/1/98	Dilution 1.0 Prep Date NA Analysis date 9/21/98		
~~Naphthalene~~				
Methylene Chloride	1.0U	5.9 (~~2.00~~ 10U)	6	MD
Number of TICs: ∅	Sum of Concentration: ∅	Sum of Concentration: ∅		

Compound	Concentration (Detection limit) (units ug/L)		Difference	Disagreement /Major Disagreement (D / MD)
	1	2		
	Dilution 1.0 Prep Date 9/26/98 Analysis date 9/27/98	Dilution 1.0 Prep Date 9/26/98 Analysis date 9/27/98		
Naphthalene	4.2 (1.0U)	2.8 (1.0U)	2	
1,2,4-Trimethylbenzene	1.1 (1.0U)	1.0 U	1.1	
Number of TICs:	Sum of Concentration:	Sum of Concentration:		

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/L)		Difference	Disagreement /Major Disagreement (D / MD)
	5 (KE)	6 (KE)		
	Dilution 1.0 Prep Date 10/1/98 Analysis date 10/1/98	Dilution 1.0 Prep Date 10/1/98 Analysis date 10/1/98		
Naphthalene	2.6 (1.0U)	4.2 (1.0U)	2	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ug/L)		Difference	Disagreement /Major Disagreement (D / MD)
	1 A	6 (KE)		
	Dilution 1.0 Prep Date 9/24/98 Analysis date 9/27/98	Dilution 1.0 Prep Date 10/1/98 Analysis date 10/1/98		
Naphthalene	4.2 (1.0U)	4.3 (1.0U)	1	
1,2,4-Trimethylbenzene	1.1 (1.0U)	1.0U	1.1	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ug/L)		Difference	Disagreement /Major Disagreement (D / MD)
	2	5 (KE)		
	Dilution 1.0 Prep Date 9/24/98 Analysis date 9/27/98	Dilution 1.0 Prep Date 10/1/98 Analysis date 10/1/98		
Naphthalene	2.8 (1.0U)	2.6 (1.0U)		
—		—		
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/L) 1 — Dilution 1.0, Prep Date 9/26/98, Analysis date 9/27/98	98NEC166W301 — Dilution 1.0, Prep Date 9/21/98, Analysis date 9/21/98	(from 306 98-09-136) Difference	Disagreement /Major Disagreement (D / MD)
Methylene Chloride (MeCl2)	1.0U	4.7 (~~1.0U~~ 10U)	~~4.7~~ 5	D
1,2,4-Trimethylbenzene (1,2,4-TMB)	1.1 (1.0U)	1.4 (2.0U)	1	
4-Isopropyltoluene (4-IPT)	1.0U	0.92	1	
Naphthalene (Naph)	4.2 (1.0U)	4.9	1	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ug/L) 2 — Dilution 1.0, Prep Date 9/26/98, Analysis date 9/27/98	98NEC166W301 — Dilution 1.0, Prep Date 9/21/98, Analysis date 9/21/98	(from 306 98-09-136) Difference	Disagreement /Major Disagreement (D / MD)
MeCl2	1.0U	4.7 (~~1.0U~~ 10U)	5	D
1,2,4-TMB	1.0U	1.4 (2.0U)	1	
4-IPT	1.0U	0.92	1	
Naph	2.8 (1.0U)	4.9	2	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ug/L) 5 (RE) — Dilution 1.0, Prep Date 10/1/98, Analysis date 10/1/98	98NEC166W301 — Dilution 1.0, Prep Date 9/21/98, Analysis date 9/21/98	(from 306 98-09-136) Difference	Disagreement /Major Disagreement (D / MD)
MeCl2	1.0U	4.7 (~~1.0U~~ 10U)	5	D
1,2,4-TMB	1.0U	1.4 (2.0U)	1	
4-IPT	1.0U	0.92	1	
Naph	2.6 (1.0U)	4.9	2	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

LDC #: 3417F1
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/L)		Difference	Disagreement /Major Disagreement (D / MD)
	6 (RE)	98NEC1UGW301	(from SDG 98-09-136)	
	Dilution 1.0 Prep Date 10/1/98 Analysis date 10/1/98	Dilution 1.0 Prep Date 9/21/98 Analysis date 9/21/98		
Methylene Chloride	1.0U	4.7 (~~1.00~~ 1.0U)	5	D
1,2,4-Trimethylbenzene	1.0U	1.4	(2.0U) 1	
4-Isopropyltoluene	1.0U	0.92	1	
Naphthalene	4.3 (1.0U)	4.9	1	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ____)		Difference	Disagreement /Major Disagreement (D / MD)
	Dilution Prep Date Analysis date	Dilution Prep Date Analysis date		
Number of TICs:	Sum of Concentration:	Sum of Concentration:		

Compound	Concentration (Detection limit) (units ____)		Difference	Disagreement /Major Disagreement (D / MD)
	Dilution Prep Date Analysis date	Dilution Prep Date Analysis date		
Number of TICs:	Sum of Concentration:	Sum of Concentration:		

LDC #: 24151
SDG #: 063193

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8240/8260)

Y N N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

Sample: 4 Field Blank / Trip Blank / Rinsate / Other ______ (circle one)

Compound	Concentration Units (ug/L)
Naphthalene	1.3

Sample: ______ Field Blank / Trip Blank / Rinsate / Other ______ (circle one)

Compound	Concentration Units ( )

Sample: ______ Field Blank / Trip Blank / Rinsate / Other ______ (circle one)

Compound	Concentration Units ( )

LDC #: 3417D2 **VALIDATION COMPLETENESS WORKSHEET** Date: 9 10/21/98

SDG #: 98-09-136 ____EPA Level III X NFESC Level C Page: 1 of 1

Laboratory: Analytica Alaska, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/13/98
II.	GC/MS Instrument performance check	N	not provided, not reviewed
III.	Initial calibration	N	↓
IV.	Continuing calibration	N	↓
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples 'SW'	~~SW~~ A	LCS/LCSD
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	N	not provided, not reviewed
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	D = ~~8~~ 3, 98NECRCSW202 (from SDG 063183)
XIV.	System performance	N	D = 3, 98NECRCSW202
XV.	Overall assessment of data	A	D = 2, 98NECRCSD802 D = 2, 98NECRCSD202
XVI.	Field duplicates to SDG 063183	~~A~~ SW	D = 1, 98NECRCSD801
XVII.	Field blanks	N	D = 1, 98NECRCSD201

Note:
A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NECRC301 soil ~~2X~~ 1X, 2X ~~4X~~	11		21	
2	98NECRC302 ↓ ↓	12		22	
3	98NECRCSW302 H2O	13		23	
4	98NECRC302MS soil ~~2X 4X~~ 1X, 2X	14		24	
5	98NECRC302MSD ↓ ↓	15		25	
6	9/17/98-blk H2O	16		26	
7	9/18/98-blk soil	17		27	
8		18		28	
9		19		29	
10		20		30	

LDC #: 34172
SDG #: 98-09-136

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 9/17/98 **Blank analysis date:** 10/6/98
Conc. units: µg/L Associated Samples: all H2O (3)

Compound	Blank ID	Associated Samples				Sample Identification				
[illegible]	9/17/98AL									
Di-n-butylphthalate										
Butylbenzylphthalate										
Bis(2-ethylhexyl)phthalate										
Di-n-octylphthalate										
naphthalene	0.023	no detects								
CRQL										
TICs:										
4-Hydroxy-4-methyl-2-pentanone										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

VALIDATION FIN GS WORKSHEET
Surrogate Recovery

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were percent recoveries (%R) for surrogates within QC limits stated below? lab limits
Y N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
1		9/18/98-Blk	Anthracene d10	121 (43-116)	~~J det/UJ ND~~ no qual
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
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				( )	
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				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory

	QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116
S3 (TPH) = Terphenyl-d14	18-137	33-141
S4 (PHL) = Phenol-d5	24-113	10-94
S5 (2FP) = 2-Fluorophenol	25-121	21-100
S6 (TBP) = 2,4,6-Tribromophenol	19-122	10-123
S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S8 (DCB) = 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 34172
SDG #: 98 09-136

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A — Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water ~~[illegible]~~ (insufficient sample)

Y N N/A — Was a MS/MSD analyzed every 20 samples of each matrix? [illegible]

Y N N/A — Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? lab limits

#	Date	MS/MSD ID	Compound (see recws)	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		415	LLL	49.1 (50-125)	45.5 (50-125)	( )	all soil	no qual (all
			UU	39.5 (54-140)	37.8 (54-140)	( )		
			VV	40.0 (59-131)	36.7 (59-131)	( )		
			YY	38.2 (51-140)	36.7 (51-140)	( )		
			GGG	( )	( )	46.8 (≤40)		J/A
			HHH	( )	( )	47.7 ( )		
			KKK	( )	47.3 (50-129)	( )		no qual
				( )	( )	( )		
~~2~~		~~no H2O MS/MSD~~	~~all~~	( )	( )	( )	~~all H2O~~	~~none [illegible]~~
				( )	( )	( )		none
2		no ~~H2O~~ MS/MSD	all	( )	( )	( )	all H2O	~~no qual~~
		in batch		( )	( )	( )		(insufficient
		(not field QC)		( )	( )	( )		sample)
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	G.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
B.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	H.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
C.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	I.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
D.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	J.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
E.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	K.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
F.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 341.02
SDG #: 98-09-136

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required? (Y)
Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? (N) lab limits

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		9/17/98-LCS/LCSD	S	33.5 (45-136)	35.5 (45-136)	( )	All H2O + blk	J/A
			DD	44.0 (48-133)	32.0 (48-133)	~~31.6~~ ( )		
			GG	42.0 (48-121)	( )	~~25.3~~ ( )		
			NN	46.0 (58-133)	( )	54.0 (≤40)		
			UU	34.0 (54-140)	38.0 (54-140)	~~26.1~~ ( )		
			VV	34.0 (59-131)	26.0 (59-131)	( )		
			YY	38.0 (51-140)	40.0 (51-140)	( )		
			CCC	54.0 (58-118)	54.0 (58-118)	( )		
			DDD	50.0 (55-139)	~~54.0 (5%)~~	( )		
			HHH	54.0 (60-160)	560 (60-160)	165 (≤40)		J/A
			ZZ	( )	34.0 (46-135)	~~38.1~~ ( )		
			GGG	( )	480 (41-133)	166 (≤40)		
			JJJ	( )	170 (48-125)	106 ( )		
			KKK	( )	280 (50-129)	139 ( )		
			LLL	( )	168 (50-125)	105 ( )		
			III	( )	( )	90.1 ( )		J/A
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol				
B.	2-Chlorophenol				
C.	1,4-Dichlorobenzene				
D.	N-Nitroso-di-n-propylamine				
E.	1,2,4-Trichlorobenzene				
F.	4-Chloro-3-methylphenol				
G.	Acenaphthene				
H.	4-Nitrophenol				
I.	2,4-Dinitrotoluene				
J.	Pentachlorophenol				
K.	Pyrene				

LDC #: 34117D2
SDG #: 98-09-136

VALIDATION FINDINGS WORKSHEET

Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

A. Phenol	N. 2-Nitrophenol	AA. 2-Chloronaphthalene	NN. Fluorene	AAA. Butylbenzylphthalate
B. Bis (2-chloroethyl) ether	O. 2,4-Dimethylphenol	BB. 2-Nitroaniline	OO. 4-Nitroaniline	BBB. 3,3'-Dichlorobenzidine
C. 2-Chlorophenol	P. Bis(2-chloroethoxy)methane	CC. Dimethylphthalate	PP. 4,6-Dinitro-2-methylphenol	CCC. Benzo(a)anthracene
D. 1,3-Dichlorobenzene	Q. 2,4-Dichlorophenol	DD. Acenaphthylene	QQ. N-Nitrosodiphenylamine (1)	DDD. Chrysene
E. 1,4-Dichlorobenzene	R. 1,2,4-Trichlorobenzene	EE. 2,6-Dinitrotoluene	RR. 4-Bromophenyl-phenylether	EEE. Bis(2-ethylhexyl)phthalate
F. 1,2-Dichlorobenzene	S. Naphthalene	FF. 3-Nitroaniline	SS. Hexachlorobenzene	FFF. Di-n-octylphthalate
G. 2-Methylphenol	T. 4-Chloroaniline	GG. Acenaphthene	TT. Pentachlorophenol	GGG. Benzo(b)fluoranthene
H. 2,2'-Oxybis(1-chloropropane)	U. Hexachlorobutadiene	HH. 2,4-Dinitrophenol	UU. Phenanthrene	HHH. Benzo(k)fluoranthene
I. 4-Methylphenol	V. 4-Chloro-3-methylphenol	II. 4-Nitrophenol	VV. Anthracene	III. Benzo(a)pyrene
J. N-Nitroso-di-n-propylamine	W. 2-Methylnaphthalene	JJ. Dibenzofuran	WW. Carbazole	JJJ. Indeno(1,2,3-cd)pyrene
K. Hexachloroethane	X. Hexachlorocyclopentadiene	KK. 2,4-Dinitrotoluene	XX. Di-n-butylphthalate	KKK. Dibenz(a,h)anthracene
L. Nitrobenzene	Y. 2,4,6-Trichlorophenol	LL. Diethylphthalate	YY. Fluoranthene	LLL. Benzo(g,h,i)perylene
M. Isophorone	Z. 2,4,5-Trichlorophenol	MM. 4-Chlorophenyl-phenyl ether	ZZ. Pyrene	

Notes:

LDC #: 3417E2 **VALIDATION COMPLETENESS WORKSHEET** Date: 12\18\98
SDG #: 063161 ____EPA Level III __NFESC Level C Page: 1 of 1
Laboratory: Quanterra Environmental Services Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9\11-12\98
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD, $r^2 \geq 0.990$
IV.	Continuing calibration	N	all ICAL
V.	Blanks	A	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates SW	~~A~~	~~client specific~~
VIII.	Laboratory control samples	A	LCS\LCSD
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs ok (0.05ug/L)	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: all H_2O

1	98NEC03GW801 16X	11		21	
2	98NEC04GW801	12		22	
3	98NEC00GW801	13		23	
4	98NEC07GW801	14		24	
5	98NEC09GW801	15		25	
6	98NEC09GW802	16		26	
7	98NEC09GW803	17		27	
8	9\18\98-Blk	18		28	
9		19		29	
10		20		30	

LDC #: 3417E2
SDG #: 063161

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: DP
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits stated below? lab limits
(Y) N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
(Y) N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
1		1 (10x)	chrysene-d12	0.0 (10-131)	no qual (dil)
			fluorene-d10	0.0 (17-110)	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory

	QC Limits (Soil)	QC Limits (Water)
S1 (NBZ) = Nitrobenzene-d5	23-120	35-114
S2 (FBP) = 2-Fluorobiphenyl	30-115	43-116
S3 (TPH) = Terphenyl-d14	18-137	33-141
S4 (PHL) Phenol-d5	24-113	10-94
S5 (2FP) 2-Fluorophenol	25-121	21-100
S6 (TBP) 2,4,6-Tribromophenol	19-122	10-123
S7 (2CP) = 2-Chlorophenol-d4	20-130*	33-110*
S8 (DCB) 1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 3411-2
SDG #: 063161

Reviewer: DR
2nd Reviewer:

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		no MS/MSD in this batch	all	( )	( )	( )	all	none / P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	G.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
B.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	H.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
C.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	I.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
D.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	J.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
E.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	K.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
F.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 3417F2 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/18/98

SDG #: 063183 ____EPA Level III ____NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/13/98
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	RSD, r² ≥ 0.990
IV.	Continuing calibration	SW	
V.	Blanks	SW	
VI.	Surrogate spikes	SW	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	SW	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	D=12, 98NECRCSW302* (from SDG 98-09-136) D=11, 98NECRCSW302*
XIV.	System performance	N	D=3, 98NECRC302 D=4, 98NECRC302
XV.	Overall assessment of data	A	D=5, 98NECRC301 D=6, 98NECRC901
XVI.	Field duplicates	SW	D=11,12* D=3,4* D=5,6 * ND
XVII.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NECRCSD804 Soil 20X	11	98NECRCSW802 H2O	21	
2	98NECRCSD803	12	98NECRCSW202	22	
3	98NECRCSD802	13	98NECRCSW801	23	
4	98NECRCSD202	14	98NECRCSW802MS	24	
5	98NECRCSD801	15	98NECRCSW802MSD	25	
6	98NECRCSD201	16	9/27/98-Blk Soil	26	
7	98NECRCSW806 H2O	17	9/18/98-Blk H2O	27	
8	98NECRCSW805	18	98NECRCSD802MS Soil	28	
9	98NECRCSW804	19	98NECRCSD802MSD	29	
10	98NECRCSW803	20		30	

LDC #: 34' 2
SDG #: Olo. 83

VALIDATION FI NGS WORKSHEET
Initial ibration

Reviewer:
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Did the laboratory conduct an acceptable 5 point calibration prior to sample analysis?

Y (N) N/A Were all relative standard deviations (%RSD) ≤30.0% and Relative Response Factors (RRF) ≥0.05?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
1	10/24/98	1024BE04	~~2~~ W	45.670		1	J/A
		5					
		6					
		7					
		8					
		9					

A. Phenol**
B. Bis(2-chloroethyl) ether
C. 2-Chlorophenol
D. 1,3-Dichlorobenzene
E. 1,4-Dichlorobenzene**
F. 1,2-Dichlorobenzene
G. 2-Methylphenol
H. 2,2'-Oxybis(1-chloropropane)
I. 4-Methylphenol
J. N-Nitroso-di-n-propylamine*
K. Hexachloroethane
L. Nitrobenzene
M. Isophorone
N. 2-Nitrophenol**
O. 2,4-Dimethylphenol
P. Bis(2-chloroethoxy)methane
Q. 2,4-Dichlorophenol**
R. 1,2,4-Trichlorobenzene
S. Naphthalene
T. 4-Chloroaniline
U. Hexachlorobutadiene**
V. 4-Chloro-3-methylphenol**
W. 2-Methylnaphthalene
X. Hexachlorocyclopentadiene*
Y. 2,4,6-Trichlorophenol**
Z. 2,4,5-Trichlorophenol
AA. 2-Chloronaphthalene
BB. 2-Nitroaniline
CC. Dimethylphthalate
DD. Acenaphthylene
EE. 2,6-Dinitrotoluene
FF. 3-Nitroaniline
GG. Acenaphthene**
HH. 2,4-Dinitrophenol*
II. 4-Nitrophenol*
JJ. Dibenzofuran
KK. 2,4-Dinitrotoluene
LL. Diethylphthalate
MM. 4-Chlorophenyl-phenyl ether
NN. Fluorene
OO. 4-Nitroaniline
PP. 4,6-Dinitro-2-methylphenol
QQ. N-Nitrosodiphenylamine (1)**
RR. 4-Bromophenyl-phenylether
SS. Hexachlorobenzene
TT. Pentachlorophenol**
UU. Phenanthrene
VV. Anthracene
WW. Carbazole
XX. Di-n-butylphthalate
YY. Fluoranthene**
ZZ. Pyrene
AAA. Butylbenzylphthalate
BBB. 3,3'-Dichlorobenzidine
CCC. Benzo(a)anthracene
DDD. Chrysene
EEE. Bis(2-ethylhexyl)phthalate
FFF. Di-n-octylphthalate**
GGG. Benzo(b)fluoranthene
HHH. Benzo(k)fluoranthene
III. Benzo(a)pyrene**
JJJ. Indeno(1,2,3-cd)pyrene
KKK. Dibenz(a,h)anthracene
LLL. Benzo(g,h,i)perylene
MMM. ________

* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

LDC #: 3417F2
SDG #: 963183
METHOD: GC/MS BNA (EPA SW 846 Method 8270)

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument? (Y)

Y N N/A Were all percent differences (%D) ≤25.0% and Relative Response Factors ≥0.05? (N)

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
1	10/25/98	10258E02	W	25.7		1	J/A
~~2~~	~~10/22/98~~	~~10228E04~~	~~W~~	~~47.3~~		~~2-6~~	~~J/A~~
						9/27/98 B14	

A. Phenol**
B. Bis(2-chloroethyl) ether
C. 2-Chlorophenol
D. 1,3-Dichlorobenzene
E. 1,4-Dichlorobenzene**
F. 1,2-Dichlorobenzene
G. 2-Methylphenol
H. 2,2'-Oxybis(1-chloropropane)
I. 4-Methylphenol
J. N-Nitroso-di-n-propylamine*
K. Hexachloroethane
L. Nitrobenzene
M. Isophorone
N. 2-Nitrophenol**
O. 2,4-Dimethylphenol
P. Bis(2-chloroethoxy)methane
Q. 2,4-Dichlorophenol**
R. 1,2,4-Trichlorobenzene
S. Naphthalene
T. 4-Chloroaniline
U. Hexachlorobutadiene**
V. 4-Chloro-3-methylphenol**
W. 2-Methylnaphthalene
X. Hexachlorocyclopentadiene*
Y. 2,4,6-Trichlorophenol**
Z. 2,4,5-Trichlorophenol
AA. 2-Chloronaphthalene
BB. 2-Nitroaniline
CC. Dimethylphthalate
DD. Acenaphthylene
EE. 2,6-Dinitrotoluene
FF. 3-Nitroaniline
GG. Acenaphthene**
HH. 2,4-Dinitrophenol*
II. 4-Nitrophenol*
JJ. Dibenzofuran
KK. 2,4-Dinitrotoluene
LL. Diethylphthalate
MM. 4-Chlorophenyl-phenyl ether
NN. Fluorene
OO. 4-Nitroaniline
PP. 4,6-Dinitro-2-methylphenol
QQ. N-Nitrosodiphenylamine (1)**
RR. 4-Bromophenyl-phenylether
SS. Hexachlorobenzene
TT. Pentachlorophenol**
UU. Phenanthrene
VV. Anthracene
WW. Carbazole
XX. Di-n-butylphthalate
YY. Fluoranthene**
ZZ. Pyrene
AAA. Butylbenzylphthalate
BBB. 3,3'-Dichlorobenzidine
CCC. Benzo(a)anthracene
DDD. Chrysene
EEE. Bis(2-ethylhexyl)phthalate
FFF. Di-n-octylphthalate**
GGG. Benzo(b)fluoranthene
HHH. Benzo(k)fluoranthene
III. Benzo(a)pyrene**
JJJ. Indeno(1,2,3-cd)pyrene
KKK. Dibenz(a,h)anthracene
LLL. Benzo(g,h,i)perylene
MMM. ________

* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

CON .S

LDC #: 3417F2
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- Y N N/A — Was a method blank analyzed for each matrix? (Y circled)
- Y N N/A — Was a method blank analyzed for each concentration preparation level? (N/A circled)
- Y N N/A — Was a method blank associated with every sample? (Y circled)
- Y N N/A — Was the blank contaminated? If yes, please see qualification below. (Y circled)

Blank extraction date: 9/27/98 **Blank analysis date:** 10/22/98

Conc. units: ug/kg Associated Samples: All soil

Compound	Blank ID	Associated Samples	Sample Identification							
[illegible]	9/27/98 Blk	+ *								
Di-n-butylphthalate										
Butylbenzylphthalate										
Bis(2-ethylhexyl)phthalate										
Di-n-octylphthalate										
Phenanthrene	5.4	ND detects								
CRQL										
TICs:										
4-Hydroxy-4-methyl-2-pentanone										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC # 3417F2
SDG # 068183

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were percent recoveries (%R) for surrogates within QC limits stated below?
Y N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R (Limits)	Qualifications
1		1 (20x)	napthalene-d8	276 (20-131)	no qual (20x dil)
			chrysene-d12	0 (46-139)	
			fluorene-d10	261 (28-135)	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

* QC limits are advisory

		QC Limits (Soil)	QC Limits (Water)
S1 (NBZ)	Nitrobenzene-d5	23-120	35-114
S2 (FBP)	2-Fluorobiphenyl	30-115	43-116
S3 (TPH)	Terphenyl-d14	18-137	33-141
S4 (PHL)	Phenol-d5	24-113	10-94
S5 (2FP)	2-Fluorophenol	25-121	21-100
S6 (TBP)	2,4,6-Tribromophenol	19-122	10-123
S7 (2CP)	2-Chlorophenol-d4	20-130*	33-110*
S8 (DCB)	1,2-Dichlorobenzene-d4	20-130*	16-110*

LDC #: 34 F2
SDG #: 0601183

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A — Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. (Y circled)

Y N N/A — Was a MS/MSD analyzed every 20 samples of each matrix? (Y marked)

Y N N/A — Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? (N circled)

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		14/15	Benzo(ghi)perylene	( )	( )	18 (≤14)	all H2O	J/A
			Dibenzo(a,h)anthracene	( )	( )	18 (≤15)		J
			Indeno(1,2,3-cd)pyrene	( )	( )	19 (≤15)		
				( )	( )	( )		
2		no soil MS/MSD in batch	all	( )	( )	( )	all soil	none/P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	G.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
B.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	H.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
C.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	I.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
D.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	J.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
E.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	K.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
F.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 3417F2
SDG #: 068183

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

lab limits

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		9/27/98 LCS	Anthracene	110 (35-104)	( )	( )	all soil & blk	J dets / A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol				
B.	2-Chlorophenol				
C.	1,4-Dichlorobenzene				
D.	N-Nitroso-di-n-propylamine				
E.	1,2,4-Trichlorobenzene				
F.	4-Chloro-3-methylphenol				
G.	Acenaphthene				
H.	4-Nitrophenol				
I.	2,4-Dinitrotoluene				
J.	Pentachlorophenol				
K.	Pyrene				

LDC #: 341 2
SDG #: 068183

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?
(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Lab ID/Reference	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
1		5	Acenaphthene-d10	7478 (7806-31224)		J/R assoc. cmpds #1
2		7	Benzo(a)pyrene-d12	36125 (9023-36090)		J dets/P assoc. cmpds

#1 The following analytes are assoc'd to acenaphthene-d10:
naphthalene
acenaphthylene
acenaphthene
fluorene

#2 the following analytes are assoc'd to benzo(a)pyrene-d12:
benzo(a)anthracene
chrysene
benzo(k)fluoranthene
benzo(b)fluoranthene
benzo(a)pyrene
indeno(123cd)pyrene
dibenzo(ah)anthracene
benzo(ghi)perylene

QC limits are advisory
IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

SDG #: C02102

Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

(Y) N N/A Were field duplicate pairs identified in this SDG?

(Y) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/kg)		Difference	Disagreement /Major Disagreement (D / MD)
	5	6		
	Dilution 1.0x Prep Date 9/27/98 Analysis date 10/22/98	Dilution 1.0x Prep Date 9/27/98 Analysis date 10/22/98		
2-Methylnapthalene	11U	18 (13U)	2	
Naphthalene	11U	14 ↓	1	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ug/kg)		Difference	Disagreement /Major Disagreement (D / MD)
	5	98NECRC301		
	Dilution 1.0x Prep Date 9/27/98 Analysis date 10/22/98	Dilution 1x ~~2x~~ 06 Prep Date 9/18/98 Analysis date 10/23/98		
Naphthalene	11U	4.9 (3.5U)	NC	
2-Methylnaphthalene	11U	8.5	NC	
Phenanthrene	11U	13	1	
Fluoranthene	11U	3.5	NC	
Pyrene	11U	8.5 ↓	NC	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units)		Difference	Disagreement /Major Disagreement (D / MD)
	6	98NECRC301		
	Dilution 1.0X Prep Date 9/27/98 Analysis date 10/22/98	Dilution 1X Prep Date 9/18/98 Analysis date 10/23/98		
Naphthalene	14 (13U)	4.9 (3.5U)	3	
2-Methylnaphthalene	18 ↓	8.5	2	
Phenanthrene	13U	13	1	
Fluoranthene	↓	3.5	NC	
Pyrene	↓	8.5 ↓	NC	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

SDG #: [illegible]

Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/L) 11 — Dilution 1.0, Prep Date 9/18/98, Analysis date 9/25/98	12 — Dilution 1.0, Prep Date 9/18/98, Analysis date 9/25/98	Difference	Disagreement /Major Disagreement (D / MD)
	no detects			
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ug/L) 11 — Dilution 1.0, Prep Date 9/18/98, Analysis date 9/25/98	98NECFCSW02 — Dilution 1.0, Prep Date 9/17/98, Analysis date 10/16/98	Difference	Disagreement /Major Disagreement (D / MD)
	no detects			
Number of TICs:	Sum of Concentration:	Sum of Concentration:		

Compound	Concentration (Detection limit) (units ug/L) 12 — Dilution 1.0, Prep Date 9/18/98, Analysis date 9/25/98	98NECFCSW02 — Dilution 1.0, Prep Date 9/17/98, Analysis date 10/16/98	Difference	Disagreement /Major Disagreement (D / MD)
	no detects			
Number of TICs:	Sum of Concentration:	Sum of Concentration:		

SDG #: C10215 2

Field Duplicates

Reviewer: 9
2nd reviewer: [illegible]

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270)

Y N N/A Were field duplicate pairs identified in this SDG?

Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/kg) 3 — Dilution 1.0X, Prep Date 9/27/98, Analysis date 10/22/98	4 — Dilution 1.0X, Prep Date 9/27/98, Analysis date 10/22/98	Difference	Disagreement /Major Disagreement (D / MD)
	no detects			
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ug/kg) 3 — Dilution 1.0X, Prep Date 9/27/98, Analysis date 10/22/98	98NECKC302 — Dilution 1X, Prep Date 9/18/98, Analysis date 10/23/98	Difference	Disagreement /Major Disagreement (D / MD)
Naphthalene	9.3U	3.6 (3.0U)	NC	
2-Methylnaphthalene	↓	6.0 ↓	NC	
Phenanthrene	↓	3.0 ↓	NC	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

Compound	Concentration (Detection limit) (units ug/kg) 4 — Dilution 1.0X, Prep Date 9/27/98, Analysis date 10/22/98	98NECKC302 — Dilution 1X, Prep Date 9/18/98, Analysis date 10/23/98	Difference	Disagreement /Major Disagreement (D / MD)
Naphthalene	9.6U	3.6 (3.0U)	NC	
2-Methylnaphthalene	↓	6.0 ↓	↓	
Phenanthrene	↓	3.0	↓	
Number of TICs: Ø	Sum of Concentration: Ø	Sum of Concentration: Ø		

LDC #: 3417G2 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/18/98

SDG #: 063188 ___EPA Level III ___NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [signature]

2nd Reviewer: [signature]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/12/98
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	RSD, r² ≥ 0.990
IV.	Continuing calibration	A	CCC ≤ 20 others ≤ 25
V.	Blanks	A	
VI.	Surrogate spikes	SW	✓
VII.	Matrix spike/Matrix spike duplicates	~~N~~ SW	~~client specific~~ None / ?
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: all soil

1	98NECDBSD801 10X	11		21	
2	98NECDBSD802 40X	12		22	
3	98NECDBSD803 20X	13		23	
4	98NECBDSS802	14		24	
5	98NECBDSS801	15		25	
6	9/25/98-blk	16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

LDC #: 34172
SDG #: 063188
METHOD: GC/MS BNA (EPA SW 846 Method 8270)

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Did the laboratory conduct an acceptable 5 point calibration prior to sample analysis?
Y N N/A Were all relative standard deviations (%RSD) ≤30.0% and Relative Response Factors (RRF) ≥0.05?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
1	102498	10248E04	W	45.60		D8 1-3	J/A
		5				& no blk	
		6					
		7					
		8					
		9					

A. Phenol**
B. Bis(2-chloroethyl) ether
C. 2-Chlorophenol
D. 1,3-Dichlorobenzene
E. 1,4-Dichlorobenzene**
F. 1,2-Dichlorobenzene
G. 2-Methylphenol
H. 2,2'-Oxybis(1-chloropropane)
I. 4-Methylphenol
J. N-Nitroso-di-n-propylamine*
K. Hexachloroethane
L. Nitrobenzene
M. Isophorone
N. 2-Nitrophenol**
O. 2,4-Dimethylphenol
P. Bis(2-chloroethoxy)methane
Q. 2,4-Dichlorophenol**
R. 1,2,4-Trichlorobenzene
S. Naphthalene
T. 4-Chloroaniline
U. Hexachlorobutadiene**
V. 4-Chloro-3-methylphenol**
W. 2-Methylnaphthalene
X. Hexachlorocyclopentadiene*
Y. 2,4,6-Trichlorophenol**
Z. 2,4,5-Trichlorophenol
AA. 2-Chloronaphthalene
BB. 2-Nitroaniline
CC. Dimethylphthalate
DD. Acenaphthylene
EE. 2,6-Dinitrotoluene
FF. 3-Nitroaniline
GG. Acenaphthene**
HH. 2,4-Dinitrophenol*
II. 4-Nitrophenol*
JJ. Dibenzofuran
KK. 2,4-Dinitrotoluene
LL. Diethylphthalate
MM. 4-Chlorophenyl-phenyl ether
NN. Fluorene
OO. 4-Nitroaniline
PP. 4,6-Dinitro-2-methylphenol
QQ. N-Nitrosodiphenylamine (1)**
RR. 4-Bromophenyl-phenylether
SS. Hexachlorobenzene
TT. Pentachlorophenol**
UU. Phenanthrene
VV. Anthracene
WW. Carbazole
XX. Di-n-butylphthalate
YY. Fluoranthene**
ZZ. Pyrene
AAA. Butylbenzylphthalate
BBB. 3,3'-Dichlorobenzidine
CCC. Benzo(a)anthracene
DDD. Chrysene
EEE. Bis(2-ethylhexyl)phthalate
FFF. Di-n-octylphthalate**
GGG. Benzo(b)fluoranthene
HHH. Benzo(k)fluoranthene
III. Benzo(a)pyrene**
JJJ. Indeno(1,2,3-cd)pyrene
KKK. Dibenz(a,h)anthracene
LLL. Benzo(g,h,i)perylene
MMM. ______________

* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

INICA

LDC #: 345 2
SDG #: 063188

VALIDATION FIN GS WORKSHEET
Surrogate Recovery

Reviewer: A
2nd Reviewer: Q

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits stated below?

(Y) N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?

(Y) N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

#	Date	Sample ID	Surrogate	%R	(Limits)	Qualifications
1		2 (40X)	chrysene-d12	0.0	(46-139)	no qual (dil)
			fluorene-d10	↓	(28-135)	
			naphthalene-d8		(20-131)	
					( )	
2		1 (10X)	fluorene-d10	262	( )	no qual (dil)
			naphthalene-d8	158	( )	
					( )	
3		3 (20X)	chrysene-d12	0.0	( )	no qual (dil)
			fluorene-d10	0.0	( )	
			naphthalene-d8	163	( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

QC limits are advisory	QC Limits (Soil)	QC Limits (Water)
1 (NBZ) = Nitrobenzene-d5	23-120	35-114
2 (FBP) = 2-Fluorobiphenyl	30-115	43-116
3 (TPH) = Terphenyl-d14	18-137	33-141
1 (PHL) = Phenol-d5	24-113	10-94

	QC Limits (Soil)	QC Limits (Water)
S5 (2FP) 2-Fluorophenol	25-121	21-100
S6 (TBP) 2,4,6-Tribromophenol	19-122	10-123
S7 (2CP) 2-Chlorophenol-d4	20-130*	33-110*
S8 (DCB) 1,2-Dichlorobenzene-d4	20-130*	16-110*

C #: 34762

G #: 063188

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: DP
2nd Reviewer: ________

ETHOD: GC/MS BNA (EPA SW 846 Method 8270)

ease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		no MS/MSD in SDG batch	all	( )	( )	( )	all	none / P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	G.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	H.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	I.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	J.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	K.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

DC #: 345
DG #: 063108

VALIDATION FINDI S WORKSHEET
Internal S..ndards

Pa of 1
Review
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?
Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Lab ID/Reference	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
1		4	Benzo(a)pyrene-d12	8721 (1848-7390)		J dets / P assoc'd cmpds*1
2		3	Phenanthrene-d10	3888 (4055-16220)		J / R assoc'd cmpds*2
3		2	Acenaphthene-d10	2924 (3052-12208)		J / A assoc'd cmpds*3

*1 The following analytes are assoc'd to benzo(a)pyrene-d12:
benzo (a) anthracene
chrysene
benzo(k)fluoranthene
benzo (b) fluoranthene
benzo(a)pyrene
indeno (123cd) pyrene
dibenzo(ah)anthracene
benzo(ghi)perylene

*2 the following analytes are assoc'd to phenanthrene-d10:
~~phenan~~ phenanthrene fluoranthene
anthracene pyrene

*3 the following analytes are assoc'd to acenaphthene-d10:
naphthalene fluorene
acenaphthylene
acenaphthene

QC limits are advisory
(DCB) = 1,4-Dichlorobenzene d4
(NPT) = Naphthalene-d8
(ANT) = Acenaphthene d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene d12

LDC #: 3417H2 **VALIDATION COMPLETENESS WORKSHEET** Date: 12\18\98

SDG #: 063189 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9\12\98
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD, $r^2 \geq 0.990$
IV.	Continuing calibration	A	CCC ≤ 20 others ≤ 25
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW ~~A~~	~~client specific~~ none
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: all soil

1	98NECRCSD805	11		21	
2	98NECRCSD806	12		22	
3	9\25\98-B16	13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

3417H2W.AP3

DC #: 3417
DG #: 0631189

Reviewer: OP
2nd Reviewer:

VALIDATION FINDIN WORKSHEET
Matrix Spike/Matrix Spike Duplicates

ETHOD: GC/MS BNA (EPA SW 846 Method 8270)

ease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		no MS/MSD	all	( )	( )	( )	all	none/P
		ms to batch		( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	G.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
B.	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	H.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
C.	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	I.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
D.	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	J.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
E.	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	K.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
F.	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

DC #: 34172H2
DG #: 063189

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: JO
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?
(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Lab ID/Reference	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
1		1	Phenanthrene-d10	58120 (12617-50466)		J det/UJ A assoc cmpds*

The following analytes are assoc'd to phenanthrene-d10:
* phenanthrene
anthracene
fluoranthene
pyrene

QC limits are advisory
1 (DCB) = 1,4-Dichlorobenzene-d4
2 (NPT) = Naphthalene-d8
3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

INTST.2.

LDC #: 3417K2 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/18/98

SDG #: 063195 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/16/98
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD, r² ≥ 0.990
IV.	Continuing calibration	SW	CCC ≤ 20 others ≤ 25
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW ~~A~~	~~client specific~~
VIII.	Laboratory control samples	SW	LCS/LCSD
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: all H_2O

1	98NEC27SW801	11		21	
2	9/22/98-Blk	12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

LDC #: 34171K2
SDG #: 063195

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A"

(Y) N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?

Y (N) N/A Were all percent differences (%D) ≤25.0% and Relative Response Factors ≥0.05?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
1	9/26/98	0926J02	DDD	28.8		all & blk	J/A

A. Phenol**
B. Bis(2-chloroethyl) ether
C. 2-Chlorophenol
D. 1,3-Dichlorobenzene
E. 1,4-Dichlorobenzene**
F. 1,2-Dichlorobenzene
G. 2-Methylphenol
H. 2,2'-Oxybis(1-chloropropane)
I. 4-Methylphenol
J. N-Nitroso-di-n propylamine*
K. Hexachloroethane
L. Nitrobenzene
M. Isophorone
N. 2-Nitrophenol**
O. 2,4-Dimethylphenol
P. Bis(2-chloroethoxy)methane
Q. 2,4-Dichlorophenol**
R. 1,2,4-Trichlorobenzene
S. Naphthalene
T. 4-Chloroaniline
U. Hexachlorobutadiene**
V. 4-Chloro-3-methylphenol**
W. 2-Methylnaphthalene
X. Hexachlorocyclopentadiene*
Y. 2,4,6-Trichlorophenol**
Z. 2,4,5-Trichlorophenol
AA. 2-Chloronaphthalene
BB. 2-Nitroaniline
CC. Dimethylphthalate
DD. Acenaphthylene
EE. 2,6-Dinitrotoluene
FF. 3-Nitroaniline
GG. Acenaphthene**
HH. 2,4-Dinitrophenol*
II. 4-Nitrophenol*
JJ. Dibenzofuran
KK. 2,4-Dinitrotoluene
LL. Diethylphthalate
MM. 4-Chlorophenyl-phenyl ether
NN. Fluorene
OO. 4-Nitroaniline
PP. 4,6-Dinitro-2-methylphenol
QQ. N-Nitrosodiphenylamine (1)**
RR. 4-Bromophenyl-phenylether
SS. Hexachlorobenzene
TT. Pentachlorophenol**
UU. Phenanthrene
VV. Anthracene
WW. Carbazole
XX. Di-n-butylphthalate
YY. Fluoranthene**
ZZ. Pyrene
AAA. Butylbenzylphthalate
BBB. 3,3'-Dichlorobenzidine
CCC. Benzo(a)anthracene
DDD. Chrysene
EEE. Bis(2-ethylhexyl)phthalate
FFF. Di-n-octylphthalate**
GGG. Benzo(b)fluoranthene
HHH. Benzo(k)fluoranthene
III. Benzo(a)pyrene**
JJJ. Indeno(1,2,3-cd)pyrene
KKK. Dibenz(a,h)anthracene
LLL. Benzo(g,h,i)perylene
MMM. ________

* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

CONC

C #: 3417K
G #: 063195

VALIDATION FINDING WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: ______

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		no MS/MSD in ~~[illegible]~~ batch	All	( )	( )	( )	all	None/P
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
	Phenol	26-90%	≤ 35%	12-110%	≤ 42%	G.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
	2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	H.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
	1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	I.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
	N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	J.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
	1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	K.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
	4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 34172
SDG #: 063195

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		9/22/98-LCS/LCSD	Benzo(g,h,i)perylene	( )	( )	20 (≤14)	all & blk	J/A
			Dibenzo(a,h)perylene	( )	( )	20 (≤15)		↓
			Indeno(1,2,3-cd)pyrene	( )	( )	20 (↓)		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol				
B.	2-Chlorophenol				
C.	1,4-Dichlorobenzene				
D.	N-Nitroso-di-n-propylamine				
E.	1,2,4-Trichlorobenzene				
F.	4-Chloro-3-methylphenol				
G.	Acenaphthene				
H.	4-Nitrophenol				
I.	2,4-Dinitrotoluene				
J.	Pentachlorophenol				
K.	Pyrene				

LDC #: 3417L2

VALIDATION COMPLETENESS WORKSHEET

Date: 12/18/98

SDG #: 063197 ____EPA Level III __NFESC Level C

Page: 1 of 1

Laboratory: Quanterra Environmental Services

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: ~~9/15/98~~ 9/15/98
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	RSD, r² ≥ 0.990
IV.	Continuing calibration	SW	CCC ≤ 20 others ≤ 25
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates SW	~~N~~	~~client specific~~
VIII.	Laboratory control samples	SW	LCS/LCSD
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note:
A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NECBKSW801 H_2O	11		21	
2	98NECBKSW802 ~~Soil~~ H_2O	12		22	
3	98NECBKSD801 soil	13		23	
4	98NECBKSD802	14		24	
5	98NEC09SS801 soil	15		25	
6	9/22/98-Blk H_2O	16		26	
7	9/29/98-Blk soil	17		27	
8		18		28	
9		19		29	
10		20		30	

LDC # 34172
SDG #: 063197

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: ___
2nd Reviewer: ___

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Did the laboratory conduct an acceptable 5 point calibration prior to sample analysis?
Y N N/A Were all relative standard deviations (%RSD) ≤30.0% and Relative Response Factors (RRF) ≥0.05?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
1	10/24/98	10248E04	W	45.670		5 &	J/A
		5				9/29/98-814	
		6					
		7					
		8					
		9					
						3/01	

A. Phenol**
B. Bis(2-chloroethyl) ether
C. 2-Chlorophenol
D. 1,3-Dichlorobenzene
E. 1,4-Dichlorobenzene**
F. 1,2-Dichlorobenzene
G. 2-Methylphenol
H. 2,2'-Oxybis(1-chloropropane)
I. 4-Methylphenol
J. N-Nitroso-di-n-propylamine*
K. Hexachloroethane
L. Nitrobenzene
M. Isophorone
N. 2-Nitrophenol**
O. 2,4-Dimethylphenol
P. Bis(2-chloroethoxy)methane
Q. 2,4-Dichlorophenol**
R. 1,2,4-Trichlorobenzene
S. Naphthalene
T. 4-Chloroaniline
U. Hexachlorobutadiene**
V. 4-Chloro-3-methylphenol**
W. 2-Methylnaphthalene
X. Hexachlorocyclopentadiene*
Y. 2,4,6-Trichlorophenol**
Z. 2,4,5-Trichlorophenol
AA. 2-Chloronaphthalene
BB. 2-Nitroaniline
CC. Dimethylphthalate
DD. Acenaphthylene
EE. 2,6-Dinitrotoluene
FF. 3-Nitroaniline
GG. Acenaphthene**
HH. 2,4-Dinitrophenol*
II. 4-Nitrophenol*
JJ. Dibenzofuran
KK. 2,4-Dinitrotoluene
LL. Diethylphthalate
MM. 4-Chlorophenyl-phenyl ether
NN. Fluorene
OO. 4-Nitroaniline
PP. 4,6-Dinitro-2-methylphenol
QQ. N-Nitrosodiphenylamine (1)**
RR. 4-Bromophenyl-phenylether
SS. Hexachlorobenzene
TT. Pentachlorophenol**
UU. Phenanthrene
VV. Anthracene
WW. Carbazole
XX. Di-n-butylphthalate
YY. Fluoranthene**
ZZ. Pyrene
AAA. Butylbenzylphthalate
BBB. 3,3'-Dichlorobenzidine
CCC. Benzo(a)anthracene
DDD. Chrysene
EEE. Bis(2-ethylhexyl)phthalate
FFF. Di-n-octylphthalate**
GGG. Benzo(b)fluoranthene
HHH. Benzo(k)fluoranthene
III. Benzo(a)pyrene**
JJJ. Indeno(1,2,3-cd)pyrene
KKK. Dibenz(a,h)anthracene
LLL. Benzo(g,h,i)perylene
MMM. ___

* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

LDC #: 34r 2
SDG #: O/a. 57
METHOD: GC/MS BNA (EPA SW 846 Method 8270)

VALIDATION FIN GS WORKSHEET
Continuin Calibration

je: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?
Y N N/A Were all percent differences (%D) ≤25.0% and Relative Response Factors ≥0.05?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤25.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
1	9/26/98	0926J02	DDD	28.8		all H2O & blk.	J/A

A. Phenol**
B. Bis(2-chloroethyl) ether
C. 2-Chlorophenol
D. 1,3-Dichlorobenzene
E. 1,4-Dichlorobenzene**
F. 1,2-Dichlorobenzene
G. 2-Methylphenol
H. 2,2'-Oxybis(1-chloropropane)
4-Methylphenol
J. N-Nitroso-di-n-propylamine*
K. Hexachloroethane
Nitrobenzene
M. Isophorone
N. 2-Nitrophenol**
O. 2,4-Dimethylphenol
P. Bis(2-chloroethoxy)methane
Q. 2,4-Dichlorophenol**
R. 1,2,4-Trichlorobenzene
S. Naphthalene
T. 4-Chloroaniline
U. Hexachlorobutadiene**
V. 4-Chloro-3-methylphenol**
W. 2-Methylnaphthalene
X. Hexachlorocyclopentadiene*
Y. 2,4,6-Trichlorophenol**
Z. 2,4,5-Trichlorophenol
AA. 2-Chloronaphthalene
BB. 2-Nitroaniline
CC. Dimethylphthalate
DD. Acenaphthylene
EE. 2,6-Dinitrotoluene
FF. 3-Nitroaniline
GG. Acenaphthene**
HH. 2,4-Dinitrophenol*
II. 4-Nitrophenol*
JJ. Dibenzofuran
KK. 2,4-Dinitrotoluene
LL. Diethylphthalate
MM. 4-Chlorophenyl-phenyl ether
NN. Fluorene
OO. 4-Nitroaniline
PP. 4,6-Dinitro-2-methylphenol
QQ. N-Nitrosodiphenylamine (1)**
RR. 4-Bromophenyl-phenylether
SS. Hexachlorobenzene
TT. Pentachlorophenol**
UU. Phenanthrene
VV. Anthracene
WW. Carbazole
XX. Di-n-butylphthalate
YY. Fluoranthene**
ZZ. Pyrene
AAA. Butylbenzylphthalate
BBB. 3,3'-Dichlorobenzidine
CCC. Benzo(a)anthracene
DDD. Chrysene
EEE. Bis(2-ethylhexyl)phthalate
FFF. Di-n-octylphthalate**
GGG. Benzo(b)fluoranthene
HHH. Benzo(k)fluoranthene
III. Benzo(a)pyrene**
JJJ. Indeno(1,2,3-cd)pyrene
KKK. Dibenz(a,h)anthracene
LLL. Benzo(g,h,i)perylene
MMM. ______

* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

C #: 34172
G #: 063197

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: Q
2nd Reviewer:

THOD: GC/MS BNA (EPA SW 846 Method 8270)
ase see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD Soil / Water.

N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		no MS/MSD	all	( )	( )	( )	all	none/P
		in SDG batch		( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
Phenol	26-90%	≤ 35%	12-110%	≤ 42%	G.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	H.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	I.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	J.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	K.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

MSD.2S

LDC #: 34 2
SDG #: 063197

VALIDATION FI IGS WORKSHEET
Laboratory Control Samples (LCS)

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A	Was a LCS required?
Y (N) N/A	Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? lab limits

#	Date	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		9/22/98-LCS/LCSD	Benzo(ghi)perylene	( )	( )	20 (≤14)	all H2O & blk	J/A
			Dibenzo(ah)perylene	( )	( )	20 (≤15)		↓
			Indeno(123cd)pyrene	( )	( )	20 (↓)		
				( )	( )	( )		
2		9/29/98-LCS	Dibenzo(ah)anthracene	( )	( )	( )		
			→	139 (20-126)	( )	( )	all soil & blk	J/A dets
			Pyrene	144 (29-134)	( )	( )		↓
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
A.	Phenol					G.	Acenaphthene				
B.	2-Chlorophenol					H.	4-Nitrophenol				
C.	1,4-Dichlorobenzene					I.	2,4-Dinitrotoluene				
D.	N-Nitroso-di-n-propylamine					J.	Pentachlorophenol				
E.	1,2,4-Trichlorobenzene					K.	Pyrene				
F.	4-Chloro-3-methylphenol										

DC #: 34572
SDG #: 063A7

Reviewer: DP
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Internal Standards

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?
(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Lab ID/Reference	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
1		5	acenaphthene-d10	2388 (2442-9768)		J/A assoc cmpds *
2		3	acenaphthene-d10	34510 (8203-32810)		Jdets/A assoc cmpds *
3		4	acenaphthene-d10	34681 (8203-32810)		↓

* The following analytes are assoc'd to acenaphthene-d10:
naphthalene
acenaphthylene
acenaphthene
fluorene

QC limits are advisory
1 (DCB) = 1,4-Dichlorobenzene-d4
2 (NPT) = Naphthalene-d8
3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

LDC #: 3417M2 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/18/98

SDG #: 063336 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9/14/98
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD
IV.	Continuing calibration	N	all ICALs
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW ~~A~~	~~client specific~~ none / P
VIII.	Laboratory control samples	A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	SW	
XI.	Target compound identification	N	
XII.	Compound quantitation/CRQLs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: all soil

1	98NEC02SS801	11		21	
2	10/30/98 [illegible]	12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

VALIDATION FINDINGS WORKSHEET

SDG #: 063336

Technical Holding Times

Page: ___ of ___
Reviewer: ___
2nd Reviewer: ___

All circled dates have exceeded the technical holding times.

Y N N/A Were all cooler temperatures within validation criteria?

METHOD : GC MS BNA (EPA SW 846 Method 8270)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
1	Soil	NA	9/14/98	10/30/98	11/2/98	46	J dets & R ND

TECHNICAL HOLDING TIME CRITERIA

Water: Extracted within 7 days, analyzed within 40 days.
Soil: Extracted within 14 days, analyzed within 40 days.

C #: 34516
G #: 063336

VALIDATION FINDING WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page. 1 of 1
Reviewer: ℘
2nd Reviewer: ________

ETHOD: GC/MS BNA (EPA SW 846 Method 8270)

ase see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		no MS/MSD	all	( )	( )	( )	all	none/P
		smpl batch		( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)		Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
Phenol	26-90%	≤ 35%	12-110%	≤ 42%	G.	Acenaphthene	31-137%	≤ 19%	46-118%	≤ 31%
2-Chlorophenol	25-102%	≤ 50%	27-123%	≤ 40%	H.	4-Nitrophenol	11-114%	≤ 50%	10-80%	≤ 50%
1,4-Dichlorobenzene	28-104%	≤ 27%	36-97%	≤ 28%	I.	2,4-Dinitrotoluene	28-89%	≤ 47%	24-96%	≤ 38%
N-Nitroso-di-n-propylamine	41-126%	≤ 38%	41-116%	≤ 38%	J.	Pentachlorophenol	17-109%	≤ 47%	9-103%	≤ 50%
1,2,4-Trichlorobenzene	38-107%	≤ 23%	39-98%	≤ 28%	K.	Pyrene	35-142%	≤ 36%	26-127%	≤ 31%
4-Chloro-3-methylphenol	26-103%	≤ 33%	23-97%	≤ 42%						

LDC #: 34171M2
SDG #: 063336

VALIDATION FINDINGS WORKSHEET
Internal Standards

Reviewer: Q
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?
(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

#	Date	Lab ID/Reference	Internal Standard	Area (Limits)	RT (Limits)	Qualifications
1		1	acenaphthene-d10	81144 (18215-72858)		J dets / P assoc cmpds *
			* The following analytes are assoc'd w/ acenaphthene-d10:			
				naphthalene		
				acenaphthylene		
				acenaphthene		
				fluorene		

QC limits are advisory
1 (DCB) = 1,4-Dichlorobenzene-d4
2 (NPT) = Naphthalene-d8
3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

LDC #: 3417D3 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-10-98

SDG #: 98-09-136 ____EPA Level III X NFESC Level C Page: 1 of 1

Laboratory: Analytica Alaska, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-13-98
II.	GC/ECD Instrument Performance Check	N	Not Provided Not Reviewed
III.	Initial calibration	N	" "
IV.	Continuing calibration	N	" "
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	No AQ MS/MSD [illegible]
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	A	FR = 3, 21 See SDG 063183
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1 FR	98NECRC301 SOIL	11		21	
2 FR	98NECRC302	12		22	
3 FR	98NECRCSW302 AQ	13		23	
4	98NECRC302MS SOIL	14		24	
5	98NECRC302MSD	15		25	
~~5~~	MB-9801165	16		26	
7	MB-9801151 AQ	17		27	
8		18		28	
9		19		29	
10		20		30	

LDC #: 3417 D3
SDG #: 98-09-136

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ~~Pesticides~~/PCBs (EPA SW 846 Method ~~8080~~ 8082)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
Y N N/A Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits stated below?

Level IV/D Only

Y N N/A Were the percent recoveries (%R) and the relative percent differences (RPD) recalculated?
Y N N/A Were the %R and RPD reported results within 10.0% of the recalculated results?

#	EXT. Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1	9-17-98	415	G	579 (38-128)	-57.9 (38-128)	75.9 (≤50)	All Soil Sample	J/A for RPD
		Sample Conc 72x	H	158 (↓)	( )	92.7 (↓)	↓	↓
		spiked amt for		( )	( )	( )		
		G		( ) No Qual	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A	gamma-BHC				
B	Heptachlor				
C	Aldrin				
D	Dieldrin				
E	Endrin				
F	4,4,'-DDT				
G	PCB-1260	38-128	≤50 *		
H	PCB-1016				
I					
J					

* LDC limit used

LDC #: 3417F3 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-18-98

SDG #: 063183 ___EPA Level III ___NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-13-98
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	%RSD
IV.	Continuing calibration	SW	%D
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	ND	D1 = 11,12 Replicate = 98NECRCSW302 from SP9 all
XV.	Field blanks	N	D2 = 3,4 Replicate = 98NECRC302 98-09-13 6 D3 = 5,6 Replicate = 98NECRC301

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NECRCSD804 SOIL	11 D1	98NECRCSW802 AQ	21	
2	98NECRCSD803	12 D1	98NECRCSW202	22	
3 D2	98NECRCSD802	13	98NECRCSW801	23	
4 D2	98NECRCSD202	14	98NECRCSW802MS	24	
5 D3	98NECRCSD801	15	98NECRCSW802MSD	25	
6 D3	98NECRCSD201	16	LB981015K (BLK)	26	
7	98NECRCSW806 AQ	17	LB981017K SOIL	27	
8	98NECRCSW805	18	98NECRCSD802 MS	28	
9	98NECRCSW804	19	98NECRCSD802 MSD	29	
10	98NECRCSW803	20		30	

LDC # 3417F2
SDG # 083183

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

METHOD: GC ~~Pesticides~~/PCBs (EPA SW 846 Method ~~8081~~ 8082)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

What type of calibration verification calculation was performed? ✓ %D or RPD

Y N N/A	Were Evaluation mix standards run before initial calibration and before samples?
Y N N/A	Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤20.0% for individual breakdowns)?
Y N N/A	Was at least one Individual Mix standards A and/or B run daily to verify the working curve?
Y N N/A	Were continuing standards analyzed at a frequency of every 10 samples to verify the working curve?
Y N N/A	Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≤15.0%?

Level IV/D Only

Y N N/A	Were the retention times for all calibrated compounds within their respective acceptance windows?
Y N N/A	Were the percent difference (%D) results recalculated? (Please see Calibration verification results verification worksheet.)
Y N N/A	Were the (%D) recalculated results within 10.0% of the reported results?

#	Date	Standard ID	Column	Compound	%D / RPD (Limit ≤ 15.0)	RT (Limits)	Associated Samples	Qualifications
1	10-16-98 08:54	CCV	Not specified	BB	15.7	( )	All AQ Samples 2MK	J/A
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

A. alpha-BHC
B. beta-BHC
C. delta-BHC
D. gamma-BHC
E. Heptachlor
F. Aldrin
G. Heptachlor epoxide
H. Endosulfan I
I. Dieldrin
J. 4,4'-DDE
K. Endrin
L. Endosulfan II
M. 4,4'-DDD
N. Endosulfan sulfate
O. 4,4'-DDT
P. Methoxychlor
Q. Endrin ketone
R. Endrin aldehyde
S. alpha-Chlordane
T. gamma-Chlordane
U. Toxaphene
V. Aroclor-1016
W. Aroclor-1221
X. Aroclor-1232
Y. Aroclor-1242
Z. Aroclor-1248
AA. Aroclor-1254
BB. Aroclor-1260
CC. DB 608
DD. DB 1701
EE. ________
FF.
GG. ___
HH. ___
II. ___
JJ.

LDC #: 341
SDG #: 063101

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

METHOD: GC ~~Pesticides~~/PCBs (EPA SW 846 Method 8082)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
Y N N/A Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?
Y (N) N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits stated below?

Level IV/D Only

Y N (N/A) Were the percent recoveries (%R) and the relative percent differences (RPD) recalculated?
Y N (N/A) Were the %R and RPD reported results within 10.0% of the recalculated results?

#	Ext. Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1	9-26-98	18/19	G	( )	( )	25 (≤21)	All Soil Samples	J/A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A	gamma-BHC				
B	Heptachlor				
C	Aldrin				
D	Dieldrin				
E	Endrin				
F	4,4,'-DDT				
G	PCB-1016	32-156	≤21		
H	PCB-1260	36-168	≤29		
I					
J					

LDC #: 3417G3 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-17-97

SDG #: 063188 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: pm

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-12-98
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	~~%RSD~~
IV.	Continuing calibration	A	~~%D~~
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	N	
XII.	Compound quantitation and reported CRQLs	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NECBDSS802 SOIL	11		21	
2	98NECBDSS801	12		22	
3	LB981017K (Blk)	13		23	
4		14		24	
5		15		25	
~~6~~		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

LDC #: 341 'I
SDG #: 063

VALIDATION FIN IGS WORKSHEET
Matrix Spike/Matix Spike Duplicates

Page: 1 of
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ~~Pesticides~~/PCBs (EPA SW 846 Method 808~~0~~ 2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- Y N N/A — Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? (Y circled)
- Y N N/A — Was a MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed? (Y circled)
- Y N N/A — Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits stated below? (N circled)

Level IV/D Only

- Y N N/A — Were the percent recoveries (%R) and the relative percent differences (RPD) recalculated? (N/A circled)
- Y N N/A — Were the %R and RPD reported results within 10.0% of the recalculated results? (N/A circled)

#	Ext. Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1	9-26-98	98NECRCSDP02 MS/MSD	G	( )	( )	25 (≤21)	All Soil Samples	J/A
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A	gamma BHC				
B	Heptachlor				
C	Aldrin				
D	Dieldrin				
E	Endrin				
F	4,4'-DDT				
G	PCB-1016	32-156	≤21		
H	PCB-1260	36-168	≤29		
I					
J					

LDC #: 3417F4 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/24/98
SDG #: 063183 ____EPA Level III __NFESC Level C Page: 1 of 1
Laboratory: Quanterra Environmental Services Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Lead (EPA SW 846 Method 6010B)
Extra metals:________________________

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/13/98
II.	Calibration	SW	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	N	ICP not used
V.	Matrix Spike Analysis	SW	MS/MSD
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	ICP-MS not used
IX.	Furnace Atomic Absorption QC	A	MSA performed
X.	ICP Serial Dilution	N	ICP not used
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	SW	(1, 2) (1, 98NEC16GV301) from SAG
XIV.	Field Blanks	N	(2, ↓) 98-09-06

Note. A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NEC16GW801 AQ	11		21	
2	98NEC16GW201	12		22	
3	98NEC16GW802	13		23	
4	98NEC16GW801MS	14		24	
5	98NEC16GW801MSD	15		25	
6	PBW	16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:________________________________

DC #: 3417

DG #: 063183

age: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

VALIDATION FIN... GS WORKSHEET
Calibration

IETHOD: ~~Inorganics~~ metals, EPA Method See cover

lease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- Y N N/A — Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
- Y N N/A — Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
- Y N N/A — Are all correlation coefficients ≥0.995 ?

EVEL IV/D ONLY:

- Y N N/A — Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
- Y N N/A — Was a balance check conducted prior to the TDS analysis.?
- Y N N/A — Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	9/30/98	CCV1	Pb	88.07 R	none	no qual.

mments:

LDC #: 5417F4
SDG #: 062183

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: mmf
2nd Reviewer: A

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75 125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1		415	Aq	Pb	32.5	45.0		all	J/A

Comments:

MSD

LDC #: [illegible]
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (Detection limit) (units mg/L) 1: 98NEC166W801 Dilution 5 Prep Date 9/29/98 Analysis date 9/30/98	2: 98NEC168W801 Dilution 5 Prep Date 9/29/98 Analysis date 9/30/98	Difference	Disagreement Major Disagreement (D / MD)
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead	0.026 (0.006)	0.026 (0.006)		
Magnesium				
Manganese				
Mercury				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Thallium				
Vanadium				
Zinc				

Notes:

FLDUP 4AR

SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: mc
2nd reviewer: A

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (Detection limit) (units mg/L) 98NEC16GW801 Dilution 5 Prep Date 9/29/98 Analysis date 9/30/98	98NEC16GW301 Dilution N/A Prep Date 10/1/98 Analysis date 10/7/98	Difference	Disagreement Major Disagreement (D / MD)
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead	0.026 (0.006)	0.022 (0.001)	1.2	
Magnesium				
Manganese	N/A	0.0015 (0.0001)	N/A	
Mercury				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Thallium				
Vanadium				
Zinc				
—				

Notes:

FDUP 4AR

LDC #: [illegible]
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: mt
2nd reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (Detection limit) (units mg/L) 98NECK6GW301 Dilution 5 Prep Date 9/29/98 Analysis date 9/30/98	98NEC16GW301 Dilution N/A Prep Date 10/1/98 Analysis date 10/7/98	Difference	Disagreement /Major Disagreement (D / MD)
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead	0.026 (0.005)	0.022 (0.001)	1.2	
Magnesium				
Manganese	N/A	0.0015 (0.0005)	N/A	
Mercury				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Thallium				
Vanadium				
Zinc				

Notes:

FLDUP 4AR

LDC #: 3417L4 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/24/98

SDG #: 063197 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: ~~Lead~~ Manganese (EPA SW 846 Method 6010B)

Extra metals:____________________

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/15/98
II.	Calibration	A	
III.	Blanks	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	N	no MS/Dup not P
VI.	Duplicate Sample Analysis	N	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	technique not used
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	N	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NEC27GW801 AQ	11		21	
2	AROW ↓	12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:______________________________

LDC #: 3417E7 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-18-98

SDG #: 063161 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: [illegible]

METHOD: Gasoline Range Organics (Method AK-101)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-11-98
IIa.	Initial calibration	A	%RSD < 25%
IIb.	Calibration verification	A	%D < 25%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	~~SW~~ N	~~Client specified~~ None / P
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	TB=2

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NEC00GW801 Water	11		21	
2 TB	98NECTB001	12		22	
3	LB980924N1 (BLK)	13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

LDC #: 3417F7 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-18-98

SDG #: 063183 ___EPA Level III ___NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: [illegible]

METHOD: Gasoline Range Organics (Method AK-101)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-13-98
IIa.	Initial calibration	A	%RSD < 25%
IIb.	Calibration verification	A	%D < 25%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable, N = Not provided/applicable, SW = See worksheet, ND = No compounds detected, R = Rinsate, FB = Field blank, D = Duplicate, TB = Trip blank, EB = Equipment blank

Validated Samples:

1	98NECRCSW806 Water	11		21	
2	98NECRCSW805	12		22	
3	98NECRCSW804	13		23	
4	98NECRCSW803	14		24	
5	98NECRCSW802	15		25	
6	98NECRCSW801	16		26	
7	98NECRCSW802MS	17		27	
8	98NECRCSW802MSD	18		28	
9	LB980925N1 (BLK)	19		29	
10		20		30	

Notes:

LDC #: 3417K7 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-18-98

SDG #: 063195 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: J

METHOD: Gasoline Range Organics (Method AK-101)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-16-98
IIa.	Initial calibration	A	%RSD < 25%
IIb.	Calibration verification	A	%D < 25%
III.	Blanks	~~A~~ SW	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	~~SW~~ N	~~Client specified~~ have / P
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	TB=2

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NEC27SW801 Water	11		21	
2 TB	98NECTB007	12		22	
3	LB980929N1 (BLK)	13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

LDC #: 3417 K7
SDG #: 063195

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Z. Pa
2nd Reviewer:

METHOD: GC ✓ TFH Volatiles (Gasoline) ___ TFH Extractables (Diesel) ___ CDOHS LUFT ✓ ~~EPA SW 846~~ Method ~~8015 Modified~~ AK101

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed with each batch or extraction batch?
Y N N/A Was method blank contamination less than the RDL for all target compounds?

Level IV/D Only

Y N N/A (Gasoline only) Was a method blank analyzed with each 24 hour batch?
Y N N/A Was a method blank analyzed for each analytical/extraction batch of ≤20 samples?

Blank extraction date: N/A **Blank analysis date:** 9-29-98 **Associated samples:** All Samples ND
Conc. units: mg/L

Compound	Blank ID	Sample Identification								
	LB980929AA1									
GRO	0.14									
Reporting Limit	0.1									

Blank extraction date: **Blank analysis date:** **Associated samples:**
Conc. units:

Compound	Blank ID	Sample Identification								

Blank extraction date: **Blank analysis date:** **Associated samples:**
Conc. units:

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT

All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 3417L7 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-18-98

SDG #: 063197 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: Q

METHOD: Gasoline Range Organics (Method AK-101)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-15-98
IIa.	Initial calibration	A	%RSD < 25%
IIb.	Calibration verification	A	%D < 25%
III.	Blanks	SW	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N ~~SW~~	~~client specified~~ None / P
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NEC27GW801 Water	11		21	
2	LB980929N1 ↓	12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

LDC #: 2117L7
SDG #: 063197

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: Z. Pa
2nd Reviewer: [illegible]

METHOD: GC ✓ TPH Volatiles (Gasoline)   TPH Extractables (Diesel)   CDOHS LUFT ✓ ~~EPA SW 846~~ Method ~~8015 Modified~~ Ak101

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- (Y) N N/A Were all samples associated with a method blank?
- (Y) N N/A Was a method blank analyzed for each matrix?
- (Y) N N/A Was a method blank analyzed with each batch or extraction batch?
- Y (N) N/A Was method blank contamination less than the RDL for all target compounds?

Level IV/D Only

- Y N (N/A) (Gasoline only) Was a method blank analyzed with each 24 hour batch?
- Y N (N/A) Was a method blank analyzed for each analytical/extraction batch of ≤20 samples?

Blank extraction date: N/A Blank analysis date: 9-29-98 Associated samples: All Samples
Conc. units: mg/L

Compound	Blank ID	Sample Identification								
	LB980929N1	ND								
GRO	0.14									
Reporting Limit	0.1									

Blank extraction date: Blank analysis date: Associated samples:
Conc. units:________

Compound	Blank ID	Sample Identification								

Blank extraction date: Blank analysis date: Associated samples:
Conc. units:________

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 3417A8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-16-98

SDG #: A8-09-082 ____EPA Level III X NFESC Level C Page: 1 of 1

Laboratory: Analytica Alaska, Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Residual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9-12-98 → 9-13-98
IIa.	Initial calibration	A	%RSD ≤25%
IIb.	Calibration verification	A	%R (75-125)
III.	Blanks	A	
IVa.	Surrogate recovery	~~A~~ A	
IVb.	Matrix spike/Matrix spike duplicates	SW	
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	* D2 = 1 ⌀98NEC10GW801 ⌀98NEC10GW201 from SDG: 063180
X.	Field blanks	N	*D1 = 2 ⌀98NECRCSW802 ⌀98NECRCSW202 from SDG: 063183, D5 = 5 ⌀98NEC19GW801 ⌀ 98NEC19GW201 from SDG: 063183.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

*ND

Validated Samples:

1 D2	98NEC10GW301 W	11		21	
2 D1	98NECRCSW302	12		22	
3	98NECRCSW302*	13		23	
4	98NECRCSW302**	14		24	
5 D5	98NEC19GW301	15		25	
6	98NEC19GW301MS	16		26	
7	98NEC19GW301MSD	17		27	
8	MB10918	18		28	
9	MB20918	19		29	
10	~~MB20917~~	20		30	

Notes: * Aromatic, ** Aliphatic

3417A8W.AP3

SDG #: ~~AB-04~~082

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC (EPA AK102 & 103)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a matrix spike (MS) and matrix spike duplicate (MSD)?
Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix?
Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits stated below?

Level IV/D Only

Y N N/A Were a MS/MSD analyzed for each analytical extraction batch of ≤20 samples?
Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) recalculated for all spiked compounds?
Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) reported results within 10.0% of the recalculated results?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1	10-12-98	617	DRO	295 (60-120)	40.4 (60-120)	152 (20)	1-5	no qual. (%R) J/A (RPD)
				( )	( )	( )		
			Sample Conc. is	> 2 X the spike	amount.			
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )			
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A	DRO	60-120	≤ 20		
B					
C					
D					
E					
F					
G					
H					
I					
J					

VALIDATION FINDINGS WORKSHEET
Field Duplicates

ETHOD: ✓ GC ___ HPLC (~~EPA~~ AK102&103)

Y N N/A Were field duplicate pairs identified in this SDG?
Y/ N N/A Were target compounds detected in the field duplicate pairs?

Compound		Concentration (Detection limit) (units ug/L) #1 Dilution 1 Prep Date 9-18-98 Analysis date 10-12-98	98NEC10GW801 Dilution 1 Prep Date 9-18-98 Analysis date 9-30-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	270	~~0.27~~ (0.190)	ND (100)	3	D
RRO	30	~~0.30~~ (0.190)	ND (200)	2	—

Compound	Concentration (Detection limit) (units ug/L) #1 Dilution 1 Prep Date 9-18-98 Analysis date 10-12-98	98NEC10GW201 Dilution 1 Prep Date 9-18-98 Analysis date 9-30-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO 270 (190)	~~0.27 (0.19)~~	110 (100)	2	—
RRO 300 (190)	~~0.30 (0.19)~~	ND (200)	2	—

Compound	Concentration (Detection limit) (units ug/L) 98NEC10GW801 Dilution 1 Prep Date 9-18-98 Analysis date 9-30-98	98NEC10GW201 Dilution 1 Prep Date 9-18-98 Analysis date 9-30-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	ND (100)	110 (100)	1	—

From 063183, 3417F8

LDC #: 3417F8
SDG #: AR-09-082

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: ml
2nd reviewer: n

METHOD: ✓ GC __ HPLC (~~EPA~~ AK 102/103)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units mg/L) #5 Dilution 1 Prep Date 9-18-98 Analysis date 10-13-98	98NEC19GW801 Dilution 10 Prep Date 9-19-98 Analysis date 10-22-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	14000 (190) ~~14 (0.19)~~	1600 (1000)	1	—
RRO	930 (190) ~~0.93 (0.19)~~	ND (2,500)	NC	—

Compound	Concentration (Detection limit) (units mg/L) #5 Dilution 1 Prep Date 9-18-98 Analysis date 10-13-98	98NEC19GW201 Dilution 10 Prep Date 9-19-98 Analysis date 10-22-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	14000 (190) ~~14 (0.19)~~	1800 (1000)	1	—
RRO	930 (190) ~~0.93 (0.19)~~	ND (2,500)	NC	—

Compound	Concentration (Detection limit) (units mg/L) 98NEC19GW801 Dilution 10 Prep Date 9-19-98 Analysis date 10-22-98	98NEC19GW201 Dilution 10 Prep Date 9-19-98 Analysis date 10-22-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	1600 (1000)	1800 (1000)	1	—
~~RRO~~	~~ND (2.5~~	~~ND (2.5)~~	ml	

From 3417F8, 063183

LDC #: 3417B8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-16-98

SDG #: A8-09-083 ____EPA Level III _X_NFESC Level C Page: 1 of 1

Laboratory: Analytica Alaska, Inc. Reviewer: mz

2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-13-98
IIa.	Initial calibration	A	%RSD ≤ 25%
IIb.	Calibration verification	A	%R (75-125)
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	SW	
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	see LDC:3417F8
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1 D7	98NECRC301	S	11	98NECRC302MS**	S	21	
2 D7	98NECRC301*		12	98NECRC302MSD**		22	
3 D7	98NECRC301**		13	MB20925		23	
4 D6	98NECRC302		14	MB10923		24	
5 D6	98NECRC302*		15			25	
6 D6	98NECRC302**		16			26	
7	98NECRC302MS		17			27	
8	98NECRC302MSD		18			28	
9	98NECRC302MS*		19			29	
10	98NECRC302MSD*		20			30	

Notes: * Aromatic, ** Aliphatic

3417B8W.AR3

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

SDG #: 9417 DS A8-09.088
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC HPLC (EPA AK102 & 103)

Are surrogates required by the method? Yes x or No

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks?

Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1	10-17-98	~~OTT~~ 1	Not Specified	A	D (60-120)	1	Dilution: 5 No qual
				B	D ( )	1	
2	10-17-98	~~O2B#~~ 4		A	( )	4	
				B	( )	4	
					( )		
		5		A	36 (50-150)	5	J / A extractable
					( )		
		6		B	44 (50-150)	6	
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	O-Terphenyl	60-120		
B	Squalene	60-120		

SDG #: AE 9-083

Reviewer: [illegible]

2nd Reviewer: [illegible]

VALIDATION FI NGS WORKSHEET
Matrix Spike/M x Spike Duplicates

METHOD: ✓ GC ___ HPLC (EPA AK102 & 103)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a matrix spike (MS) and matrix spike duplicate (MSD)?

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix?

Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits stated below?

Level IV/D Only

Y N N/A Were a MS/MSD analyzed for each analytical extraction batch of ≤20 samples?

Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) recalculated for all spiked compounds?

Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) reported results within 10.0% of the recalculated results?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1	11-3-98	KB09083-02B	C	( )	( )	40.1 (20)	#3 & #6	J/A extractables
			D	( )	( )	49.1 (20)		
			A	( )	49.2 (50-150)	( )	#2 & #5	
			B	( )	46.9 ( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )			
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A	Diesel Range ~~Aliphatic~~ Aromatics	50-150	20		
B	Residual Range Aromatics	50-150	20		
C	Diesel Range Aliphatics	50-150	20		
D	Residual Range Aliphatics	50-150	20		
E					
F					
G					
H					
I					
J					

LDC #: 3417C8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-17-98

SDG #: A8-09-093 ____EPA Level III _X_NFESC Level C Page: 1 of 1

Laboratory: Analytica Alaska, Inc. Reviewer: MZ

2nd Reviewer: JY

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-14-98
IIa.	Initial calibration	A	%RSD ≤25%
IIb.	Calibration verification	A	%R(75-125)
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1 **	98NEC02SS301 Soil	11		21	
2	MB10123	12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes: * Aromatic, ** Aliphatic

LDC #: 3417E8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063161 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-11-98, 9-12-98
IIa.	Initial calibration	A	%RSD≤25%, r²≥.990
IIb.	Calibration verification	A	%D≤25%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	~~Client specified~~ none/P
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NEC03GW801 W	11		21	
2	98NEC04GW801	12		22	
3	98NEC00GW801	13		23	
4	98NEC07GW801	14		24	
5	98NEC09GW801	15		25	
6	98NEC09GW802	16		26	
7	98NEC09GW803	17		27	
8	LB980925IDRO	18		28	
9	LB980930IRRO	19		29	
10	LB980930IDRO	20		30	

Notes:

DC #: 341/E8
DG #: 063161

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: mc
2nd Reviewer:

METHOD: ✓ GC __ HPLC (AK 102 & 103)
Are surrogates required by the method? Yes ✓ or No
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1	9/25/98	# 4	DB624	A	0 (50-150)	4	J/R/X (DRO)
2	9/26/98	5			( )	5	
3	9/30/98	6			( )	6	
4	9/25/98	3		B	( )	3	(RRO)
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	O-Terphenyl		50-150	
B	Tricontane		50-150	

SURR.GC

LDC #: 3417F8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063183 ____EPA Level III ___NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9.13.98
IIa.	Initial calibration	A	%RSD ≤25, r^2 ≥.990
IIb.	Calibration verification	A	%D ≤25
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	SW	
IVc.	Laboratory control samples	SW	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	For D_5 Ø D_5 See LDC # 3417A8, D_6 = 15 → 20 Ø 98NECRC302
X.	Field blanks	N	From SDG: A8-09-083. D_7 = 21 → 26 Ø 98NECRC301 from SDG: A8-09-083.

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

ND's = 20, 23

Validated Samples:

1	98NEC11GW801 W	11	98NECRCSD804** S	21 D_7	98NECRCSD801 S	31 D_1	98NECRCSW802 W
2	98NEC11GW802	12	98NECRCSD803	22 D_7	98NECRCSD801*	32 D_1	98NECRCSW202
3	98NEC13GW001	13	98NECRCSD803*	23 D_7	98NECRCSD801**	33	98NECRCSW801
4	98NEC15GW801	14	98NECRCSD803**	24 D_7	98NECRCSD201	34	98NECRCSW801*
5 D_5	98NEC19GW801	15 D_6	98NECRCSD802	25 D_7	98NECRCSD201*	35	98NECRCSW801**
6 D_5	98NEC19GW201	16 D_6	98NECRCSD802*	26 D_7	98NECRCSD201**	36	98NEC19GW801MS
7	98NEC19GW802	17 D_6	98NECRCSD802**	27	98NECRCSW806 W	37	98NEC19GW801MSD
8	98NEC27GW001	18 D_6	98NECRCSD202	28	98NECRCSW805	38	98NEC19GW201MS
9	98NECRCSD804 S	19 D_6	98NECRCSD202*	29	98NECRCSW804	39	98NEC19GW201MSD
10	98NECRCSD804*	20 D_6	98NECRCSD202**	30	98NECRCSW803	40	98NECRCSW802MS
42	98NECRCSD802MS Soil	43	98NECRCSD802MSD Soil			41	98NECRCSW802MSD

Notes: *Aromatic, **Aliphatic LB 9810221 LB 9810221 A

LB 9810222

3417F8W.AB3

DC #: 34178
DG #: 063183

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC (EPA AK102&103)
Are surrogates required by the method? Yes ___ or No ___
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1	10/22/98	2	DB624	A	0 (50-150)	2 Dil: 20	no qual
		3			( )	3 Dil: 50	
	10/29/98	4			( )	4 Dil: 5.0	
	10/22/98	5			( )	5 Dil: 10	
		6			( )	6 Dil: 10	
	10/23/98	7			( )	7 Dil: 5.0	
	10/30/98	34			3.1 ( )	34 Dil: 1.0	J/R/A (DRO)
	10/29/98	9			0 ( )	9 Dil: 10	no qual
	10/30/98	10			( )	10 Dil: 1.0	J/R/A (DRO)
	10/31/98	13			1.5 ( )	13 Dil: 1.0	J/R/A (DRO)
	10/29/98	15			0 ( )	15	
	10/31/98	16			3.9 ( )	16	
		19			3.1 ( )	19	
		22			5.3 ( )	22	
		25			3.5 ( )	25	
	10/22/98	2		B	80 ( )	2 Dil: 20	no qual
		3			( )	3 Dil: 50	
	10/29/98	4			( )	4 Dil: 5	
	10/22/98	5			( )	5 Dil: 10	
		6			( )	6	
	10/23/98	7			( )	7 Dil: 5.0	
		8			( )	8 Dil: 1.0	J/R/A (RRO)
	10/29/98	9			( )	9	
	10/30/98	11			( )	11 Dil: 2.0	no qual

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
DRO A	O-Terphenyl	50-150	50-150	
RRO B	Tricontane			

SDG #: 3411 3
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Reviewer: ML
2nd Reviewer: SL

METHOD: ✓ GC HPLC (EPA 4K1020103
Are surrogates required by the method? Yes or No
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
	10/29/98	12	DB624	B	0 (50-150)	12 Dil:10	J/R/A (RRO)
	10/30/98	14			( )	14	
	10/29/98	15			( )	15	
	10/31/98	17			( )	17	
	10/29/98	18			( )	18	
	10/31/98	20			( )	20	
	10/29/98	21			( )	21	
	10/31/98	23			( )	23	
	10/29/98	24			( )	24	
	10/31/98	26			( )	26	
		LB9810221A*		A	3.0 ( )	LB9810221A*	J/R/A (DRO)
		LB9810201A*			2.7 ( )	LB9810201A*	

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	O-Terphenyl	50-150	50-150	
B	Tricontane			

LDC #: 3417E8
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC (~~EPA~~ AK102 & 103)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- Y N N/A Were all samples associated with a matrix spike (MS) and matrix spike duplicate (MSD)?
- Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix?
- Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits stated below?

Level IV/D Only

- Y N N/A Were a MS/MSD analyzed for each analytical extraction batch of ≤20 samples?
- Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) recalculated for all spiked compounds?
- Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) reported results within 10.0% of the recalculated results?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1	11/6/98	36/37	A	180 (50-150)	463 (50-150)	300 (20)	All Water Samples	Dil:1 J/X (RPD) no qual (%R)
		38/39	A	700 ( )	340 ( )	100 ( )	Dil:10	
		38/39	B	24.8 ( )	48.2 ( )	64 ( )		J/X
		~~40/41~~		( )	( )	( )		
	55/56	98[illegible]SD802	A	170 ( )	180 ( )	( )	All Soil Samples	no qual (DK)
			B	( )	286 ( )	67 ( )		J/X (RPD)
				( )	( )	( )		
		For all the spikes: Sample Conc is > 2X the spike amount						
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A	DRO	50-150	20	50-150	20
B	RRO	↓	↓	↓	↓
C					
D					
E					
F					
G					
H					
I					
J					

MSD

DC #: 3417 ?
DG #: 063183

VALIDATION FIND' S WORKSHEET
Laboratory Contro, Samples (LCS)

' o: 1 of 1
Rev. er: [illegible]
2nd Reviewer: [illegible]

METHOD: / GC __ HPLC (~~EPA~~ AK102/103)

lease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a blank spike analyzed for each matrix or whenever a sample extraction was performed?

Y N N/A Were the blank spike percent recoveries (%R) and relative percent differences (RPD) within the QC limits stated below?

#	Date	Lab ID/Reference	Compound	%R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	11/6/98	LCS/~~D~~ 8	A	59.8 (60-120)	( )	All Water samples	J/A
		/LCD		( )	( )	~~& AB Water~~	
				( )	( )	+ blanks	
				( )	( )	(LB9810221	
				( )	( )	LB9810222	
				( )	( )	LB9810221A)	
				( )	( )		
				( )	( )		
				( )	( )		
				( )	( )		
				( )	( )		
				( )	( )		
				( )	( )		
				( )	( )		
				( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A	RRO	60-120	20		
B					
C					
D					
E					
F					
G					
H					
I					
J					

LDC #: 541+F8
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: mr
2nd reviewer: SL

METHOD: ✓ GC __ HPLC (~~EPA~~ mo AK102 & 103)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units mg/kg) #15 Dilution 1 Prep Date 9-27-98 Analysis date 10-29-98	#18 Dilution 1 Prep Date 9-27-98 Analysis date 10-29-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	130 (7.4)	11 (7.7)	12	MD
RRO	77 (19)	47 (19)	2	—

Compound	Concentration (Detection limit) (units mg/kg) #21 Dilution 1 Prep Date 9-27-98 Analysis date 10-29-98	#24 Dilution 1 Prep Date 9-27-98 Analysis date 10-29-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	20 (8.5)	36 (11)	2	—
RRO	110 (21)	170 (26)	2	—

Compound	Concentration (Detection limit) (units mg/kg) #23 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	#26 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO, Aliphatic	ND (21)	28 (26)	1	—

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: ✓ GC ___ HPLC (~~EPA~~ AK102 & 103)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units mg/Kg) #17 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	#20 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO, Aliphatic	110 (19)	ND (19)	6	MD

Compound	Concentration (Detection limit) (units mg/Kg) #16 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	#19 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	Difference	Disagreement /Major Disagreement (D / MD)
~~DRO,~~ RRO, Aromatic	81 (37)	44 (38)	2	—

Compound	Concentration (Detection limit) (units mg/Kg) #22 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	#25 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	Difference	Disagreement /Major Disagreement (D / MD)
RRO, Aromatic	93 (43)	180 (53)	2	—

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: ✓ GC __ HPLC (~~EPA~~ AK102/103)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

From 3417B8

Compound	Concentration (Detection limit) (units mg/kg) 98NECRC301 Dilution 1 Prep Date 9-25-98 Analysis date 11-3-98	#23Q2 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO, Aliphatics	29 (10)	ND (21)	1	—
RRO, "	66 (26)	ND (43)	2	—
RRO, Aromatics	60 (26)	93 (43)	2	—
~~DRO~~ ~~RRO~~				

Compound	Concentration (Detection limit) (units mg/kg) 98NECRC301 Dilution 5 Prep Date 9-23-98 Analysis date 10-19-98	#21 Dilution 1 Prep Date 9-27-98 Analysis date 10-29-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	210 (52)	20 (8.5)	11	MD
RRO	1600 (52)	110 (21)	15	MD

Compound	Concentration (Detection limit) (units mg/kg) 98NECRC301 Dilution 5 Prep Date 9-23-98 Analysis date 10-19-98	#24 Dilution 1 Prep Date 9-27-98 Analysis date 10-29-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO	210 (52)	36 (11)	6	MD
RRO	1600 (52)	170 (26)	9	MD

LDC #: 3417F8
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC (~~EPA~~ AK102/103)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

From 3417B8

Compound	Concentration (Detection limit) (units mg/Kg) 98NECRC301 Dilution 1 Prep Date 9-25-98 Analysis date 11-3-98	25, 26 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO, Aliphatics	29 (10)	28 (26)	1	—
RRO, "	66 (26)	ND (53)	1	—
RRO, Aromatics	60 (26)	180 (53)	3	—

Compound	Concentration (Detection limit) (units mg/Kg) 98NECRC302 Dilution 1 Prep Date 9-25-98 Analysis date 11-3-98	16, 17 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO, Aliphatics	15 (7.3)	110 (19)	7	MD
RRO, "	32 (18)	ND (37)	NC	—
RRO, Aromatics	26 (18)	81 (37)	3	—

Compound	Concentration (Detection limit) (units mg/Kg) 98NECRC302 Dilution 1 Prep Date 9-25-98 Analysis date 11-3-98	19, 20 Dilution 1 Prep Date 9-27-98 Analysis date 10-31-98	Difference	Disagreement /Major Disagreement (D / MD)
DRO, Aliphatics	15 (7.3)	ND (19)	NC	—
RRO, "	32 (18)	ND (38)	NC	—
RRO, Aromatics	26 (18)	44 (38)	2	—

LDC #: 341FF6
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: ms
2nd reviewer: L

METHOD: ✓ GC ___ HPLC (EPA AK102 & 103)

Y N N/A — Were field duplicate pairs identified in this SDG?
Y N N/A — Were target compounds detected in the field duplicate pairs?

From 341788

Compound	Concentration (Detection limit) (units mg/kg)		Difference	Disagreement /Major Disagreement (D / MD)
	98NECRC302	15		
	Dilution 5 Prep Date 9-23-98 Analysis date 10-17-98	Dilution 1 Prep Date 9-27-98 Analysis date 10-29-98		
DRO	64 (37)	130 (74)	2	—
RRO	380 (37)	77 (19)	5	D

Compound	Concentration (Detection limit) (units mg/kg)		Difference	Disagreement /Major Disagreement (D / MD)
	98NECRC302	18		
	Dilution 5 Prep Date 9-23-98 Analysis date 10-17-98	Dilution 1 Prep Date 9-27-98 Analysis date 10-29-98		
DRO	64 (37)	11 (7.7)	6	MD
RRO	380 (37)	47 (19)	8	MD

Compound	Concentration (Detection limit) (units ______)		Difference	Disagreement /Major Disagreement (D / MD)
	Dilution ______ Prep Date ______ Analysis date	Dilution ______ Prep Date ______ Analysis date		

LDC #: 3417G8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/21/98

SDG #: 063188 ___EPA Level III ___NFESC Level C Page: 1 of ___

Laboratory: Quanterra Environmental Services Reviewer: m

2nd Reviewer: ___

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9-12-98
IIa.	Initial calibration	A	%RSD ≤ 25%, ~~r² ≥ .990~~
IIb.	Calibration verification	~~SW~~ A	%D ≤ 25%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	~~Client Specified~~ none
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NECDBSD801	S	11	98NECDBSS806*	S	21	98NECDBSS809**	S	31	LB9810021ARO	S
2	98NECDBSD801*		12	98NECDBSS806**		22	98NECBDSS802		32	LB9810021ARO*	
3	98NECDBSD801**		13	98NECDBSS807		23	98NECBDSS802*		33	LB9810021ARO**	
4	98NECDBSD802		14	98NECDBSS807*		24	98NECBDSS802**		34		
5	98NECDBSD802*		15	98NECDBSS807**		25	98NECBDSS801		35		
6	98NECDBSD802**		16	98NECDBSS808		26	98NECBDSS801*		36		
7	98NECDBSD803		17	98NECDBSS808*		27	98NECBDSS801**		37		
8	98NECDBSD803*		18	98NECDBSS808**		28	LB9810021DRO		38		
9	98NECDBSD803**		19	98NECDBSS809		29	LB9810021DRO*		39		
10	98NECDBSS806		20	98NECDBSS809*		30	LB9810021DRO**		40		

Notes: *Aromatic, **Aliphatic

VALIDATION FINDINGS WORKSHEET

SDG #: 063188

Technical Holding Times

Page: ___ of ___
Reviewer: [illegible]
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.

Y N N/A Were all cooler temperatures within validation criteria?

METHOD : ✓ GC __ HPLC (EPA AK 102/103)

Sample ID	Matrix	Preserved	Sampling Date	~~Extraction date~~	Analysis date	Total # of Days	Qualifier
2	Soil	N/A	9-12-98	10-15-98	10-27-98	33	J/R
3					10-28-98		
5					10-27-98		
6					10-28-98		
8							
9							
11					10-27-98		
12							
14				10-16-98		34	
15							
17							
18							
20							
[illegible]							
[illegible]					10-28-98		
[illegible]							
26				10-15-98		33	
27							
~~1~~				~~9-26-98~~	~~10-27-98~~ SJ		SJ

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

EDC #: 341 8
SDG #: 063188

VALIDATION FIN DS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: SI

METHOD: ✓ GC   HPLC (EPA AK102/103)
Are surrogates required by the method? Yes ✓ or No
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A   Were surrogates spiked into all samples and blanks?
Y N N/A   Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)		Associated Samples		Qualifications
1	10/5/98	1	DB624	A	.10	(50-150)	1	Dil: 50	no qual
	10/27	2			0	( )	2	1.0	J/R/A (DRO)
	10/28	3				( )	3	10	no qual
	10/5	4			8.8	( )	4	50	no qual
	10/27	5		B	0	( )	5	2.0	
	10/28	6		C		( )	6	50	
	10/5	7		A	6.1	( )	7	50	
	10/28	8			0	( )	8	2.0	
		9		C	0	( )	9	50	
	10/27	11		A		( )	11	1.0	J/R/A (DRO)
		18		C		( )	18		
		21				( )	21		
	10/5	1		D		( )	1	5.0	no qual
	10/27	3			23	( )	3	1.0	J/A (RRO)
	10/5	4			0	( )	4	20	no qual
	10/27	5		B		( )	5	1.0	J/R/A (RRO)
	10/28	6		D		( )	6	50	no qual
		6		C		( )	6		
	10/5	7		D		( )	7	10	
	10/27	8		B		( )	8	1.0	J/R/A (RRO)
	10/28	9		D		( )	9	50	no qual
		9		C		( )	9		
	10/5	10		D		( )	10	1.0	J/R/A (RRO)
		13				( )	13		J/R/A

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
Diesel A	O-Terphenyl	50-150		
B	Phenanthrene-d10	RRO aromatic		
aliphatic DRO	Pentacosane			

DC #: 34176 8
SDG #: 063188

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Reviewer: m
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC (EPA AK102&103)
Are surrogates required by the method? Yes ✓ or No
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
	10/5/98	16	DB624	D	0 (50-150)	16 Dil: 1.0	J/R/A (RRO)
	10/27	~~18~~		C	( )	~~18~~	~~RS~~
		~~18~~		~~C~~	( )	~~18~~	
	10/5	19		D	( )	19	J/R/A (RRO)
	10/27	21			( )	21	
	10/5	22			( )	22	
	10/28	24			( )	24	
	10/5	25			( )	25	
	10/28	27			( )	27	
		18		~~C~~	~~on first page~~	18	
				D	( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A				
B				
C	Pentacosane	50-150		
D	Tricontane			

LDC #: 3417H8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/21/98

SDG #: 063189 ___EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-12-98
IIa.	Initial calibration	A	%RSD ≤ 25%, $r^2 \geq .990$
IIb.	Calibration verification	A	%D ≤ 25%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	~~Client Specified~~ none / P
IVc.	Laboratory control samples	A	LCS / LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NECRCSD805	S	11	LB981002/RRO*	S	21		31	
2	98NECRCSD805*		12	LB981002/RRO**		22		32	
3	98NECRCSD805**		13			23		33	
4	98NECRCSD806		14			24		34	
5	98NECRCSD806*		15			25		35	
6	98NECRCSD806**		16			26		36	
7	LB981002/DRO		17			27		37	
8	LB981002/DRO*		18			28		38	
9	LB981002/DRO**		19			29		39	
10	LB981002/RRO		20			30		40	

Notes: *Aromatic, **Aliphatic

SDG #: 34178
SDG #: 063189

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: mcf
2nd Reviewer: SS

METHOD: ✓ GC HPLC (EPA AK 102/103)
Are surrogates required by the method? Yes ✓ or No ____
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1	10/28/98	5	DB624	A	0 (50-150)	5	J/R/A (DRO)
		LB981002IDRO*		↓	28 (↓)	LB981002IDRO*	↓

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	o-Terphenyl	50-150		
B				

SURGC

LDC #: 341718 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063190 ____EPA Level III ___NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: ms

2nd Reviewer: g

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-12-98
IIa.	Initial calibration	A	%RSD ≤ 25%, r^2 ≥ .990
IIb.	Calibration verification	A	%D ≤ 25%
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	~~Client Specified~~ None/P
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	See SDG A8-09-082 (LDC: 3417A8)
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	D2	98NEC10GW801 W	11		21		31	
2	D2	98NEC10GW201	12		22		32	
3		98NEC10GW802	13		23		33	
4		LB9809301DRO	14		24		34	
5		LB9809301RRO	15		25		35	
6			16		26		36	
7			17		27		37	
8			18		28		38	
9			19		29		39	
10			20		30		40	

Notes: *Aromatic, **Aliphatic

LDC #: 34171 8
SDG #: 063190

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: mz
2nd Reviewer: Q

✓ DRO ⌀ RRO

METHOD: GC___TFH Volatiles (Gasoline)___TFH Extractables (Diesel)___CDOHS LUFT___EPA SW 846 Method 8015 Modified. ✓AK102⌀103

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks? (Not required)

Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Sample ID	Surrogate Compound	%R (Limits)	Qualifications
1	9/30/98	1	A	0 (50-150)	J/A R/A ND (DRO)
2		2		( )	
		3		( )	
		1	B	( )	(RRO)
		2		( )	
		3		( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	O-Terphenyl	50-ms	50-150	
B	Tricontane			

SUR.

LDC #: 3417J8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063191 ____EPA Level III ____NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9-14-98
IIa.	Initial calibration	A	%RSD ≤ 20, $r^2 \geq .990$
IIb.	Calibration verification	A	%D ≤ 20
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	SW	
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NEC02SS801 S	11	LB9810201A*RRO S	21		31	
2	98NEC02SS802	12	LB9810201DRO	22		32	
3	98NEC02SS201	13	LB9810201RRO	23		33	
4	98NEC14SS802	14	98NEC14SS802*	24		34	
5	98NEC00SS801	15	98NEC14SS802**	25		35	
6	98NEC02SS801MS	16	98NEC00SS801*	26		36	
7	98NEC02SS801MSD	17	98NEC00SS801**	27		37	
8	LB9810201A**DRO	18		28		38	
9	LB9810201A*DRO	19		29		39	
10	LB9810201ARRO**	20		30		40	

Notes: *Aromatic, **Aliphatic

SDG #: 063191

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD : ✓ GC __ HPLC EPA AK 102 & 103

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
15	Soil	N/A	9-14-98	10/27/98	10/30/98	43	J/R [illegible]
14							
17					10/31/98		
16							

TECHNICAL HOLDING TIME CRITERIA

VOLATILES: Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
Water preserved: Both within 14 days of sample collection.
Soils: Both within 14 days of sample collection.

EXTRACTABLES:
Water: Extracted within 7 days, analyzed within 40 days.
Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 341 8
SDG #: 063141

Reviewer: [illegible]
2nd Reviewer: [illegible]

VALIDATION FIN DS WORKSHEET
Surrogate Recovery

METHOD: ✓ GC ___ HPLC (EPA AK102/103)
Are surrogates required by the method? Yes ✓ or No____.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
(Y) N N/A Were surrogates spiked into all samples and blanks?
Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1	10/30/98	14	DB624	A	9.1 (50-150)	14 Dil: 10	J/R/A (DRO)
	10/26	5			0 ( )	5 20	no qual
	10/31	16			( )	16 1.0	J/R/A (DRO)
	10/20	1		B	( )	1	(RRO)
		3			( )	3	(RRO)
		4			( )	4	
	10/30	15			( )	15	
	10/26	ms ~~14~~ 5			( )	5 20	no qual
	10/30	17			( )	17 1.0	J/R/A (RRO)
					( )		
					( )		
		LB9810201ADRO*		A	2.7 ( )	LB9810201ADRO*	J/R/A (DRO)
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	O-Terphenyl	50-150		
B	Tricontane			

LDC #: 34128
SDG #: 063191

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: ml
2nd Reviewer: SL

METHOD: ✓ GC __ HPLC (EPA AK 102 & 103)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A — Were all samples associated with a matrix spike (MS) and matrix spike duplicate (MSD)? (Y)
Y N N/A — Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix? (Y)
Y N N/A — Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits stated below? (N)

Level IV/D Only

Y N N/A — Were a MS/MSD analyzed for each analytical extraction batch of ≤20 samples? (N/A)
Y N N/A — Were the percent recoveries (%R) and relative percent differences (RPD) recalculated for all spiked compounds? (N/A)
Y N N/A — Were the percent recoveries (%R) and relative percent differences (RPD) reported results within 10.0% of the recalculated results? (N/A)

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1	10/31/98	6/7	RRO	291 (50-150)	349 (50-150)	( )	All	~~J dets/A~~
				( )	( )	( )		No qual
				Sample Conc. is >2X the spike concent				
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )			
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A					
B					
C					
D					
E					
F					
G					
H					
I					
J					

LDC #: 3417K8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063195 ___EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: MS

2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-16-98
IIa.	Initial calibration	A	%RSD ≤ 25, r2 ≥ .990
IIb.	Calibration verification	A SW	%D ≤ 25
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	~~Client specified~~ None
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NEC27SW801 W	11		21		31	
2	MBDRO	12		22		32	
3	MBRRO	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: *Aromatic, **Aliphatic

3417K8W.AR3

LDC #: 3417K8
SDG #: 063195

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: MG
2nd Reviewer: SC

METHOD: ___ GC ___ HPLC (EPA KA 10280103)
Are surrogates required by the method? Yes ✓ or No____.
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were surrogates spiked into all samples and blanks? (Y circled)
Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below? (N circled)

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1	10/17/98	1	DB624	A	17 (50-150)	1	J/X (RRO)
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
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					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	Tricontane		50-150	
B				

SUR

LDC #: 3417L8 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063197 ___EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Diesel Range Organics & Resudual Range Organics (Method AK102 & AK103)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9-15-98
IIa.	Initial calibration	A	%RSD≤25, r2≥.990
IIb.	Calibration verification	A	%D≤25
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	~~Client specified~~ none/P
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NECBKSW801 W	11	98NEC06SS802 S	21	MBDROS* S	31	
2	98NECBKSW802	12	98NEC09SS801	22	MBRROS**	32	
3	98NEC13GW802	13	98NEC10SS801	23	MBRROS*	33	
4	98NECBKSD801 S	14	98NEC10SS801*	24		34	
5	98NECBKSD801*	15	98NEC10SS801**	25		35	
6	98NECBKSD801**	16	MBDROW W	26		36	
7	98NECBKSD802	17	MBRROW	27		37	
8	98NECBKSD802*	18	MBDROS S	28		38	
9	98NECBKSD802**	19	MBRROS	29		39	
10	98NEC06SS801	20	MBDROS**	30		40	

Notes: *Aromatic, **Aliphatic

LDC #: 241T6 5
SDG #: 063197

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: ___ of ___
Reviewer: ___
2nd Reviewer: ___

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD : ✓ GC__ HPLC (EPA AK103 & 102)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
6	Soil	N/A	9-15-98	10/22/98	10/28/98	37	J/R R/P
5							
9							
8							
15							
14							

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

LDC #: 341_3
SDG #: C63197

Reviewer: [illegible]
2nd Reviewer: JY

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

METHOD: ___ GC ___ HPLC (EPA AK102 & 103)
Are surrogates required by the method? Yes ✓ or No
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate recoveries (%R) meet the QC limits stated below?

#	Date	Lab ID/Reference	Column	Surrogate Compound	%R (Limits)	Associated Samples	Qualifications
1	10/17/98	3	DB624	A	0 (50-150)	3 Dil: 10	no qual
	10/29	11			( )	11 20	
	10/17	13			( )	13 10	
		2		B	13 ( )	2 1.0	J/A (RRO)
		3			7.3 ( )	3	J/R/A (RRO)
	10/29	11			0 ( )	11 20	no qual
		13			( )	13 10	
	10/28	15			( )	15 1.0	J/R/A (RRO)
					( )		
		MBDROS*		A	2.7 ( )	MBDROS*	J/R/A (DRO)
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		
					( )		

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	O-Terphenyl	50-150	50-150	
B	Tricontane			

LDC #: 3417A32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-16-98

SDG #: A8-09-082 ____EPA Level III X NFESC Level C Page: 1 of 1

Laboratory: Analytica Alaska, Inc. Reviewer: m2

2nd Reviewer: JJ

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-12-98 → 9-13-98
IIa.	Initial calibration	A	%RSD
IIb.	Calibration verification	A	%R
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	~~A~~ SW	D_2* = 1, 98NEC10GW801, 98NEC10GW201 from SDG 063190, ~~D_3 = 3, 98NEC15GW801 from SDG 0631~~. D_5 = 5, 98NEC19GW801, 98NEC19GW201 from SDG 063183.
X.	Field blanks	ND	TB = 2

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

*ND

Validated Samples:

1 D_2	98NEC10GW301	W	11		21	
2 TB	98NECTB004		12		22	
3 D_3	98NEC15GW301		13		23	
4	98NEC15GW301RE		14		24	
5 D_5	98NEC19GW301		15		25	
6	98NEC19GW301RE		16		26	
7	98NEC10GW301MS		17		27	
8	98NEC10GW301MSD	↓	18		28	
9	MB ~~8~~0924-1	↓	19		29	
10	MB MS 092~~5~~-1		20		30	

Notes: ______________________________

LDC #: [illegible]
SDG #: A8-09-082

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC (EPA SW846 Method 8021

(Y) N N/A Were field duplicate pairs identified in this SDG?
(Y) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/L) 98NECAGW801 Dilution 1 Prep Date 9.25-98 Analysis date 9.25-98	98NEC19GW201 Dilution 1 Prep Date 9-25-98 Analysis date 9-25-98	Difference	Disagreement /Major Disagreement (D / MD)
Xylenes, Total	35 (3.0)	34) (3.0)	1	—
			SDG	
	already in		063183	
			LDC	3417F32

Compound	Concentration (Detection limit) (units ___) Dilution___ Prep Date___ Analysis date	Dilution___ Prep Date___ Analysis date	Difference	Disagreement /Major Disagreement (D / MD)

Compound	Concentration (Detection limit) (units ___) Dilution___ Prep Date___ Analysis date	Dilution___ Prep Date___ Analysis date	Difference	Disagreement /Major Disagreement (D / MD)

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: ✓ GC ___ HPLC (~~EPA~~ EPA SW846 Method 8021

(Y) N N/A Were field duplicate pairs identified in this SDG?
(Y) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/L) #3 Dilution 1 Prep Date N/A Analysis date 9.24.98	98NEC15GW801 Dilution 1.0 Prep Date 9.25.98 Analysis date 9.25.98	Difference	Disagreement /Major Disagreement (D / MD)
Ethylbenzene	1.5 (1.0)	ND (1.0)	2	—
Xylenes, Total	5.0 (1.0)	23 (3.0)	5	MD

Compound	Concentration (Detection limit) (units ug/L) #5 Dilution 1 Prep Date N/A Analysis date 9.24.98	98NEC19GW801 Dilution 1. Prep Date 9-25-98 Analysis date 9.25.98	Difference	Disagreement /Major Disagreement (D / MD)
Toluene	1.4 (1.0)	ND (1.0)	1	—
Xylenes, Total	32 (1.0)	35 (3.0)	1	—

Compound	Concentration (Detection limit) (units ug/L) #5 Dilution 1 Prep Date N/A Analysis date 9.24.98	98NEC19GW201 Dilution 1 Prep Date 9-25-98 Analysis date 9-25-98	Difference	Disagreement /Major Disagreement (D / MD)
Toluene	1.4 (1.0)	ND (1.0)	1	—
Xylenes (Total)	32 (1.0)	34 (3.0)	1	—

LDC #: 3417B32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-16-98

SDG #: A8-09-083 ____EPA Level III X NFESC Level C Page: 1 of 1

Laboratory: Analytica Alaska, Inc. Reviewer: mr

2nd Reviewer: jt

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-13-98
IIa.	Initial calibration	A	%RSD
IIb.	Calibration verification	A	%R
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	~~See LDC # 3417F8~~ mr
IX.	Field duplicates	ND ~~SW~~ mr	(1, 98NECRCSD801) (1, 98NECRCSD201) = D7 } from F32
X.	Field blanks	N	(2, 98NECRCSD802) (2, 98NECRCSD802)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1 D7	98NECRC301 S	11		21	
2 D7	98NECRC302	12		22	
3	98NECRC302MS	13		23	
4	98NECRC302MSD	14		24	
5	MB0922-1	15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

3417B32W.AR3

LDC #: 3417B32
SDG #: A8-09-08'5

VALIDATION FINDINGS WORKSHEET
Surrogate Spikes

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: JC

METHOD: GC Volatiles (EPA SW 846 Method 8010/8020)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks?
Y N N/A Did all surrogate percent recoveries (%R) meet the QC limits stated below?

#	Date	Sample ID	Column	Surrogate Compound	%R (Limits)	Qualifications
1	9-22-98	1	Not Specified	A	28 (60-120)	Dilution: 25 No qual
	↓	2	↓	↓	40 (↓)	↓ ↓
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	
					( )	

Letter Designation	Surrogate Compound	Recovery QC Limits (Soil)	Recovery QC Limits (Water)	Comments
A	P-Bromofluorobenzene	60-120		
B				
C				

LDC #: 3417E32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-18-98

SDG #: 063161 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: Q

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-11-98 and 9-12-98
IIa.	Initial calibration	A	%RSD < 20% and $R^2 > 0.990$
IIb.	Calibration verification	A	%D < ~~25%~~ 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	~~SW~~ N	~~Client specified~~ None / P
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N ~~N SW~~	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	TB = 4, 9

Note: A = Acceptable ND = No compounds detected D = Duplicate
N = Not provided/applicable R = Rinsate TB = Trip blank
SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples:

1	98NEC03GW801 Water	11		21	
2	98NEC04GW801	12		22	
3	98NEC00GW801	13		23	
4 TB	98NECTB001	14		24	
5	98NEC07GW801	15		25	
6	98NEC09GW801	16		26	
7	98NEC09GW802	17		27	
8	98NEC09GW803	18		28	
9 TB	98NECTB002	19		29	
10	LB980924N2	20		30	

Notes:

LDC #: 3417F32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063183 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: [illegible]

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-13-98
IIa.	Initial calibration	A	%RSD < 20% OR R^2 > 0.990
IIb.	Calibration verification	SW	%D < 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	SW	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	ND
VII.	System Performance	N	ND
VIII.	Overall assessment of data	A	D_6 = 12, 13 ; D_7 = 14, 15
IX.	Field duplicates	SW	D_3 = 4,5, 98NEC15GW301 from SDG# AB-09-082
X.	Field blanks	N	D_5 = 6, 7, 98NEC19GW301 from S... AB-0908..

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate (14,15); TB = Trip blank; EB = Equipment blank (12,13)

Validated Samples:

1	98NEC11GW801 Water	11	98NECRCSD803 Soil	21	98NECRCSW801 Water
2	98NEC11GW802	12 D_6	98NECRCSD802	22	98NEC19GW801MS
3	98NEC13GW001	13 D_6	98NECRCSD202	23	98NEC19GW801MSD
4 D_3	98NEC15GW801	14 D_7	98NECRCSD801	24	98NEC19GW201MS
5 D_3	98NEC15GW201	15 D_7	98NECRCSD201	25	98NEC19GW201MSD
6 D_5	98NEC19GW801	16	98NECRCSW806 Water	26	98NECRCSW802MS
7 D_5	98NEC19GW201	17	98NECRCSW805	27	98NECRCSW802MSD
8	98NEC19GW802	18	98NECRCSW804	28	LB980925N2 (BLK) Water
9	98NEC27GW001	19	98NECRCSW803	29	LB980925N2A
10	98NECRCSD804 Soil	20 R	98NECRCSW802	30	

Notes:

LDC # 341, 32
SDG # 063183

VALIDATION FI[illegible] [illegible]GS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: Z. Pa
2nd Reviewer: gn

METHOD: GC Volatiles (EPA SW 846 Method 8010/8020)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ✓ %D or RPD
Y N N/A Was at least one continuing standard run daily to verify the working curve?
Y N N/A Were continuing standards analyzed at a frequency of every 10 samples to verify the working curve?
Y N N/A Did the continuing calibration standards meet the percent difference (%D) and relative percent differences (RPD) criteria of ≤15.0%?
Level IV/D Only
Y N N/A Were the percent difference (%D) results recalculated? (Please see Calibration Verification results verification worksheet.)
Y N N/A Were the (%D) reported results within 10.0% of the recalculated results?

#	Date	Standard ID	Column	Compound	%D / RPD (Limit ≤ 15.0)	Associated Samples	Qualifications
1	9-25-98 20:09	8021B CCV	Not Specified	DD	36.5	#16-21; 26-27	J/A
							(aver. <15%)

A. Chloromethane
B. Bromomethane
C. Vinyl chloride
D. Chloroethane
E. Trichlorofluoromethane
F. 1,1-Dichloroethene
G. Methylene chloride
H. t-1,2-Dichloroethene
I. 1,1-Dichloroethane
J. c-1,2-Dichloroethene
K. Chloroform
L. 1,1,1-Trichloroethane
M. Carbon tetrachloride
N. 1,2-Dichloroethane
O. Trichloroethene
P. 1,2-Dichloropropane
Q. Bromodichloromethane
R. 2-Chloroethylvinyl ether
S. c-1,3-Dichloropropene
T. t-1,3-Dichloropropene
U. 1,1,2-Trichloroethane
V. Tetrachloroethene
W. Dibromochloromethane
X. Chlorobenzene
Y. Bromoform
Z. 1,1,2,2-Tetrachloroethane
AA. 1,3-Dichlorobenzene
BB. 1,4-Dichlorobenzene
CC. 1,2-Dichlorobenzene
DD. Benzene
EE. Toluene
FF. Ethylbenzene
GG. m,p-Xylene
HH. o-Xylene

LDC #: 3417F32
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: Z. Pa
2nd Reviewer: A

METHOD: GC Volatiles (EPA SW 846 Method 8010/8020)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?
Y N N/A Were a MS/MSD analyzed every 20 samples for each matrix and whenever a sample extraction was performed?
Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within the QC limits stated below?

Level IV/D Only

Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) recalculated for all spiked compounds?
Y N N/A Were the %R and RPD reported results within 10.0% of the recalculated results?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
1		#22/23	A	( )	( )	13 (<6)	All Water Samples	J/A
			C	( )	( )	7.9 ( )		
			D	( )	( )	9.0 ( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A	Benzene			~~132~~ 62-132	<6%
B	Ethylbenzene			73-121	<6%
C	Toluene			59-117	<6%
D	Xylene			74-109	<6%
E					
F					
G					
H					
I					
J					

LDC #: [illegible]
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: Z. Pan
2nd reviewer: SJ

METHOD: ✓ GC ___ HPLC (EPA 8021)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units µg/L) #4 Dilution 1 Prep Date N/A Analysis date 9-25-98	#5 Dilution 1 Prep Date NA Analysis date 9-25-98	Difference	Disagreement /Major Disagreement (D / MD)
Xylenes	23 (3.0)	26 (3.0)	1	—

Compound	Concentration (Detection limit) (units µg/L) #4 Dilution 1 Prep Date N/A Analysis date 9-25-98	98NEC15GW301 Dilution 1 Prep Date NA Analysis date 9-24-98	Difference	Disagreement /Major Disagreement (D / MD)
Xylenes	23. (3.0)	5.0 (1.0)	5	MD
Ethylbenzene	ND (1.0)	1.5 (1.0)	2	—

Compound	Concentration (Detection limit) (units µg/L) #5 Dilution 1 Prep Date N/A Analysis date 9-25-98	98NEC15GW301 Dilution 1 Prep Date N/A Analysis date 9-24-98	Difference	Disagreement /Major Disagreement (D / MD)
Xylenes	26 (3.0)	5.0 (1.0)	~~5.2~~ 5	MD
Ethylbenzene	ND (1.0)	1.5 (1.0)	~~1.5~~ 2	—

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VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: ✓ GC __ HPLC (EPA 8021)

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (Detection limit) (units ug/L) #6 Dilution 1 Prep Date N/A Analysis date 9-25-98	#7 Dilution 1 Prep Date N/A Analysis date 9-25-98	Difference	Disagreement /Major Disagreement (D / MD)
Xylenes	35 (1.0)	34 (1.0)	1	—

Compound	Concentration (Detection limit) (units ug/L) #6 Dilution 1 Prep Date N/A Analysis date 9-25-98	98NEC19GW301 Dilution 1 Prep Date N/A Analysis date 9-24-98	Difference	Disagreement /Major Disagreement (D / MD)
Toluene	ND (1.0)	1.4 (1.0)	1	—
Xylenes	35 (1.0)	32 (1.0)	1	—

Compound	Concentration (Detection limit) (units) #7 Dilution 1 Prep Date N/A Analysis date 9-25-98	98NEC19GW301 Dilution 1 Prep Date N/A Analysis date 9-24-98	Difference	Disagreement /Major Disagreement (D / MD)
Toluene	ND (1.0)	1.4 (1.0)	1	—
Xylenes	34 (1.0)	32 (1.0)	1	—

LDC #: 3417G32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-18-98

SDG #: 063188 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: a

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-12-98
IIa.	Initial calibration	A	%RSD < 20% and $R^2 > 0.990$
IIb.	Calibration verification	A	%D < 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N ~~SW~~	client ~~specified~~ none / P
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NECDBSD801 Soil	11		21	
2	98NECDBSD802	12		22	
3	98NECDBSD803	13		23	
4	98NECBDSS802	14		24	
5	98NECBDSS801	15		25	
6	LB980923N2 (BLK)	16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

3417G32W.AR3

LDC #: 3417I32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063190 ___EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-12-98
IIa.	Initial calibration	A	%RSD < 20%
IIb.	Calibration verification	A	%D < 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N ~~SW~~	~~Client specified~~ none
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	ND	D_2 = 1, 2, 98NEC10GW301 from SDG# A8-09-082
X.	Field blanks	ND	TB = 4

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1 D_2	98NEC10GW801 Water	11		21	
2 D_2	98NEC10GW201	12		22	
3	98NEC10GW802	13		23	
4 TB	98NECTB003	14		24	
5	LB980924N2 (BLK)	15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

LDC #: 3417J32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063191 ___EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: [illegible]

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-14-98
IIa.	Initial calibration	A	%RSD < 20%
IIb.	Calibration verification	A	%D < 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NEC02SS801 Soil	11		21	
2	98NEC02SS802	12		22	
3	98NEC14SS802	13		23	
4	98NEC00SS801	14		24	
5	LB980928N2 (BLK)	15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

LDC #: 3417K32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-18-98

SDG #: 063195 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: Z. Pan

2nd Reviewer: [illegible]

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-16-98
IIa.	Initial calibration	A	%RSD < 20% and $R^2 > 0.990$
IIb.	Calibration verification	A	%D < 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	~~SW~~ N	~~Client specified~~ none [illegible]
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	TB = 3

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NEC27SW801 Water	11		21	
2	LB980929N2B (BLK)	12		22	
3 TB	98NECTB007	13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

LDC #: 3417L32 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063197 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [signature]

2nd Reviewer: [signature]

METHOD: Aromatic Volatile Organics (EPA SW 846 Method 8021B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-15-98
IIa.	Initial calibration	A	%RSD < 20% and R^2 > 0.990
IIb.	Calibration verification	A	%D < 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NECBKSW801 Water	11		21	
2	98NECBKSW802	12		22	
3	98NEC13GW802	13		23	
4	98NECBKSD801 Soil	14		24	
5	98NECBKSD802	15		25	
6	98NEC06SS801	16		26	
7	98NEC09SS801	17		27	
8	98NEC10SS801	18		28	
9	LB980929N2A (BLK) Water	19		29	
10	LB980929N2 (BLK) Soil	20		30	

Notes:

3417L32W.AR3

LDC #: 3417F21 **VALIDATION COMPLETENESS WORKSHEET** Date: 2-21-98

SDG #: 063183 ___EPA Level III ___NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A SW	Sampling dates: 9-13-98
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration	A	
IV.	Routine calibration	SW	
V.	Blanks	A	
VI.	Matrix spike/Matrix spike duplicates	N	~~[illegible]~~ [illegible]
VII.	Laboratory control samples	A	LCS
VIII.	Regional quality assurance and quality control	N	
IX.	Internal standards	SW A	
X.	Target compound identifications	N	
XI.	Compound quantitation and CRQLs	N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NEC25SS801 Soil	11		21	
2	LB9810069A	12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

LDC #: 34171.21
SDG #: 063183

VALIDATION FINDINGS WORKSHEET

Page: 1 of 1
Reviewer: JH
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total Hx CDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:

LDC #: 5-7F2
SDG #: 063183

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Reviewer: SL
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD : HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
All	cooler temp	at 21°.	criteria < 11°C		J/~~[illegible]~~		

TECHNICAL HOLDING TIME CRITERIA

EXTRACTABLES
Water: Extracted within 30 days, analyzed within 45 days.
Soil: Extracted within 30 days, analyzed within 45 days.

LDC #: 341
SDG #: 003183

VALIDATION FIN[illegible]IGS WORKSHEET
Routine Calibration

Reviewer: JS
2nd Reviewer: B

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Was a routine calibration was performed at the beginning and end of each 12 hour period? (Y)
Y N N/A Were all percent differences (%D) of RRFs ≤ 20% for unlabeled compounds and ≤ 30% for labeled? (N)
Y N N/A Did all routine calibration standards meet the Ion Abundance Ratio criteria? (N/A)

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Finding Ion Abundance Ratio	Associated Samples	Qualifications
1	10-17-98	ST1D178	A	25		LB981009A	J/A
		(end)	I	22			
			J	22			
			M	24			
			N	33			
			C	21			
			P	22			
			Q	29			no qual, alg. used
			^{13}C-12378-PeCDF	33			J/A (1, J, W)
			^{13}C-1234678-HpCDF	36			(O, P, X)

	PCDDs	Selected Ions (m/z)	Ion Abundance Ratio		PCDFs	Selected Ions (m/z)	Ion Abundance Ratio
A.	Tetra-	M/M+2	0.65-0.89	H.	Tetra-	M/M+2	0.65-0.89
B.	Penta-	M+2/M+4	1.32-1.78	I.	Penta-	M+2/M+4	1.32-1.78
C.	Hexa-	M+2/M+4	1.05-1.43	J.	Hexa-	M+2/M+4	1.05-1.43
D.	Hexa-^{13}C-HxCDF (IS) only	M/M+2	0.43-0.59	K.	Hexa-^{13}C-HxCDF (IS) only	M/M+2	0.43-0.59
E.	Hepta-^{13}C-HpCDF (IS) only	M/M+2	0.37-0.51	L.	Hepta-^{13}C-HpCDF (IS) only	M/M+2	0.37-0.51
F.	Hepta-	M+2/M+4	0.88-1.20	M.	Hepta-	M+2/M+4	0.88-1.20
G.	Octa-	M+2/M+4	0.76-1.02	N.	Octa-	M+2/M+4	0.76-1.02

LDC #: 3417G15 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/24/98

SDG #: 063188 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: MG

2nd Reviewer: A

METHOD: Total organic carbon (Method Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/12/98
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/MSD from another SDG
IVb.	Laboratory control samples	A	LCS
V.	Sample result verification	N	
VI.	Overall assessment of data	A	
VII.	Field duplicates	N	
VIII.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NECDBSS803 Soil	11		21	
2	98NECDBSS804	12		22	
3	98NECDBSS805	13		23	
4	MB	14		24	
5		15		25	
5		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes: 5

LDC #: 3417J15 **VALIDATION COMPLETENESS WORKSHEET** Date: 12/24/98

SDG #: 063191 ____EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Total organic carbon (Method Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9/14/98
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	A	MS/Dup from another SDG.
IVb.	Laboratory control samples	A	LCS
V.	Sample result verification	N	
VI.	Overall assessment of data	A	
VII.	Field duplicates	N	
VIII.	Field blanks	N	~~[illegible]~~

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NEC14SS802 Soil	11		21	
2	98NEC00SS801	12		22	
3	MB	13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes: 5

LDC #: 3417L15 **VALIDATION COMPLETENESS WORKSHEET** Date: 2/24/98

SDG #: 063197 ____EPA Level III X NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: MM

2nd Reviewer: [illegible]

METHOD: Total organic carbon (Method Walkley/Black)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 9/15/98
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IVa.	Matrix Spike/(Matrix Spike) Duplicates	SW	Soil MS/MSD from another SDG.
IVb.	Laboratory control samples	A	LCS
V.	Sample result verification	N	
VI.	Overall assessment of data	A	
VII.	Field duplicates	N	
VIII.	Field blanks	N	~~Blank = 1, 2, 3, 4, 8~~ MM

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	98NECBKSW801 Aq	11		21	
2	98NECBKSW802	12		22	
3	98NECBKSD801 Soil	13		23	
4	98NECBKSD802	14		24	
5	98NEC06SS801	15		25	
6	98NEC07SS802	16		26	
7	98NEC09SS802	17		27	
8	98NEC10SS801	18		28	
9	98NECBKSW801MS Aq	19		29	
10	98NECBKSW801MSD	20		30	

10

Notes:

VALIDATION FINDINGS WORKSHEET

Technical Holding Times

SDG #: C63197

Page:___of___
Reviewer: [signature]
2nd reviewer: _____

All circled dates have exceeded the technical holding time.

Y N N/A Soil Were all samples preserved as applicable to each method ?

Y N N/A Were all cooler temperatures within validation criteria?

Method:	Walkley Black					
Parameters:	TOC					
Technical holding time:	28 days					

Sample ID	Sampling date	Analysis date	Analysis date	Analysis date	Analysis date	Analysis date	Qualifier
1	9/15/98	10/16/98	31 days				J/P
2							
3		9/30/98					no qual
4							
5							
6							
7							
8							
9		10/16/98	31 days				J/P
10							

LDC #: 34145
SDG #: 063F97

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: mf
2nd Reviewer: [illegible]

METHOD: Inorganics, EPA Method See cover

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a facto of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
1		9/10	AQ	TOC	0	0		~~1-9~~ (all water)	J/A det; R/A nd

Comments:

MSD

LDC #: 3417L51 **VALIDATION COMPLETENESS WORKSHEET** Date: 12-21-98

SDG #: 063197 ___EPA Level III __NFESC Level C Page: 1 of 1

Laboratory: Quanterra Environmental Services Reviewer: ML

2nd Reviewer: gl

METHOD: GC Methane, ~~Ethane & Ethene~~ (Method ~~AK102 & 103~~ RSK175)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 9-15-98
IIa.	Initial calibration	A	%RSD<25, ~~r2 > .990~~
IIb.	Calibration verification	A	RPD ≤25
III.	Blanks	A	
IVa.	Surrogate recovery	N	Not Required
IVb.	Matrix spike/Matrix spike duplicates	NSW	~~Client specified~~
IVc.	Laboratory control samples	A	LCS/LCSD
V.	Target compound identification	N	
VI.	Compound Quantitation and CRQLs	N	
VII.	System Performance	N	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

1	98NEC00GW801 W	11		21	
2	MB	12		22	
3		13		23	
4		14		24	
5		15		25	
6		16		26	
7		17		27	
8		18		28	
9		19		29	
10		20		30	

Notes:

LDC #: 34176 51
SDG #: 063197

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: [illegible]
2nd Reviewer: ___

METHOD: ✓ GC ___ HPLC (~~EPA~~ RSK175)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- Y N N/A Were all samples associated with a matrix spike (MS) and matrix spike duplicate (MSD)?
- Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix?
- Y N N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits stated below?

Level IV/D Only

- Y N N/A Were a MS/MSD analyzed for each analytical extraction batch of ≤20 samples?
- Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) recalculated for all spiked compounds?
- Y N N/A Were the percent recoveries (%R) and relative percent differences (RPD) reported results within 10.0% of the recalculated results?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		No MS/MSD		( )	( )	( )	All Samples NB	
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		
				( )	( )			
				( )	( )	( )		
				( )	( )	( )		
				( )	( )	( )		

Letter Designation	Compound	Soil QC Limits % Recovery	Soil QC Limits RPD	Water QC Limits % Recovery	Water QC Limits RPD
A					
B					
C					
D					
E					
F					
G					
H					
I					
J					

APPENDIX D

Biological Sampling Results

Appendix D
Biological Sampling

Samples were collected for phytoplankton, zooplankton, and benthic invertebrate identification and enumeration at four locations along the drainage basin and the unnamed stream. These samples were collected to determine if the unnamed creek has been significantly impacted by contamination in the drainage basin. This determination assists in documentation of existing conditions in the decision of which remedial action alternative will be recommended for the drainage basin area. Two of the sample locations are along the drainage basin before the confluence with the unnamed creek (96NEDB101 and 96NEDB102), a third was collected in the portion of the unnamed creek east of and prior to this confluence (96NEDB103), and a fourth was collected along the unnamed creek west of and subsequent to this confluence (96NEDB104). These four sample locations are shown on Figure 2-4.

Sample identification numbers, their associated sample locations, and selected field characteristics are listed below. The sample identification numbers listed below end with either BN, ZO, or PL for benthic, zooplankton, and phytoplankton samples, respectively.

Sample ID	Sample Location	Electrical Conductivity (umhos)	pH	Temperature (deg. C)	Dissolved Oxygen
96NEDB101	DB-5 along drainage basin	75	6.98	10	8.1
96NEDB102	Junction of drainage basin and unnamed creek	100	7.04	9	-
96NEDB103	DB-7 along unnamed creek; upstream of drainage basin confluence	50	7.29	9	7.9
96NEDB104	DB-8 along unnamed creek; downstream of drainage basin confluence	50	7.17	9	7.3

Sample ID	Stream Width (feet)	Stream Depth (feet)	Velocity (gpm)	Sediment Characteristics	Petroleum Odor/Sheen
96NEDB101	20-30	0.5-1.0	5	Muck-mud; organic	Yes/No*
96NEDB102	1-2	Riffle	10	Sludge; organic silt	Yes/Yes
96NEDB103	2-4	1-2	20	Silty	No/No
96NEDB104	3-5	3	20-30	Silty; sandy; organic	No/No*

* Sheen observed upon sediment disturbance

There is a recognizable relationship between the composition of the aquatic community and water quality. One commonly used method for evaluating water quality by looking at macroinvertebrates is indicator organisms. The concept of indicator organisms is based on the fact that every species has a certain range of physical and chemical conditions in which it can survive. Some organisms can survive in a wide range of conditions and are more tolerant of pollution. Others are very sensitive to changes in conditions and are intolerant of pollution. The evaluation of water quality is linked to the numbers of pollution-tolerant organisms at the site compared with intolerant organisms (Mitchell and Stapp, 1992).

M E M O R A N D U M

MONTGOMERY WATSON

To:	Chris Brown	**Date:**	December 3, 1996
From:	Chuck Johnson	**Reference:**	2198.0460
Subject:	Methods Used for Biological Samples		

INTRODUCTION

The purpose of this memorandum is to identify the methodology used to sort, identify, and enumerate the benthic invertebrate, zooplankton, and phytoplankton samples collected on August 5, 1996, by the MW Anchorage, AK office. Upon completion of the sorting and identification process, a tabular report was generated and will accompany this memo.

METHODS

Benthic invertebrate samples were passed through a US Standard No. 30 sieve. Samples were then washed with a gentle stream of tap water to remove residual formalin and any silt or clay material that was small enough to pass through the openings. After sufficient washing, the sample was placed in a white enamel pan for the sorting process. Sorting was completed by placing small portions of the sample in the pan and covering the material with water, and scanning the contents with a low power microscope. Organisms were removed from the detritus with forceps. Samples were hand sorted three times to ensure that the majority of the organisms were found. Each benthic invertebrate sample was hand sorted in this manner, which consumes large volumes of time. Sorted samples were then placed in smaller containers and preserved with 70 percent ethyl alcohol for later identification and enumeration.

Identification of benthic invertebrates was completed using a dissecting microscope and a compound light microscope along with the appropriate taxonomic reference by Pennak (1953). Invertebrates were first sorted into general taxonomic groups according to Family level. Then each individual organism was viewed with a dissecting microscope and identified to the lowest taxonomic level possible. It is worth mentioning that the key used for taxonomy was developed for the continental United States. I feel, however, that it should be representative for genus level identification throughout North America. Each sample has also been archived for future use.

Zooplankton samples were reduced to smaller volumes using a 70 µm Wisconsin Style plankton net. This was done to condense the original 1 gallon samples and ensure a greater chance of viewing representative subsamples. This process reduces the original sample volume to 50-100 ml. Three 1 ml subsamples were then removed from the sample to identify and count organisms present. After this was accomplished, an average number of organisms per count was determined. The original sample volume collected from the site was 60 liters. By using this volume and the measured reduced sample size, the abundance numbers can then be calculated for comparative purposes, i.e., critters/liter.

Phytoplankton samples are first examined by viewing a wet mount slide at 400X to determine which taxa are present. A list of taxa is then developed and used in the counting process. To perform the count, a 1 ml subsample is placed in a Sedgewick Rafter Counting Cell and viewed at 100x magnification. Approximately 5% of this sample is counted using a random grid method. Each algal cell within the grid is counted and the number of grids counted represent a known area of the 1 ml Segdewick Rafter Cell. This count is then extrapolated to the entire cell volume to calculate sample densities.

REFERENCES

Pennak, R. W., 1953, Freshwater Invertebrates of the United States; New York, The Ronald Press, 769 p.

USGS, 1977, Methods for Collection and Analysis of Aquatic Biological and Microbiological Samples, Chapter A4; 331p.

NORTHEAST CAPE ECOLOGICAL RISK ASSESSMENT
BENTHIC BIOSURVEY RESULTS IN THE DRAINAGE BASIN

Invertebrate Classification — Station ID 96NEDB	101BN(A)	101BN(B)	101BN(C)	102BN(A)	102BN(B)	102BN(C)	103BN(A)	103BN(B)	103BN(C)	104BN(A)	104BN(B)
CLASS Insecta											
Order Diptera											
Family CHIRONOMIDAE (midge)											
SubFamily ORTHOCLADIINAE											
Genus *Orthocladius sp.*	81	68	46		1	1	26	33	45		61
SubFamily TANYPODINAE											
Genus *Procladius sp.*	9	76	57								
Family ANTHOMYIIDAE (related to housefly)											
Genus *Limnophora sp.*	1	2	2				2	2	1		
Family TIPULIDAE (crane Fly)											
Genus *Tipula sp.*	1	1		1		2					
Diptera Pupae ID Unknown	4	21	31								1
Diptera larvae ID Unknown		7	11								
Order Ephemeroptera (mayfly)											
Family BAETIDAE											
Genus *Baetis sp*	1								1		2
Order Coleoptera (beetles)											
Family DYTISCIDAE											
Genus *Hygrotus sp*		8	5								4
CLASS Arachnoidea (water mite)											
Order Hydrachnellae											
Family HYGROBATIDAE											
Genus *Atractides sp.*								6			
CLASS Mollusca (clam)											
Oder Pelecypoda											
Family SPHAERIIDAE											
Genus *Pisidium sp.*				5	3	2	8	4	17	1	
CLASS Oligochaeta (aquatic earthworm)											
ID unknown							2	1	8		
Total Organisms	97	183	152	6	4	5	38	46	72	1	68
Number of Taxa	6	7	6	2	2	3	4	5	5	1	4
Percent Contribution by Dominant Taxa	83.5	41.5	37.5	83.3	75.0	40.0	68.4	71.7	62.5	100	89.7
EPT Index	1	0	0	0	0	0	0	0	1	0	1

* Note Sample 96 NEDB104BN(A) also had 11 Caddisfly cases but there were no Caddis fly larvae.
Samples were Identified using Freshwater Invertebrates of the United States, Second Edition 1978 by Robert W. Pennak. Published by John Wiley & Sons, Inc.

TABLE X-5

NORTHEAST CAPE ECOLOGICAL RISK ASSESSMENT
PHYTOPLANKTON IDENTIFICATION AND ENUMERATION IN THE DRAINAGE BASIN

Sample Site: 96NEDB101 PL

Taxa	Total cells/ml
Desmids:	
Closterium	16
Cosmarium	21
Diatoms:	
Unidentified Diatoms	106954
Fragilaria	277
Melosira	4431
Synedra	2554
Tabellaria	954

Total Cells/ml	115207
Total Cells/Liter	1.15E+08

Comments:
Some green algal cells observed (Desmids).
Many individual diatom units seen.
Some short strands (colonies) of Fragilaria observed.
No strands (colonies) of Tabellaria observed.
Some Rotifers observed.

Sample Site: 96NEDB102 PL

Taxa	Total cells/ml
Desmids:	
Closterium	5
Diatoms:	
Amphora	123
Unidentified Diatoms	52300
Fragilaria	11000
Melosira	25450
Synedra	9100
Tabellaria	93400

Total Cells/ml	191378
Total Cells/Liter	1.91E+08

Comments:
Sample had many large strands (colonies) of Fragilaria and Tabellaria.
Many long strands (colonies) of Melosira seen as compared to sample 101.
No Rotifers observed.

TABLE X-5

NORTHEAST CAPE ECOLOGICAL RISK ASSESSMENT
PHYTOPLANKTON IDENTIFICATION AND ENUMERATION IN THE DRAINAGE BASIN

Sample Site: 96NEDB103 PL

Taxa	Total cells/ml
Desmids:	
Cosmarium	2
Diatoms:	
Unidentified Diatoms	460
Fragilaria	366
Melosira	164
Synedra	94
Tabellaria	478

Total Cells/ml	1564
Total Cells/Liter	1.56E+06

Comments:
Very few algal cells seen. Virtually all diatoms.
Some short strands (colonies) of Fragelaria and Tabellaria observed.
Very few Melosira strands (colonies) observed.
No Rotifers observed.

Sample Site: 96NEDB104 PL

Taxa	Total cells/ml
Desmids:	
Cosmarium	4
Staurastrum	2
Diatoms:	
Unidentified Diatoms	216
Fragilaria	106
Melosira	496
Synedra	30
Tabellaria	92

Total Cells/ml	946
Total Cells/Liter	9.46E+05

Comments:
Very few algal cells seen. Virtually all diatoms.
Very few short strands (colonies) of Fragelaria and Tabellaria observed.
Some Melosira strands (colonies) observed.
No Rotifers observed.

TA X-6

NORTHEAST CAPE ECOLOGICAL RISK ASSESSMENT
ZOOPLANKTON IDENTIFICATION AND ENUMERATION IN THE DRAINAGE BASIN

Sample Identification:	**96NEDB101ZO**		**96NEDB103ZO**		**96NEDB102ZO**		**96NEDB104ZO**	
Species	Size(mm)	Organisms/Liter	Size(mm)	Organisms/Liter	Size(mm)	Organisms/Liter	Size(mm)	Organisms/Liter
Leptodora kindtii	3	0.00	3	0.00	3	0.00	3	0.00
Diaphanasoma sp.	1.5	0.00	1.5	0.40	1.5	0.00	1.5	0.00
Ceriodaphnia sp.	1.2	0.00	1.2	0.80	1.2	0.00	1.2	0.00
Daphnia pulex	1.2	0.61	1.2	0.40	1.2	0.00	1.2	0.26
D. galaetea mendotae	1	0.00	1	0.00	1	0.00	1	0.00
D. retrocurva	1	0.00	1	0.00	1	0.00	1	0.00
D. schodleri	1	0.00	1	0.00	1	0.00	1	0.00
D. dubia	0.8	0.00	0.8	0.00	0.8	0.00	0.8	0.00
Calanoids	1	0.00	1	0.00	1	0.00	1	0.00
Cyclopoids	0.7	2.46	0.7	0.00	0.7	0.00	0.7	0.00
Daphnia juveniles	0.7	0.00	0.7	0.00	0.7	0.00	0.7	0.00
Bosmina sp.	0.5	1.85	0.5	2.83	0.5	2.30	0.5	3.39
Chydorus sp.	0.5	0.00	0.5	0.00	0.5	0.00	0.5	0.00
nauplii	0.5	0.00	0.5	0.00	0.5	0.00	0.5	0.00
Total		4.92		4.43		2.30		3.65

Zooplankton numbers are calculated in total number of organisms per liter of sample water.
To obtain numbers of organisms per cubic meter of sample water multiply the organisms/ liter value by 1000.

APPENDIX E

Streamflow Measurements

Appendix E
Stream Flow Measurements

Streamflow measurements were taken from eight locations in and effort to further characterize the unnamed creek the drainage basin and its tributaries. Figure 2-4 shows the locations of the streamflow measurements with respect to the drainage basin. The following are brief synopses of the conditions and results from each streamflow measurement. Streamflow data, calculations, and cross-sections are provided in this Appendix.

Streamflow 1

Streamflow 1 is located in the unnamed creek, upstream from its confluence with the drainage basin. The stream substrate consists of sand and gravel (roughly 50%/50%). Streamflow for this location was calculated to be 10.98 ft^3/s or 4,930 gpm. There was no visible sheen observed and the stream appeared to be healthy, with little to no bank erosion.

Streamflow 2

Streamflow 2 is a relatively small drainage which feeds the unnamed creek upstream from its confluence with the drainage basin. The stream bottom in this location consisted of silty organic material with occasional rocks. There were four empty 55-gallon drums upstream from this location. Streamflow for this location was calculated to be 0.20 ft^3/s or 91 gpm. There was no visible sheen observed and the stream is apparently healthy.

Streamflow 3

Streamflow 3 is located in the drainage basin approximately 200 feet south from its confluence with the unnamed creek. When the drainage basin is disturbed gross contamination bubbles to the surface and creates a sheen which is very odorous. No float measurements were conducted at this location as there was too much grass choking the basin. Streamflow for this location was estimated to be 1.83 ft^3/s or 823 gpm.

Streamflow 4

Streamflow 4 is located in the unnamed creek approximately 120 feet west (and downstream) of its confluence with the drainage basin. The stream bottom consisted of an organic matte with some fine sands and silts, occasional rocks and pebbles 0.5 to 3.0 inches in diameter. Medium to coarse sand is also present in some areas. When the banks of the creek are disturbed, a visible hydrocarbon sheen contamination bubbles to the surface accompanied by a distinct petroleum odor. However, the stream does appear to be healthy when undisturbed. Streamflow for this location was calculated to be 11.52 ft^3/s or 5,171 gpm.

Streamflow 5

Streamflow 5 is located within the artificial swale emanating from the culvert at Site 27. Flow was minimal at this location and no float measurements were possible. Materials consisted of disturbed gravel and sand. The northern embankment was stained from what appears to be seepage from Site 27. However, there is no visible sheen present in the surface water. Vegetation is sparse due to the disturbed nature of the soils. Streamflow for this location was visually estimated to be 1 to 3 gpm.

Streamflow 6

Streamflow 6 is located within the artificial drainage channel leading from the sewer manhole near Site 13. Flow was minimal and float measurements were prohibitive. Materials consisted of disturbed gravel and sands, similar to Streamflow 5. A visible sheen was present only after the sediments had been disturbed. The streamflow was visually estimated at 3 to 5 gallons per minute.

Streamflow 7

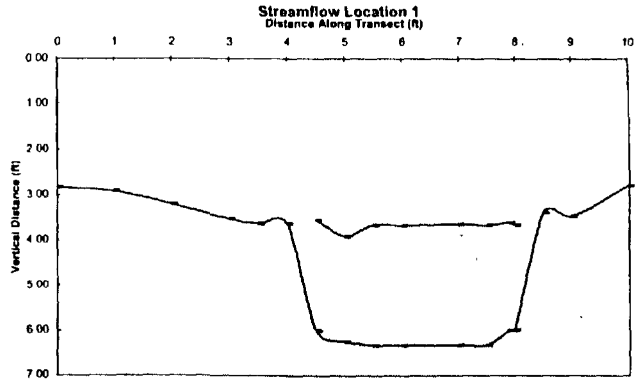
Streamflow 7 is located in the drainage basin approximately 700 feet south of its confluence with the unnamed creek. This area of the drainage basin consists of a series of four braided channels approximately 20 to 50 feet in width. The largest and deepest channel is also the westernmost. Flow could not be measured directly here because of the basins' indistinct nature. All of the channels are choked with grass and appear to have a maximum depth of 3 feet. Upon disturbing the sediments, gross contamination bubbles to the surface and is accompanied by a strong diesel odor and surface water sheen. However, there is no visually-apparent adverse effect of the contamination on the healthy vegetation.

Streamflow 8

Streamflow 8 is located in the unnamed creek approximately 800 feet west of the bridge near Site 2. The substrate consists of medium to coarse sand and moss with boulders 1 to 2.5 feet in diameter. A sheen is evident only upon disturbing the organic materials in the banks. It appears that the hydrocarbons are retained by the organic bank materials only. Streamflow for this location was calculated to be 12.19 ft^3/s or 5,471 gpm.

Streamflow calculations for Streamflow Location 1

Notes	Horizontal traverse distance from abitrary point al side of streambank (feet)	Vertical distance from ground or streambed to arbilrary vertical datum (feet)	Vertical distance from stream bottom to water surface (feet)	Vertical distance from arbirary datum to water surface feet)	Cross-sectional area of increment ($feet^2$)
		B	A	B-A	
	0.00	2.83			
	1.00	2.92			
	2.00	3.21			
	3.00	3.52			
	3.50	3.63			
	4.00	3.63			
Bank edge	4.50	6.00	2.46	3.54	1.23
(@4.3 ft)	5.00	6.25	2.34	3.91	1.17
	5.50	6.33	2.68	3.66	1.34
	6.00	6.33	2.67	3.67	2.00
	7.00	6.33	2.69	3.65	2.02
	7.50	6.33	2.67	3.67	1.20
	7.90	6.00	2.40	3.60	0.60
Bank edge	8.00	6.00	2.33	3.67	0.70
	8.50	3.40			
	9.00	3.48			
	10.00	2.79			
				Area of flow:	10.3



Float measurements:

(observed time in seconds):

42
46
46
38
39
37
37

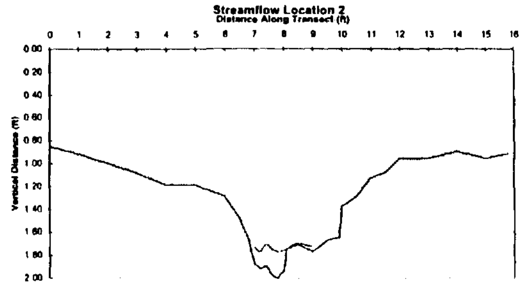
Distance=	50	feet
Average of fastest 3 observations:	37	seconds
Velocity based on fastest 3 measurements:	1.34	feet/second
Correction factor for average water column velocity:	0.8	
Calculated average velocity:	1.07	feet/second
Calculated streamflow:	10.98	$feet^3$/second
=	4,930	gallons/min

Stream substrate at this location consists of sand and gravel (roughly 50%/50%)
Stream appears to be healthy, with little to no bank erosion
No sheen evident on the water

Streamflow calculations for Streamflow Location 2

Notes	Horizontal traverse distance from abitrary point at side of streambank (feet)	Vertical distance from ground or streambed to arbitrary vertical datum (feet) B	Vertical distance from stream bottom to water surface (feet) A	Vertical distance from arbirary datum to water surface feet) B-A	Cross-sectional area of increment (feet²)
	0 00	0 85			
	1 00	0 92			
	2 00	1 00			
	3 00	1 08			
	4 00	1 19			
	5 00	1 19			
	6 00	1 29			
	6 50	1 48			
Bank edge	6 80	1 67			
	7 00	1 88	0 15	1 73	0 03
	7 20	1 92	0 15	1 77	0 03
	7 40	1 90	0 19	1 71	0 04
	7 60	1 98	0 23	1 75	0 05
	7 80	2 00	0 23	1 77	0 05
	8 00	1 94	0 18	1 76	0 03
	8 10	1 75	0 00	1 75	0 00
	8 50	1 71	0 01	1 70	0 00
Bank edge	9 00	1 77	0 04	1 73	0 02
	9 50	1 67			
	9 90	1 65			
	10 00	1 38			
	10 50	1 29			
	11 00	1 13			
	11 50	1 08			
	12 00	0 96			
	13 00	0 96			
	14 00	0 90			
	15 00	0 96			
	15 80	0 92			

Area of flow 0 24 feet²



Float measurements

(observed time in seconds)

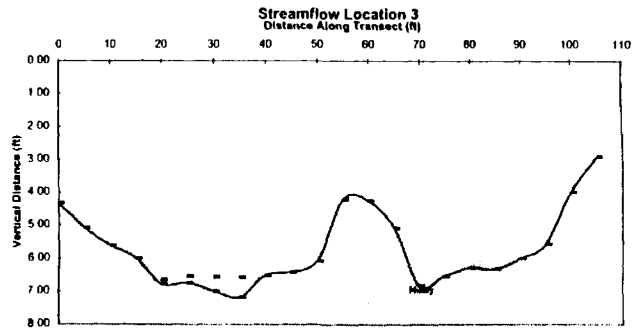
10
9 5
9 5
9 5
10
9 5
9 5

Distance=	10	feet
Average of fastest 3 observations:	9.5	seconds
Velocity based on fastest 3 measurements	1.05	feet/second
Correction factor for average water column velocity	0 8	
Calculated average velocity	0 84	feet/second
Calculated streamflow:	0 20	feet³/second
=	91	gallons/min

The stream bottom in this location consists of silty organic material with occassional rocks
This is a relatively small drainage that feeds the main stream (Streamflow locations 1 and 4)
Several rusted 55-g drums are located in channel upstream of this location (probably wind blown)
No sheen is observed in this location, stream is apparently healthy

Streamflow calculations for Streamflow Location 3

Notes	Horizontal traverse distance from abitrary point at side of streambank (feet)	Vertical distance from ground or streambed to arbitrary vertical datum (feet)	Vertical distance from stream bottom to water surface (feet)	Vertical distance from arbirary datum to water surface feet)	Cross-sectional area of increment (feet²)
		B	A	B-A	
	0 00	4 33			
	5 00	5 08			
	10 00	5 63			
	15 00	6 00			
Water	20 00	6 79	0 13	6 67	0 63
choked	25 00	6 75	0 21	6 54	1 04
with	30 00	7 00	0 44	6 56	2 19
grass	35 00	7 19	0 60	6 58	3 02
	40 00	6 52	0 00	6 52	0 00
	45 00	6 42			
	50 00	6 08			
Mound	55 00	4 21			
	60 00	4 25			
	65 00	5 08			
Muddy	70 00	6 83			
	75 00	6 54			
	80 00	6 29			
	85 00	6 33			
	90 00	6 00			
	95.00	5 58			
	100 00	4 00			
	105 00	2 92			



Area of flow: 6 88 feet²

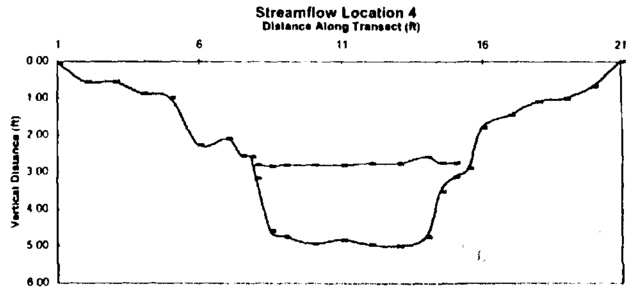
No float measurements (too much grass)

Distance=	10	feet
Estimated travel time:	30	seconds
Velocity based on estimated time:	0.33	feet/second
Correction factor for average water column velocity:	0.8	
Calculated average velocity:	0.27	feet/second
Calculated streamflow:	1 83	feet³/second
=	823	gallons/min

Streamflow calculations for Streamflow Location 4

Notes	Horizontal traverse distance from abitrary point at side of streambank (feet)	Vertical distance from ground or streambed to arbitrary vertical datum (feet)	Vertical distance from stream bottom to water surface (feet)	Vertical distance from arbirary datum to water surface (feet)	Cross-sectional area of increment (feet²)
		B	A	B-A	
	1 00	0 04			
	2 00	0 55			
	3 00	0 56			
	4 00	0 88			
	5 00	0 99			
	6 00	2 27			
	7 00	2 10			
	7 50	2 56			
Edge of flow	7 80	2 58			
	8 00	3 17	0 38	2 79	0 13
	8 50	4 58	1 75	2 83	0 88
	9 00	4 75	1 94	2 81	1 45
	10 00	4 94	2 14	2 80	2 14
	11 00	4 83	2 02	2 81	2 02
	12 00	4 96	2 20	2 76	2 20
	13 00	5 00	2 24	2 76	2 24
	14 00	4 75	2 17	2 58	1 63
	14 50	3 52	0 77	2 75	0 39
	15 00	3 13	0 38	2 75	0 19
Edge of flow	15 50	2 90			
	16 00	1 79			
	17 00	1 46			
	18.00	1 08			
	19 00	1 00			
	20 00	0 67			
	21 00	0 00			

Area of flow: 13 25 feet²



Float measurements (seconds):

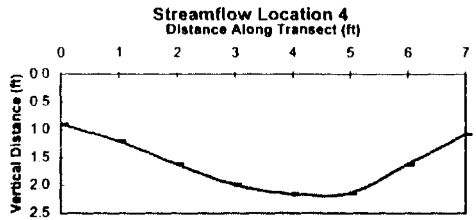
46
53 (hangup)
46
46
46
46
46

Distance=	50	feet
Measured travel time	46	seconds
Velocity based on estimated time:	1.09	feet/second
Correction factor for average water column velocity:	0.8	
Calculated average velocity:	0 87	feet/second
Calculated streamflow:	11 52	feet³/second
=	5,171	gallons/min

Stream substrate at this location consists of an organic matt with some fine sand and silts, with occasional rocks and pebbles 0 5 to 3-inch diameter. Medium to coarse sand is also present in some areas

Streamflow calculations for Streamflow Location 5

Notes	Horizontal traverse distance from abitrary point at side of streambank (feet)	Vertical distance from ground or streambed to arbitrary vertical datum (feet)	Vertical distance from stream bottom to water surface (feet)	Vertical distance from arbirary datum to water surface (feet)	Cross-sectional area of increment (feet²)
		B	A	B-A	
	0 00	0 92			
	1 00	1 21			
	2 00	1 63			
	3 00	2 00			
Minor flow	4 00	2.17	0 03	2.14	0 03
	5.00	2 15			
	6.00	1 63			
	7.00	1.08			
				Area of flow:	0.03 feet²



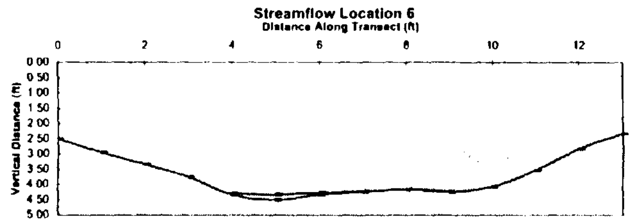
No float measurements (too little flow)

Distance=	N/A	feet
Measured travel time	N/A	seconds
Velocity based on estimated time:	N/A	feet/second
Correction factor for average water column velocity:	0.8	
Calculated average velocity:	N/A	feet/second
Calculated streamflow:	N/A	feet³/second
=	1 to 3	gallons/min

Flow is very minor at this location, too little to use a float. Flow estimated visually at 1 to 3 gallons per minute.
Materials consist of disturbed gravel and sand. No sheen is visable. Vegetation is sparse due to disturbed nature of soils (this is an artificial swale).
Staining is evident on northern embankment due to seepage. Vegetation up stream does not appear to be affected.

Streamflow calculations for Streamflow Location 6

Notes	Horizontal traverse distance from abitrary point at side of streambank (feet)	Vertical distance from ground or streambed to arbitrary vertical datum (feet)	Vertical distance from stream bottom to water surface (feet)	Vertical distance from arbirary datum to water surface (feet)	Cross-sectional area of increment (feet²)
		B	A	B-A	
	0 00	2 50			
	1 00	2 96			
	2 00	3 33			
	3 00	3 75			
	4 00	4 33	0 04	4 29	0 04
	5 00	4 50	0 17	4 33	0 17
	6 00	4 33	0 06	4 27	0 06
	7 00	4 25	0 02	4 23	0 02
Edge of flow	8 00	4 17	0 00	4 17	0 00
	9 00	4 25	0 02	4 23	0 02
	10 00	4 08			
	11 00	3 54			
	12 00	2 83			
	13 00	2 33			
				Area of flow	0 31 feet²



No float measurements (too little flow)

Distance=	N/A	feet
Measured travel time	N/A	seconds
Velocity based on estimated time:	N/A	feet/second
Correction factor for average water column velocity:	0.8	
Calculated average velocity:	N/A	feet/second
Calculated streamflow:	N/A	feet³/second
=	3 to 5	gallons/min

Total depth of channel crest to bottom is approximately 8 feet, however, this drainage was artificially created.
A sheen on the water is evident when the sediments are disturbed
Flow was estimated visually at 3 to 5 gallons per minute (water is stagnant)

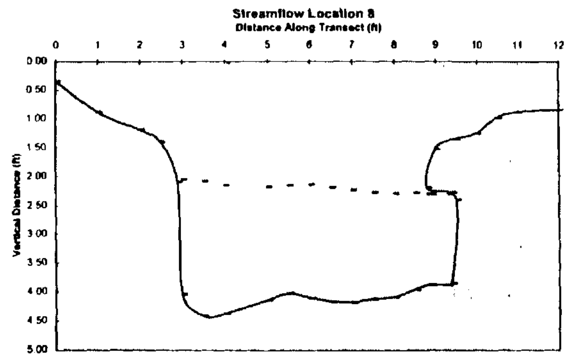
Streamflow observations at Streamflow Location 7

The drainage from pump island (Site 27) and Site 10 have coalesed into a series of 4 braided channels, each approximately 20 to 50 feet wide. The largest and deepest channel is the westernmost channel.
Flow cannot be measured directly here becuase of it's spread out and indistict nature.
All of the channels are choked with grass, and appear to have a maximum depth of 3 feet.
A sheen is observed on the westernmost channel when the sediments are disturbed.
Maximum topographic relief across the entire flood plain appears to be about 4 feet.
There is no apparent adverse effect of hydrocarbons on the healthy vegetation.
Drums are scattered about along with pieces of sheet metal (windblown)
This location is about 500 feet south of the last antennea pole from which streamflow measurement No. 3 was taken.

Streamflow calculations for Streamflow Location 8

Notes	Horizontal traverse distance from abitrary point at side of streambank (feet)	Vertical distance from ground or streambed to arbitrary vertical datum (feet)	Vertical distance from stream bottom to water surface (feet)	Vertical distance from arbirary datum to water surface feet)	Cross-sectional area of increment (feet^2)
		B	A	B-A	
	0 00	0 35			
	1 00	0 88			
	2 00	1 19			
	2 50	1 40			
Bank edge	2 90	2 10			
	3 00	4 04	1 99	2 05	0 60
	3 50	4 42	2 34	2 08	1 17
	4 00	4 38	2 22	2 16	1 67
	5 00	4 14	1 96	2 18	1 47
	5 50	4 02	1 86	2 16	0 93
	6 00	4 10	1 96	2 14	0 98
	6 50	4 16	1 97	2 19	0 99
	7 00	4 18	1 95	2 23	0 98
	7 50	4 12	1 85	2 27	0 93
	8 00	4 09	1 80	2 29	0 90
	8 50	3 96	1 68	2 28	0 67
Bank edge	8 80	3 88	1 58	2 30	0 40
	8 90	3 88	1 58	2 30	0 55
	9 30	3 88	1 58	2 30	0 87
	9 40	3 85	1 58	2 27	0 95
	9 50	2 40			
	8 80	2.20			
	9 00	1.53			
	9 50	1 34			
	10 00	1.25			
	10 50	0.98			
	11 00	0 88			
	12 00	0.84			

Area of flow: 14.0 feet^2



Float measurements

(observed time in seconds):

38 15
34 49
27 01
39 57
36 71
28 07
27 81

Distance=	30	feet
Average of fastest 3 observations:	27.63	seconds
Velocity based on fastest 3 measurements:	1.09	feet/second
Correction factor for average water column velocity:	0.8	
Calculated average velocity:	0 87	feet/second
Calculated streamflow:	12.19	feet^3/second
=	5,471	gallons/min

The substrate at this location consists of medium to coarse sand and moss, with boulders 1 to 2.5 foot diameter. At this location, a sheen can be noted when the organic bank materials are disturbed, but the sheen is not evident when the sandy bottom is disturbed Apparently the hydrocarbons are retained by the organic bank materials only

APPENDIX F

Site Survey and Control Report

604	98226.398	96564.720	75.110 MW11-2
626	98042.278	96273.918	85.800 MW19-2
2001	103699.787	95286.504	24.348 98NEC2SS801
2002	103697.417	95296.267	20.220 98NEC2SS802
2003	99677.336	97394.408	36.329 98NECRCSW-SD802
2004	99632.906	97687.483	37.511 98NECRCSW-SD801
2005	98049.523	96900.294	77.916 98NEC10SS801
2006	98513.376	96632.514	60.940 98NECDBSS808
2007	98402.848	96560.794	63.335 98NECDBSS809
2010	98225.808	96239.340	71.686 98NEC13SS803
2013	98198.175	96082.224	73.148 98NEC13SS801
2014	98042.343	96274.096	85.742 98NEC626-MW19-2
2015	98226.153	96564.738	75.060 98NECMW11-2--
2016	98732.535	96208.811	58.333 98NECDBSS806-
2017	98708.212	96296.079	59.733 98NECDBSS807
2018	98585.759	96303.947	61.273 98NECDBSS805
2019	98617.039	96276.332	57.198 98NECDBSWSD803
2020	99192.818	96529.999	46.059 98NECDBSS804
2021	99251.020	96468.204	41.525 98NECDBSW-SD802
2022	99724.612	96627.343	38.216 98NECDBSW-SD801
2023	99670.069	96678.609	42.586 98NECDBSS803
2024	99799.071	96400.469	40.814 98NECDBSS802
2025	99888.823	96346.996	37.487 98NECDBSS801
2026	99930.240	96609.249	33.989 98NECRCSW-SD804
2027	99934.935	96665.028	33.968 98NECRCSW-SD803
2029	100035.965	95327.061	31.209 98NECRCSW-SD805
2030	100043.838	95051.654	30.399 98NECRCSW-SD806
2037	108040.051	89862.681	2.581 98NECBKSW-SD802
2038	106650.317	89911.631	2.865 98NECBKSWSD801
2039	107041.025	96870.740	-0.414 98nec tide line
2041	100419.806	98874.634	56.655 98NEC07SS802
2042	100533.627	99629.013	51.853 98NEC07SS801
2043	101411.473	99595.000	45.558 98NEC06SS801
2046	103946.860	101491.577	19.715 98NEC3-1WELLPT
2047	103961.249	101501.871	21.055 98NEC SW COR BLD
2048	103816.821	101252.723	22.273 98NEC4-1WELLPT
2049	103796.798	101258.195	21.298 98NEC EAST END TANK
2051	97626.264	95668.608	75.082 98NEC00SS801
2052	97634.607	95662.104	78.665 98NEC14-1WELLPT
2053	97720.925	95607.070	77.200 98NEC14SS802
2054	97734.799	95568.188	77.206 98NEC14SS801
2056	98129.888	97268.551	75.800 98NEC09SS802
2061	101220.074	99638.308	47.084 98NEC06SS802
2103	99677.336	97394.408	34.800 98NEC WATER BOTTOM
2104	99632.906	97687.483	35.000 98NEC WATER BOTTOM
2114	98042.343	96274.096	82.190 98NEC OG
2145	103916.724	101484.997	18.902 98NEC OG
2148	103816.821	101252.723	19.400 98NEC OG
2152	97634.607	95662.104	74.970 98NEC OG
2162	98258.167	96120.482	69.750 98NEC13SS802
2163	98213.932	96336.945	-99.000 98NEC NE COR GARAGE

	M	N	O	P	Q	R	S
1	101464.001						2044 - Fnd. USCGS B.C. in Boulder, 1968
2	100727.450						2050 -Fnd. USCGS B.C. in Boulder, 1968
3	99373.352						2060 =- Fnd. Al. cap on 5/8" rebar, 8535-LS, 1994, #9
4	100000.000						2035 - Fnd B.C. on 1" pipe
5	96723.975						2040 - Fnd. cap welded on rebar, no marks
6	95161.128						2000 - Set Al. cap on 5/8" rebar, 4469-S, 1998, GPS-2
7	97928.168						2033 - Fnd 1" pipe, no cap
8	96869.699						2057 - Fnd. Al. cap on 5/8" rebar, 8535-LS, 1994
9	93684.912						2058 - Set Al. cap on 5/8" rebar, 4469-S, 1998, GPS-1

	A	B	C	D	E	F	G	H	I	J	K	L
1	2044	NE Cape, St. Lawrence Is.	St. Lawrence Is.	USCGS	BM-5	1968	U.S. Ft.	1950 MSL	2.702			104279.594
2	2050	NE Cape, St. Lawrence Is.	St. Lawrence Is.	USCGS	BM-4	1968	U.S. Ft.	1950 MSL	6.065			104599.631
3	2060	NE Cape, St. Lawrence Is.	St. Lawrence Is.	Lounsbury	RB #9	1994	U.S. Ft.	1950 MSL	69.367			100691.649
4	2035	NE Cape, St. Lawrence Is.	St. Lawrence Is.	USCOE	BM-B	1951	U.S. Ft.	1950 MSL	75.828			100000.000
5	2040	NE Cape, St. Lawrence Is.	St. Lawrence Is.	unknown		unknown	U.S. Ft.	1950 MSL	21.069			103549.699
6	2000	NE Cape, St. Lawrence Is.	St. Lawrence Is.	Mullikin	GPS2	1998	U.S. Ft.	1950 MSL	26.262			103549.699
7	2033	NE Cape, St. Lawrence Is.	St. Lawrence Is.	USCOE	BM-H	1951	U.S. Ft.	1950 MSL	70.317			99063.443
8	2057	NE Cape, St. Lawrence Is.	St. Lawrence Is.	Lounsbury	RB #4	1994	U.S. Ft.	1950 MSL	73.05			98340.713
9	2058	NE Cape, St. Lawrence Is.	St. Lawrence Is.	Mullikin	GPS1	1998	U.S. Ft.	1950 MSL	25.645			101981.082

format, point #, y, x, z, descriptor, with commas as delineaters.

NEC98CON.CR5 -- Survey control mons only, as in NECMONS.XLS, in Tripod Data System format.

NEC98MONS.PTS -- Survey control Mons only, as in NECMONS.XLS, "pacsoft" format, Pt#, y, x, z, descriptor.

NEC98MONS.FIN -- Survey control lmons onlyl, as in NECMONS.XLS, pt#, x, y, z, descriptor, tab delineated.

Readme file for Northeast Cape field survey, Mullikin Surveys. The GPS field work and calculations were done using Trimble 4000 SSI receivers, and Trimble Office software. The survey report describes basis of coordinates, bearing and elevation. The AutoCad drawing was done in version 12c.3 for DOS, with Softdesk 7.2 cogo modules.
Most points are on four layers:

LAYER

PTSREC Precomputed points, should reflect prior reported values
PTSMEAS Adjusted measured values
PTSCOMP Computed values based on the measured points. i.e. the top of a monitor well might have been measured directly, and a distance to the ground recorded. A point with ground elevation was generated, and given a point number 100 higher. For example, monitor well top might be 2099, ground elevation computed as 2199.
PTS CONTROL Survey monuments --both measured (2000 range) and published (1-1000 range) values.

JUNK Various things such as redundant points, precomputed points not field tied.

ATTACHED FILES:

NECAPE.DWG -- autocad drawing containing points, created in AutoCad v12.c3 DOS.

NECREP.WPD -- Survey report generated in Wordperfect 6.1 for Windows.

NECMONS.XLS -- Excell format spread sheet of survey monuments as specified.
NEC98.FIN -- ascii file of points NOT including survey monuments, point #, X, Y, Z, Descriptor, format tab delineated

NEC98.CR5 -- same contents as nec98.fin, but in tripod data systems format, listed in numerical order, point number, y,x,z,descriptor

NEC98.PTS -- same contents as nec98.fin, but in "Pacsoft"

MULLIKIN SURVEYS
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e-mail: mullikin@xyz.net

October 14, 1998

SURVEY REPORT FOR NORTHEAST CAPE, ST LAWRENCE ISLAND

Field work was conducted on September 14 and 15, 1998 at an abandoned military base on St. Lawrence Island. During the survey it was raining with winds estimated at 20 to 40 mph.

The purpose of the survey was to measure monitor wells, soil and water sample sites and photo ID points and report these locations on the same coordinate system as previous surveys.

Trimble 4000 SSI GPS survey units were used in Real Time Kinematic mode. Basis of coordinates was USArmy Corps Of Engineers BM B. Basis of bearing was from USACOE BMB TO BM H. Elevations were based on a 1994 aluminum cap marked #4, set by Lounsbury & Associates, and extended using the 1996 geoid undulation model. The elevation of #4 was checked with ties to Lounsbury aluminum cap #9, as well as to two previously tied monitor wells, (Mullikin Surveys 1998 points 2015 and 2014).

```
2145,103916.724,101484.997,18.902,98NEC OG
2047,103961.249,101501.871,21.055,98NEC SW COR BLD
2049,103796.798,101258.195,21.298,98NEC EAST END TANK
2148,103816.821,101252.723,19.400,98NEC OG
2048,103816.821,101252.723,22.273,98NEC4-1WELLPT
2046,103946.860,101491.577,19.715,98NEC3-1WELLPT
2043,101411.473,99595.000,45.558,98NEC06SS801
2061,101220.074,99638.308,47.084,98NEC06SS802
2041,100419.806,98874.634,56.655,98NEC07SS802
2042,100533.627,99629.013,51.853,98NEC07SS801
2039,107041.025,96870.740,-0.414,98nec tide line
2037,108040.051,89862.681,2.581,98NECBKSW-SD802
2038,106650.317,89911.631,2.865,98NECBKSWSD801
2002,103697.417,95296.267,20.220,98NEC2SS802
2001,103699.787,95286.504,24.348,98NEC2SS801
2003,99677.336,97394.408,36.329,98NECRCSW-SD802
2103,99677.336,97394.408,34.800,98NEC WATER BOTTOM
2004,99632.906,97687.483,37.511,98NECRCSW-SD801
2104,99632.906,97687.483,35.000,98NEC WATER BOTTOM
2005,98049.523,96900.294,77.916,98NEC10SS801
2056,98129.888,97268.551,75.800,98NEC09SS802
2016,98732.535,96208.811,58.333,98NECDBSS806-
2017,98708.212,96296.079,59.733,98NECDBSS807
2019,98617.039,96276.332,57.198,98NECDBSWSD803
2020,99192.818,96529.999,46.059,98NECDBSS804
2021,99251.020,96468.204,41.525,98NECDBSW-SD802
2023,99670.069,96678.609,42.586,98NECDBSS803
2024,99799.071,96400.469,40.814,98NECDBSS802
2025,99888.823,96346.996,37.487,98NECDBSS801
2026,99930.240,96609.249,33.989,98NECRCSW-SD804
2029,100035.965,95327.061,31.209,98NECRCSW-SD805
2030,100043.838,95051.654,30.399,98NECRCSW-SD806
604,98226.398,96564.720,75.110,MW11-2
626,98042.278,96273.918,85.800,MW19-2
2007,98402.848,96560.794,63.335,98NECDBSS809
2010,98225.808,96239.340,71.686,98NEC13SS803
2013,98198.175,96082.224,73.148,98NEC13SS801
2014,98042.343,96274.096,85.742,98NEC626-MW19-2
2015,98226.153,96564.738,75.060,98NECMW11-2--
2162,98258.167,96120.482,69.750,98NEC13SS802
2114,98042.343,96274.096,82.190,98NEC OG
2163,98213.932,96336.945,-99.000,98NEC NE COR GARAGE
2051,97626.264,95668.608,75.082,98NEC00SS801
2052,97634.607,95662.104,78.665,98NEC14-1WELLPT
2053,97720.925,95607.070,77.200,98NEC14SS802
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2018,98585.759,96303.947,61.273,98NECDBSS805
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2022,99724.612,96627.343,38.216,98NECDBSW-SD801
2027,99934.935,96665.028,33.968,98NECRCSW-SD803
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2044,104279.594,101464.001,2.702,98NEC FND BM5 USCGS
2050,104599.631,100727.450,6.065,98NEC FND BM4 USCGS
1,100000.000,100000.000,76.000,BM-B
2035,100000.000,100000.000,75.828,98NEC BMB
9,100691.660,99373.313,69.240,AL
2060,100691.649,99373.352,69.367,98NEC FND RB#9 94
2000,103549.699,95161.128,26.262,98NEC SET AL CAP
2,99063.483,97928.256,71.647,BM-H
2033,99063.443,97928.168,70.317,98NEC FND BM 1"PIPE
4,98340.637,96869.886,73.050,AL
2057,98340.713,96869.699,73.050,98NEC FND RB
2058,101981.082,93684.912,25.645,98NEC SET RB/ALCAP
2040,106247.320,96723.975,21.069,98NEC FND RB WELDED
```

MULLIKIN SURVEYS
P.O. BOX 7?
HO?ER, ALASKA 99?03

a product of
J. L. Darling Corporation
2212 Port of Tacoma Road
Tacoma, WA 98421 USA
(206) 383-1714

152 152

152

DURA Rite
WATERPROOF

TRANSIT

NOTEBOOK NO. 601

NOME
NE CAPE, ST. LAWRENCE

MULLIKIN SURVEYS
P.O. BOX 7?
HOMER, ALASKA 99?03

...VE CAPE - ST LAWRENCE IS.

MONTGOMERY - WATSON
MULLIKIN SURVEYS

HI = 4.94

BASE
2000
A e 5/9 RB
H

446 9 S
GPS 2
1998

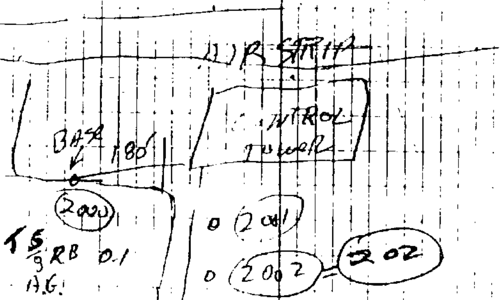
PT. #	DESCRIPTION
2001	98 NEC 02SS 80'
2002 = 202	
2003	RC SW/SD 8.2' TOP H_2O 1.5' TO Bottom
2004	RC SW/SD 80' TOP H_2O BOTTOM 2.5

14 Sept 98

RAIN 20 TO 40 MPH WINDS

4

D. MULLIKIN
SHANE
IKNOKINOK



SET 5/9 RB 0.1
A.G.
ON S. Edge
APRON
GPS 2
1998
WITH AL
CAP 2

USED 2 4000 SSI GPS RECEIVERS W. R.T.K. BASE AT 2000

NE. CAPE

PT # DESCRIPTION

2005 99NEC 10SS 801
S. OF 3 BIG TANKS
S. OF RD 100'

2006 98 NEC DBSS 808
VO#

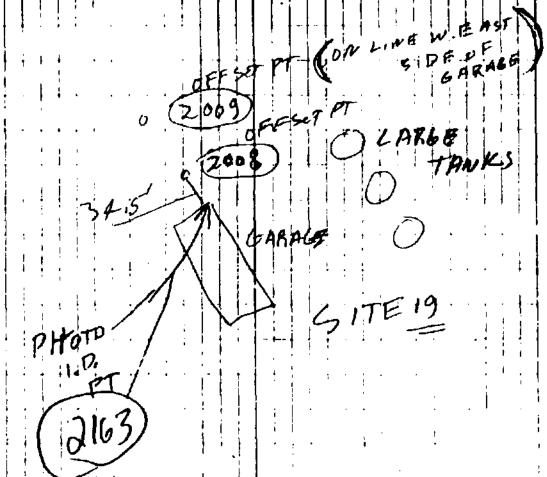
2007 99NEC DBSS 809

2008 OFF SET TO N
GARAGE

2009 OS E TO GARAGE

14 SEPT 99
RAIN, WIND 30-40 MPH

DM
S.I



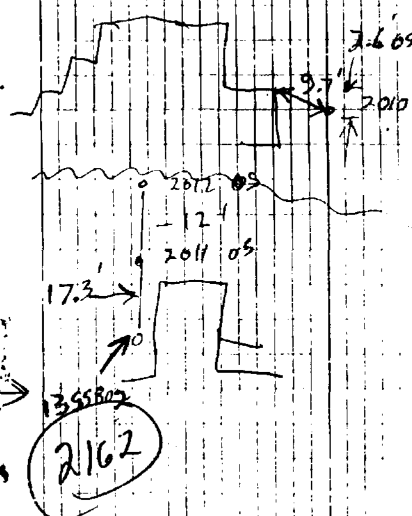
BLANK

N.E. CAPE

PT#	DESCRIPTION
2010	98 NEC SS 803
2011	OFFSET 13 SS 802
2012	" "
2162	13 SS 802 IS 1' LOWER THAN (2011)
2013	93NEC 13 SS 801 IS 2.5' W'LY OF DOOR

14 SEP 98
RAIN, 30-40 MPH WIND

DM
S.I.



NE CAPE

14 SEPT 98

RAIN, WIND 30-40 MPH

D.M.
FSI

PT #	DESCRIPTION
2014	± .2 H (WIND)
	Well 19-2 TOP OF CAP
	HT = 3.55
	= PT 626 RECORD
2015	(MW 11-2) = 604 TOP OF CAP
2016	DBSS806
	W. OF CR & POND
2017	DBSS807
	10' E CREEK - POND

N.E. CAPE

PT # DESCRIPTION

2018 DB SS 805

2019 DB SW/SD 803
~~TOP H2O~~ LEVEL

2020 DD SS 804

2021 DBSW/SD 802

2022 DB SW/SD 801 H2O LEVEL

2023 DBSS 803 E. of CREEK

2024 DBSS 802

[illegible]

14 SEP 98
RAIN, WIND 20-30 MPH

PM
S.I.

NB CAPE

14 SEP '94
RAIN, WIND 30-40 MPH

D.M.
S.I.

PT#	DESCRIPTION
2026	RC SW/SD 804 S OF CR AT H_2O Level
2027	RCSW/SD 803
2028	init.
2029	RC SW/SD 805
2030	RC SW/SD 806

NE CAPE

PT#	DESCRIPTION
2037	98 NEC BK SW/SD 802 Edge H_2O
2038	BK SW/SD 801
2039	APPROX TIDE LINE
2040	FOUND 5/8 REBAR W WELDED BRASS CAP 1" (NO I.D. ON IT)
2041	98 NEC 07 SS 802 1st PT N. OF BEACH RD
2042	98 NEC 1. 07 SS 801 801 (PT S. of RD)

14 SEPT
15 SEPT
LT. RAIN
LT. WIND

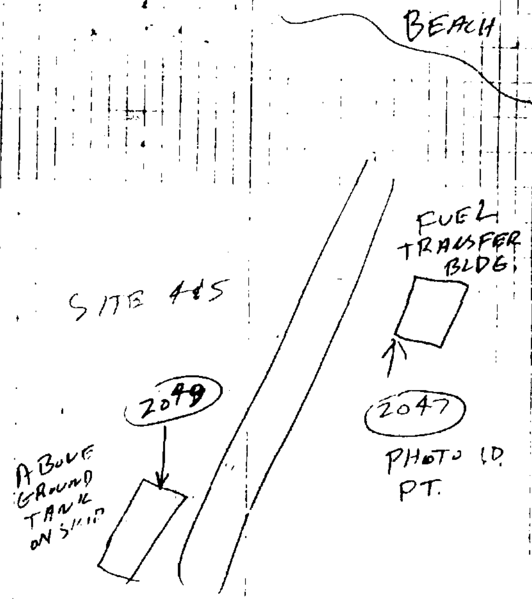
DON MULLIKIN
SHANE IKNOKINOK

NE CAPE

15 SEP 98

D.M.
S.I.

PT #	DESCRIPTION
2043	99 NEC 06 SS.801
	S. Rd
2044	BM 5 USC&GS 1962 B.C. IN BOULDER
2145 ~~2146~~ ~~2045~~	OG By 3-1 Well PT. 1¼" PIPE
2046	3-1 Well PT 1¼" PIPE (2.6 TO OG.)
2047	SW COR TRANSFER SITE BLDG S. OF RD
2048	4-1 Well PT
2049	EAST END TANK (2.9' OG) By 4-1
205[illegible]	BM N A USC&GS B.C. BOULDER



NE CAPE

PT #	DESCRIPTION
2051	98 NEC ~~98~~ SS 801
2052	14-1 Well PT (3.7' 0.6)
2053	14 SS 802 SE END 30' TANK
2054	14 SS 801
2055	TOP BOLT OF Fire Hyd. 50' E BLD. 98
2056	09 S: 902

15 SEP 98

D.M.
S.I.

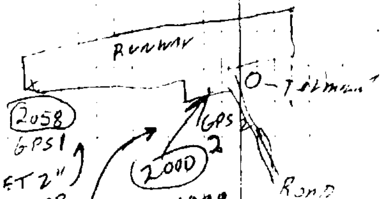
3

NE CAPE

PT #	DESCRIPTION
2057	FND 2" AL CAP Lounsbury 1994 8535 LS = #4

15 SEP 98
SUNNY, LT WIND

D.M.
S.I.



2058
GPS 1

SET 2"
AL CAP
ON 5/8"
REBAR
GPS
1998
4469-S

2000
1998
4469-S

APPENDIX G

Hazardous Waste Disposal Documentation

MONTGOMERY WATSON

October 28, 1998 1189098.050101

Alaska Department of Environmental Conservation
Attention: Hazardous Waste Manifest Coordinator
410 Willoughby Ave.
Juneau, Alaska 99801-1795

Subject: Hazardous Waste Manifest Copy for Files

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
Article No. Z 744 761 312

Dear Manifest Coordinator:

On behalf of the US Army Corps of Engineers (USACE), Montgomery Watson is transmitting this copy of the uniform hazardous waste manifest in accordance with the requirements of 18 AAC 62.230. The particulars of this manifest are:

Manifest number:	NEC01
Generator:	USACE Northeast Cape
Generator's EPA ID Number:	AK0000228395
Submittal:	Completed Manifest

If you should have any questions, please do not hesitate to contact the USACE [Dee Ginter, (907) 753-2805] or Montgomery Watson [Deborah Luper, (907) 266-1113].

Sincerely,

Deborah Luper

Deborah Luper
Principal

cc: Rick Jackson - USACE
Dee Ginter - USACE

10/28/98 16:35 FAX 618 271 9704 TWI 002/002

STATE OF ILLINOIS

P.O. BOX 19276 SPRINGFIELD, ILLINOIS 62794-9276 (217) 782-6761

State Form LPC 62 8/81 IL532-0610

EPA Form 8700-22 (Rev. 6-89)

FOR SHIPMENT OF HAZARDOUS AND SPECIAL WASTE

3

CCWM

PLEASE TYPE (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. AK0000228395 Manifest Document No. NFC01

2. Page 1 of 4

Information in the shaded areas is not required by Federal law, but is required by Illinois law.

3. Generator's Name and Mailing Address Location If Different
USACE-NORTHEAST CAPE
Kangukhsam Mtn. 52.25 miles
Savoonga AK 99789

4. "24 HOUR EMERGENCY AND SPILL ASSISTANCE NUMBERS" 800 535-5053

A. Illinois Manifest Document Number IL 7610525 FEE PAID IF APPLICABLE

B. Illinois Generator's ID 9020109999

5. Transporter 1 Company Name: Bering Air
6. US EPA ID Number: AK0000662189

C. Illinois Transporter's ID
D. (907) 443-5464 Transporter's Phone

7. Transporter 2 Company Name: Northern Air Cargo
8. US EPA ID Number: AKD003845526

E. Illinois Transporter's ID
F. (907) 243-3331 Transporter's Phone

9. Designated Facility Name and Site Address
CHEMICAL WASTE MANAGEMENT, INC.
#7 MOBILE AVE
SAUGET IL 62201

10. US EPA ID Number: ILD098642424

G. Illinois Facility's ID 1631210009
H. Facility's Phone 618 271-2804

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. WASTE CAUSTIC ALKALI, LIQUIDS, N.O.S., 8, UN1719, PGII (Diethylenetriamine, Sodium Hydroxide) Cargo Aircraft Only RQ	006	DM	1500	P	EPA HW Number XXD002; Authorization Number 0900011
b.					EPA HW Number XX; Authorization Number
c.					EPA HW Number XX; Authorization Number
d.					EPA HW Number XX; Authorization Number

J. Additional Descriptions for Materials Listed Above
WPS#422331 DECONTAMINATION AGENT DS2 ERG#154
24 Hour Emergency # 800 535-5053
Certificate of Destruction required, mail to Rich Jackson as below

K. Handling Codes for Wastes Listed Above In Item #14

15. Special Handling Instructions and Additional Information
Mail Original Manifest To: Rich Jackson, USACE, PO BOX 898, Anchorage, AK, 99506
Mail Copy To: Montgomery Watson, 4100 Spenard Rd, Anchorage, AK, 99516, Attn: 1189098.050101

Alternative TSDF: FOR TRANSHIPMENT
Chemical Waste Management, INC
9131 E 96th AVE
HENDERSON, CO 80640
COD980591184 303/289-4827

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway /WATER/AIR according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: DEIRDRE M. GINTER
Signature: Deirdre M. Ginter on behalf OF DOD
Date: Month Day Year 09 15 98

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: David W. Olson for Bering Air INC
Signature:
Date: Month Day Year 09 16 98

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: ARTHUR WILSON / STERLING E. BUFFAS FOR N.A.C.
Signature:
Date: Month Day Year 09 16 98 / 09 18 98

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: Kathy DeWitt
Signature: Kathy DeWitt
Date: Month Day Year 10 27 98

This Agency is authorized to require, pursuant to Illinois Revised Statute, 1989, Chapter 111 1/2, Section 1004 and 1021, that this information be submitted to the Agency. Failure to provide this information may result in a civil penalty against the owner or operator not to exceed $25,000 per day of violation. Falsification of this information may result in a fine up to $50,000 per day of violation and imprisonment up to 5 years. This form has been approved by the Forms Management Center.

In case of a spill call the Illinois Office of Emergency Response at 217/782-7860 and the National Response Center at 800/424-8802 or 202/426-2675.

COPY 1. TSD MAIL TO GENERATOR

13-3273

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. CWMI

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator's US EPA ID No. AK0000228395	Manifest Document No. NECØ1	22. Page 2 of 4	Information in the shaded areas is not required by Federal law.

23. Generator's Name

UASCE - NORTHEAST CAPE
KANGUKHSAM MTN. 52.25 MILES
SAVOONGA AK 99786

L. State Manifest Document Number 7610525

M. State Generator's ID 9020109999

24. Transporter 3 Company Name: Carlile Enterprises — 25. US EPA ID Number: AKD122081234

N. State Transporter's ID

O. Transporter's Phone 907-276-7797

26. Transporter 4 Company Name: Totem Ocean Trailer — 27. US EPA ID Number: WAD070397959

P. State Transporter's ID

Q. Transporter's Phone 907-276-5868

28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	29. Containers No.	29. Containers Type	30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
a.						
b.						
c.						
d.						
e.						
f.						
g.						
h.						
i.						

S. Additional Descriptions for Materials Listed Above

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

GENERATOR

33. Transporter ____ Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month Day Year
Steve A Marks	[signature]	09 24 88

34. Transporter ____ Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month Day Year
MATT DEVEREE	[signature]	09 25 88

TRANSPORTER

35. Discrepancy Indication Space

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039.

CWM

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator's US EPA ID No.: AK0000228395
Manifest Document No.: NEC01
22. Page: 3 of 4

Information in the shaded areas is not required by Federal law.

L. State Manifest Document Number: 117610525

M. State Generator's ID: 9020109999

N. State Transporter's ID

O. Transporter's Phone

P. State Transporter's ID

Q. Transporter's Phone

23. Generator's Name

USACE - NORTHEAST CAPE
KANGUKHSAM MTN. 52.25 MILES
SAVOONGA AK 99786

24. Transporter 5 Company Name: K&W Transportation
25. US EPA ID Number: AK122081234

26. Transporter 6 Company Name: Advanced Envi. Tech. Ser. (AETS)
27. US EPA ID Number: NJD080631369

	28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	HM	29. Containers No.	Type	30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
a.							
b.							
c.							
d.							
e.							
f.							
g.							
h.							
i.							

S. Additional Descriptions for Materials Listed Above

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

33. Transporter 5 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year
MEL INGRAM	Mel Ingram	10	5	98

34. Transporter 6 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year
DAVID C. WARBURTON	D C W for AETS	10	05	98

35. Discrepancy Indication Space

GENERATOR / TRANSPORTER / FACILITY

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. CWMI

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)

21. Generator's US EPA ID No.: AK0000228395
Manifest Document No.: NEC01
22. Page 4 of 4

Information in the shaded areas is not required by Federal law.

23. Generator's Name

UASCE - NORTHEAST CAPE
KANGUKHSAM MTN. 52.25 MILES
SAVOONGA AK 99786

L. State Manifest Document Number: IL 7610525
M. State Generator's ID: 9020109999

24. Transporter 7 Company Name: Tri-State Motor Transit
25. US EPA ID Number: MOD095038998

N. State Transporter's ID:
O. Transporter's Phone: 800-234-8768

26. Transporter 8 Company Name: OIL + SOLVENT PROCESS CO.
27. US EPA ID Number: COD 980591184

P. State Transporter's ID:
Q. Transporter's Phone: (313) 389-4827

28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	RQ	29. Containers No.	Type	30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
a.						
b.						
c.						
d.						
e.						
f.						
g.						
h.						
i.						

S. Additional Descriptions for Materials Listed Above

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

GENERATOR

33. Transporter 7 Acknowledgement of Receipt of Materials

Printed/Typed Name: ANTHONY KRUCHAS
Signature:
Date: Month 10 Day 23 Year 98

34. Transporter 8 Acknowledgement of Receipt of Materials

Printed/Typed Name: LON R. LINK
Signature: Lon R. Link
Date: Month 10 Day 26 Year 98

TRANSPORTER

35. Discrepancy Indication Space

FACILITY

Style CF 18 Labelmaster, An American Labelmark Co., Chicago, IL 60646 (800) 621-5808

EPA Form 8700-22A (Rev. 9-88) Previous editions are obsolete.

PRINTED ON RECYCLED PAPER USING SOYBEAN INK

ORIGINAL-RETURN TO GENERATOR

MONTGOMERY WATSON

October 20, 1998

1189098.050101

Alaska Department of Environmental Conservation
Attention: Hazardous Waste Manifest Coordinator
410 Willoughby Ave.
Juneau, Alaska 99801-1795

Subject: Hazardous Waste Manifest Copy for Files

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
Article No. Z 744 761 315

Dear Manifest Coordinator:

On behalf of the US Army Corps of Engineers (USACE), Montgomery Watson is transmitting this copy of the uniform hazardous waste manifest in accordance with the requirements of 18 AAC 62.230. The particulars of this manifest are:

Manifest number:	NEC02
Generator:	USACE Northeast Cape
Generator's EPA ID Number:	AK0000228395
Submittal:	Completed Manifest

If you should have any questions, please do not hesitate to contact the USACE [Dee Ginter, (907) 753-2805] or Montgomery Watson [Deborah Luper, (907) 266-1113].

Sincerely,

Deborah Luper

Deborah Luper
Principal

cc: Rick Jackson - USACE
Dee Ginter - USACE

4100 Spenard Road
Anchorage, Alaska
99517-2901

Tel: 907 248 8883
Fax: 907 248 8884

Serving the World's Environmental Needs

a. RQ = 10	c. RQ =	RESPONSE CENTER (800) 424-8802, AND 911 EMERGENCY NUMBER OR LOCAL OPERATOR. EMERGENCY CONTACT:	YES	RESPONSE GUIDE NUMBER 140 c. d.
b. RQ =	d. RQ =	CHEMTREC (800) 424-9300		

339635

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: AK0000228395 — Manifest Document No.: NECO2 — 2. Page 1 of 4

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
USACE- NORTHEAST CAPE
Kangukhsam Mtn. 52.25 miles
Savoonga, AK 99789

4. Generator's Phone (907) 753-5606

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name: Bering Air — 6. US EPA ID Number: AK0000662189

C. State Transporter's ID

D. Transporter's Phone 907-443-5464

7. Transporter 2 Company Name: Northern Air Cargo — 8. US EPA ID Number: AK0003845526

E. State Transporter's ID

F. Transporter's Phone 907-243-3331

9. Designated Facility Name and Site Address
Chemical Waste Management of the NW
17629 Cedar Springs Lane
Arlington, OR 97812-9709

10. US EPA ID Number: ORD089452353

G. State Facility's ID

H. Facility's Phone 541-454-2643

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. RQ, Waste Calcium Hypochlorite Mixtures, Dry, 5.1, UN2208, PGIII (Calcium hypochlorite) Cargo Aircraft Only	001	DF	400	P	D001
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
WPS#422434/CK3460 (SUPER TROPICAL BLEACH, STB),
ERG#140, 24 Hour Emergency # 800/535-5053
Certificate of Destruction required, Mail to Rich Jackson as below

K. Handling Codes for Wastes Listed Above
S40 P.
S4

15. Special Handling Instructions and Additional Information
Mail Original Manifest to: Rich Jackson, USACE
P.O. Box 898 Anchorage, AK 99506
Mail Copy; Montgomery Watson 4100 Spenard RD
Anchorage, AK 99517

AGENCY DISPLAY OF ESTIMATED BURDEN
"Public reporting burden for this collection of information is estimated to average: 37 minutes for generators, 15 minutes for transporters, and 10 minutes for treatment, storage and disposal facilities. This includes time for reviewing instructions, gathering data, and completing and reviewing the form. Send comments regarding the burden estimate, including suggestions for reducing this burden, to: Chief, Information Policy Branch, PM-223, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460; and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503."

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway /air/water according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month Day Year
DEIRDRE M. GINTER	Deirdre M. Ginter on behalf of DOD	09 14 98

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
DAVID W. OLSON for Bering Air		09 16 98

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
STERLING E. BUFFAS FOR N.A.C.		09 16 98

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name	Signature	Month Day Year
Melissa Steward	M. Steward	10 08 98

EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

KAWT 93089

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) Form Approved, OMB No. 2050-0039, Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator's US EPA ID No. AK0000228395	Manifest Document No. NEC02	22. Page 2 of 4	Information in the shaded areas is not required by Federal law.

23. Generator's Name

USACE- Northeast Cape
Kangukhsam Mtn. 52.25
Savoonga, AK 99786

[redacted]

24. Transporter 3 Company Name	25. US EPA ID Number
Carlile Enterprises	AKD122081234
26. Transporter 4 Company Name	**27. US EPA ID Number**
Totem Ocean Trailer	WAD070397959

[redacted]

	HM	28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	29. Containers No.	Type	30. Total Quantity	31. Unit Wt/Vol	[redacted]
a.							
b.							
c.							
d.							
e.							
f.							
g.							
h.							
i.							

S. Additional Descriptions for Materials Listed Above

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

GENERATOR

TRANSPORTER

33. Transporter 3 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month Day Year
Danny Imhoff	Danny Imhoff	9 25 98

34. Transporter 4 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month Day Year
MATT DEVENERE		09 25 98

FACILITY

35. Discrepancy Indication Space

Style F16 REV-6 LABELMASTER, An AMERICAN LABELMARK CO., CHICAGO, IL 60646 800-621-5808

EPA Form 8700-22A (Rev. 9-88) Previous editions are obsolete

KAWT 93089

Please print or type: (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST *(Continuation Sheet)*	21. Generator's US EPA ID No.	Manifest Document No.	22. Page	Information in the shaded areas is not required by Federal law.
	AK0000228395	NEC02	3 of 4	

23. Generator's Name
USACE - Northeast Cape
Kangukhsam Mtn. 52.25 Miles
Savoonga, AK 99786

State Manifest Document Number

State Generator's ID

24. Transporter 5 Company Name: K&W Transportation | 25. US EPA ID Number: AK122081234

State Transporter's ID
Transporter's Phone 253-874-2639

26. Transporter 6 Company Name: Advanced Envl. Tech. Ser. (AETS) | 27. US EPA ID Number: NJD080631369

State Transporter's ID
Transporter's Phone 206-241-3900

	HM	28. US DOT Description (*Including Proper Shipping Name, Hazard Class, and ID Number*)	29. Containers No.	29. Containers Type	30. Total Quantity	31. Unit Wt/Vol	Waste No.
a.							
b.							
c.							
d.							
e.							
f.							
g.							
h.							
i.							

S. Additional Descriptions for Materials Listed Above

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

GENERATOR

33. Transporter 5 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year
MEL INGRAM	Mel Ingram 1471	10	1	98

34. Transporter 6 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year
DAVID C. WARBURTON	D C W FOR AETS	10	06	98

TRANSPORTER

35. Discrepancy Indication Space

FACILITY

Style F16 REV-6 LABELMASTER, An AMERICAN LABELMARK CO., CHICAGO, IL 60646 800-621-5808

EPA Form 8700-22A (Rev. 9-88) Previous editions are obsolete.

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-96

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator's US EPA ID No.	Manifest Document No.	22. Page	Information in the shaded areas is not required by Federal law.
	AK0000228395	NEC02	4 of 4	

23. Generator's Name
USACE - Northeast Cape
Kangukhsam Mtn. 52.25 Miles
Savoonga, AK 99786

L. State Manifest Document Number
M. State Generator's ID

24. Transporter 7 Company Name ~~Tri-State Motor Transit~~ DIABLO TRANSPORTATION
25. US EPA ID Number ~~MOD095038998~~ CAD000367755

N. State Transporter's ID
O. Transporter's Phone 800-

26. Transporter ___ Company Name
27. US EPA ID Number

P. State Transporter's ID
Q. Transporter's Phone

	HM	28. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	29. Containers No.	Type	30. Total Quantity	31. Unit Wt/Vol	R. Waste No.
a.							
b.							
c.							
d.							
e.							
f.							
g.							
h.							
i.							

S. Additional Descriptions for Materials Listed Above

T. Handling Codes for Wastes Listed Above

32. Special Handling Instructions and Additional Information

GENERATOR

33. Transporter 7 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year
CJ BLUNDELL	CJ Blundell	10	08	98

34. Transporter ___ Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Date Month	Day	Year

TRANSPORTER

35. Discrepancy Indication Space

FACILITY

Style F16 REV-6 LABELMASTER, An AMERICAN LABELMARK CO., CHICAGO, IL 60646 800-621-5808

EPA Form 8700-22A (Rev. 9-88) Previous editions are obsolete.

Chem-Waste Arlington, OR

Ø005

Certificates of Disposal/Destruction not available at this time.

They will be provided in the final document.

TRADE WASTE INCINERATION
A DIVISION OF CHEMICAL WASTE MANAGEMENT
Federal EPA ID: ILD098642424
State EPA ID: 1631210009
7 MOBILE AVENUE
SAUGET, IL 62201-1069
(618) 271-2804

US ARMY CORP OF ENGINEERS
ATTN: MANIFEST SECTION
AK0000228395
KANGUKHSAM MT 52.25 MI ESE
SAVOONGA AK 99769

CERTIFICATE OF DESTRUCTION

Chemical Waste Management, Inc. has received waste material from US ARMY CORP OF ENGINEERS on 10/27/98 as described on [State Manifest or Uniform] Hazardous Waste Manifest number(s) IL07610525.

Profile Number: 433817
CWM Tracking ID: 13-3272
Treatment Date: 12/16/98
CWM Unit #: 1*0 thru 4*0

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

Gary F. Burke

GARY F. BURKE

Certificate # 48114
01/28/99

WM

CWM OF THE NORTHWEST
Federal EPA ID: ORD089452353
17629 CEDAR SPRINGS LANE
ARLINGTON, OR 97812

US ARMY CORP OF ENGINEERS
ATTN: MANIFEST SECTION
AK0000228395
KANGUKHSAM MT 52.25 MI ESE
SAVOONGA AK 99769

CERTIFICATE OF DISPOSAL

Chemical Waste Management, Inc. has received waste material from US ARMY CORP OF ENGINEERS on 10/08/98 as described on [State Manifest or Uniform] Hazardous Waste Manifest number NECO2.

Profile Number: CK3460
CWM Tracking ID: 33963501
Treatment Date: 04/29/99
CWM Unit #: 1*0

I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above-described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the date listed above.

Mitzi Yoder

LYNN MURRILL
RECORDS SUPERVISOR
Certificate # 62721
07/21/99

APPENDIX H

Field Forms

Army Corps of Engineers

Northeast Cape, Alaska

Sample Plan Checklist

MONTGOMERY WATSON

NORTHEAST CAPE SAMPLE PLAN CHECKLIST

				WATER							SOIL			SLUDGE			GRAB			
Sample Number	Location	Date	Time	BETX (SW 8020A) 3-40 ml vials with HCl	DRO (SW 8100 Mod) 2-1 L amber with HCl	TRPH (EPA 418.1) 2-1 L amber with H2SO4	PCB (SW 8080A) 2-1 L amber	TCLP - Metals (1311-6010/7000) 1-1 L plastic	Fuel Identification (8015M) 2-1 L amber	Glycol (8015M) 2-1 L amber	DRO (SW 8100 Mod) 1-4 oz. jar	TRPH (EPA 418.1) 1-4 oz. jar	PCB (SW 8080A) 1-4 oz. jar	TCLP - Metals (1311-6010/7000) 1-8 oz. jar	Fuel Identification (8015M) 1-8 oz. jar	Glycol (8015M) 1-4 oz. jar	PCB - Wipe	TRPH	PCB	BTEX
Pre-Phase II																				
96 NEC 001 SW		27-Jun	10:00															X	X	X
96 NEC 002 SW		27-Jun	10:30															X	X	X
96 NEC 011 SW		27-Jun	10:00															X	X	X
96 NEC 021 SW		27-Jun	10:15															X	X	X
96 NEC 900 SW		27-Jun	10:40																	X
96 NEC 901 SW		27-Jun	10:40																	X
Phase II																				
96 NE 04 TK 101		4-Aug	12:00	X		X														
96 NE 13 TK 101		4-Aug	16:30	X		X														
96 NE 14 TK 101		4-Aug	13:00	X		X	X													
96 NE 14 TK 102		4-Aug	14:00											X	X	X				
96 NE 16 TK 101		4-Aug	16:00	X		X	X													
96 NE 16 TK 201		4-Aug	16:05	X		X	X													
96 NE 16 TK 301		4-Aug	16:10	X		X	X													
96 NE 16 TK 102		4-Aug	16:20	Floating Product																
96 NE 16 TK 102		6-Aug	12:00											X	X	X				
96 NE 16 TK 202		6-Aug	12:05											X	X	X				
96 NE 16 TK 302		6-Aug	12:10											X	X	X				

NORTHEAST CAPE SAMPLE PLAN CHECKLIST

				WATER							SOIL			SLUDGE			GRAB			
Sample Number	Location	Date	Time	BETX (SW 8020A) 3-40 ml vials with HCl	DRO (SW 8100 Mod) 2-1 L amber with HCl	TRPH (EPA 418.1) 2-1 L amber with H2SO4	PCB (SW 8080A) 2-1 L amber	TCLP - Metals (1311-6010/7000) 1-1 L plastic	Fuel Identification (8015M) 2-1 L amber	Glycol (8015M) 2-1 L amber	DRO (SW 8100 Mod) 1-4 oz. jar	TRPH (EPA 418.1) 1-4 oz. jar	PCB (SW 8080A) 1-4 oz. jar	TCLP - Metals (1311-6010/7000) 1-8 oz. jar	Fuel Identification (8015M) 1-8 oz. jar	Glycol (8015M) 1-4 oz. jar	PCB - Wipe	TRPH	PCB	BTEX
96 NE 19 TK 101		6-Aug	11:00	X		X	X													
96 NE 19 TK 102		6-Aug	11:15											X	X	X				
96 NE 10 SS 101		5-Aug	16:15								X	X								
96 NE 10 SS 201		5-Aug	16:20								X	X								
96 NE 10 SS 301		5-Aug	16:25								X	X								
96 NE 10 SS 102		5-Aug	16:30								X	X								
96 NE 10 SS 103		5-Aug	16:40								X	X								
96 NE 10 SS 104		5-Aug	16:45								X	X								
96 NE 10 SS 105		5-Aug	16:50								X	X								
96 NE 10 SS 106		5-Aug	16:55								X	X								
96 NE 10 SS 107		5-Aug	16:45								X	X								
96 NE 10 SS 107		6-Aug	13:15										X							
96 NE 10 SS 108		5-Aug	17:00								X	X								
96 NE 27 SS 101		6-Aug	13:00								X									
96 NE 27 SS 201		6-Aug	13:05								X									
96 NE 27 SS 301		6-Aug	13:10								X									
96 NE 27 SS 102		6-Aug	13:15								X									
96 NE 27 SS 103		6-Aug	13:20								X									
96 NE 27 SS 104		6-Aug	13:25								X									

NORTHEAST CAPE SAmPLE PLAN CHECKLIST

				WATER							SOIL			SLUDGE			GRAB			
Sample Number	Location	Date	Time	BETX (SW 8020A) 3-40 ml vials with HCl	DRO (SW 8100 Mod) 2-1 L amber with HCl	TRPH (EPA 418.1) 2-1 L amber with H2SO4	PCB (SW 8080A) 2-1 L amber	TCLP - Metals (1311-6010/7000) 1-1 L plastic	Fuel Identification (8015M) 2-1 L amber	Glycol (8015M) 2-1 L amber	DRO (SW 8100 Mod) 1-4 oz. jar	TRPH (EPA 418.1) 1-4 oz. jar	PCB (SW 8080A) 1-4 oz. jar	TCLP - Metals (1311-6010/7000) 1-8 oz. jar	Fuel Identification (8015M) 1-8 oz. jar	Glycol (8015M) 1-4 oz. jar	PCB - Wipe	TRPH	PCB	BTEX
96 NE 27 SS 105		6-Aug	13:30								X									
96 NE 27 SS 106		6-Aug	13:00									X	X							
96 NE 27 SS 107		6-Aug	12:55									X	X							
96 NE 27 SS 108		6-Aug	12:45									X	X							
96 NE 27 SS 109		6-Aug	13:10										X							
96 NE NA SW 101		4-Aug	12:00		X		X													
96 NE NA SD 101		4-Aug	12:00								X		X							
96 NE NA SW 201		4-Aug	12:00		X		X													
96 NE NA SD 201		4-Aug	12:00								X		X							
96 NE NA SW 301		4-Aug	12:00		X		X													
96 NE NA SD 301		4-Aug	12:00								X		X							
96 NE NA SW 102		4-Aug	12:30		X		X													
96 NE NA SD 102		4-Aug	12:30								X		X							
96 NE NA SW 103		4-Aug	13:10		X		X													
96 NE NA SD 103		4-Aug	13:10								X		X							
96 NE NA SW 104		4-Aug	13:20		X		X													
96 NE NA SD 104		4-Aug	13:20								X		X							
96 NE NA SW 105		4-Aug	13:40		X		X													
96 NE NA SD 105		4-Aug	13:40								X		X							

NORTHEAST CAPE SAMPLE PLAN CHECKLIST

Sample Number	Location	Date	Time	WATER: BETX (SW 8020A) 3-40 ml vials with HCl	WATER: DRO (SW 8100 Mod) 2-1 L amber with HCl	WATER: TRPH (EPA 418.1) 2-1 L amber with H2SO4	WATER: PCB (SW 8080A) 2-1 L amber	WATER: TCLP - Metals (1311-6010/7000) 1-1 L plastic	WATER: Fuel Identification (8015M) 2-1 L amber	WATER: Glycol (8015M) 2-1 L amber	SOIL: DRO (SW 8100 Mod) 1-4 oz. jar	SOIL: TRPH (EPA 418.1) 1-4 oz. jar	SOIL: PCB (SW 8080A) 1-4 oz. jar	SLUDGE: TCLP - Metals (1311-6010/7000) 1-8 oz. jar	SLUDGE: Fuel Identification (8015M) 1-8 oz. jar	SLUDGE: Glycol (8015M) 1-4 oz. jar	GRAB: PCB - Wipe	GRAB: TRPH	GRAB: PCB	GRAB: BTEX
96 NE NA SW 106		4-Aug	14:05		X		X													
96 NE NA SD 106		4-Aug	14:05								X		X							
96 NE NA SW 107		4-Aug	14:20		X		X													
96 NE NA SD 107		4-Aug	14:20								X		X							
96 NE NA SW 108		4-Aug	14:30		X		X													
96 NE NA SD 108		4-Aug	14:30								X		X							
96 NE DB SD 109		4-Aug	15:05										X							
96 NE DB SD 110		4-Aug	15:10										X							
96 NE DB SD 111		6-Aug	15:15								X		X							
96 NE DB SD 112		6-Aug	16:30								X		X							
96 NE DB 113 SD		7-Aug	17:00								X		X							
96 NE DB SS 101		4-Aug	14:40										X							
96 NE DB SS 102		4-Aug	14:45										X							
96 NE DB SS 103		4-Aug	14:50										X							
96 NE DB SS 203		4-Aug	14:55										X							
96 NE DB SS 303		4-Aug	15:00										X							
96 NE 16 TB 101		4-Aug	21:00	X																

NORTHEAST CAPE SAMPLE PLAN CHECKLIST

				WATER							SOIL			SLUDGE			GRAB			
Sample Number	Location	Date	Time	BETX (SW 8020A) 3-40 ml vials with HCl	DRO (SW 8100 Mod) 2-1 L amber with HCl	TRPH (EPA 418.1) 2-1 L amber with H2SO4	PCB (SW 8080A) 2-1 L amber	TCLP - Metals (1311-6010/7000) 1-1 L plastic	Fuel Identification (8015M) 2-1 L amber	Glycol (8015M) 2-1 L amber	DRO (SW 8100 Mod) 1-4 oz. jar	TRPH (EPA 418.1) 1-4 oz. jar	PCB (SW 8080A) 1-4 oz. jar	TCLP - Metals (1311-6010/7000) 1-8 oz. jar	Fuel Identification (8015M) 1-8 oz. jar	Glycol (8015M) 1-4 oz. jar	PCB - Wipe	TRPH	PCB	BTEX
96 NE 16 TB 301		4-Aug	21:00	X																
96 NE 19 TB 101		6-Aug	21:00	X																
96 NE 19 TB 201		6-Aug	21:15	X																
Benthic Biosurvey, Zoo-plancton, Phyto Samples																				
96 NE DB 101 PL		5-Aug	13:30																	
96 NE DB 101 BN		5-Aug	13:30																	
96 NE DB 101 ZO		5-Aug	13:30																	
96 NE DB 102 PL		5-Aug	12:00																	
96 NE DB 102 BN		5-Aug	12:00																	
96 NE DB 102 ZO		5-Aug	12:00																	
96 NE DB 103 PL		5-Aug	10:30																	
96 NE DB 103 BN		5-Aug	10:30																	
96 NE DB 103 ZO		5-Aug	10:30																	
96 NE DB 104 PL		5-Aug	13:00																	
96 NE DB 104 BN		5-Aug	13:00																	
96 NE DB 104 ZO		5-Aug	13:00																	

Army Corps of Engineers

Northeast Cape, Alaska

Tailgate Safety Meeting

MONTGOMERY WATSON

Appendix B Tailgate Safety Meeting Form

Date: Aug 2 1996 Time: 10:00 Job Number: 2198.0420

Client: **USACE, Alaska** Site Location: **NE Cape, St. Lawrence Island**

Scope of Work: surface soil sampling, surface water sampling, cutting cable, site reconnaissance, radiological monitoring, bio sampling

Safety Topics Presented

Protective Clothing/Equipment: steel toed boots, hard hat, gloves, ear and eye protection, tyvek, mosquito netting and spray

Chemical Hazards: Hexane, BETX, gasoline

Roads hazardous — reduce speed

Physical Hazards: spilling, falling, heat stress, hypothermia, noise, ATV travel, rabid fox, polar bears

Nails, boards, Aggressive fox

Special Equipment: Microtip 3000, dosimeter, satellite phone, CB, marine band radio, ELT

emergency supplies, LOCATED AT AIR PORT BLDG

Other: Expanded first aid kit, bear spray,

Emergency Procedures: give emergency assistance, if needed, transport to clinic, call for MediVac SEE PHONE NUMBERS POSTED ON wall by SATELITE PHONE

MediVac Phone: 800-478-5433 Clinic Phone: 907-985-5011 (or 5012, 5013)

29

Hospital Address and Route:

Use CB channel 19 to contact Savoonga, Marine Band for Coast Guard, **ELT for life threatening event**

ATTENDEES

TAILGATE SAFETY MEETING

NAME PRINTED	SIGNATURE
Victor Harris	
Douglas Quist	
Elise Tuzman	

Meeting Conducted By: Bonnie McLean ____________

Name Printed Signature

Projected Safety Officer: ____________ Project Manager: ____________

Appendix B Tailgate Safety Meeting Form

Date: 3-Aug-96 Time: 2:30 Job Number: 2198.0420

Client: **USACE, Alaska** Site Location: **NE Cape, St. Lawrence Island**

Scope of Work: surface soil sampling, surface water sampling, cutting cable, site reconnaissance, radiological monitoring, bio sampling bio samples, basement pumping, cable cutting
SITE RECON.

Safety Topics Presented in bldg

Protective Clothing/Equipment: steel toed boots, hard hat, gloves, ear and eye protection, tyvek, mosquito netting and spray

Chemical Hazards: Hexane, BETX, gasoline

Physical Hazards: spilling, falling, heat stress, hypothermia, noise, ATV travel, rabid fox, polar bears Eugene
→ noted near office

Special Equipment: Microtip 3000, dosimeter, satellite phone, CB, marine band radio, ELT, emergency supplies,

Other: Expanded first aid kit, bear spray, located in office H&S box

Emergency Procedures: give emergency assistance, if needed, transport to clinic, call for MediVac Phone, CB-Savoonga (clinic) phone

MediVac Phone: 800-478-5433 Clinic Phone: 907-985-5011 (or 5012, 5013)

Hospital Address and Route:
Use CB channel 19 to contact Savoonga, Marine Band for Coast Guard, **ELT for life threatening event** reviewed stellit phone system

ATV's - slow

1234 STO
- HANDSET UNLOCK

ATTENDEES

TAILGATE SAFETY MEETING

NAME PRINTED	SIGNATURE
Elise Tuzman	Elise Tuzman
Douglas S [illegible]	[illegible]
Victor Harris	[illegible]

Meeting Conducted By: B McLean (Name Printed) [illegible] (Signature)

Projected Safety Officer: ____________________ Project Manager: ______________

Appendix B Tailgate Safety Meeting Form

Date: 4 Aug 96 Time: _______ Job Number: 2198.0420

Client: **USACE, Alaska** Site Location: **NE Cape, St. Lawrence Island**

Scope of Work: surface soil sampling, surface water sampling, cutting cable, site reconnaissance, radiological monitoring, bio sampling Tank Sampling

Safety Topics Presented

Protective Clothing/Equipment: steel toed boots, hard hat, gloves, ear and eye protection, tyvek, mosquito netting and spray

Chemical Hazards: ~~Hexane~~, ~~BETX~~, gasoline HCl, H_2SO_4

Physical Hazards: spilling, falling, heat stress, hypothermia, noise, ATV travel, rabid fox, polar bears nails in wood.

Special Equipment: Microtip 3000, dosimeter, satellite phone, CB, marine band radio, ELT, emergency supplies,

Other: Expanded first aid kit, bear spray,

Emergency Procedures: give emergency assistance, if needed, transport to clinic, call for MediVac

MediVac Phone: 800-478-5433 Clinic Phone: 907-985-5011 (or 5012, 5013)

Hospital Address and Route:
Use CB channel 19 to contact Savoonga, Marine Band for Coast Guard, **ELT for life threatening event**

ATTENDEES

TAILGATE SAFETY MEETING

NAME PRINTED	SIGNATURE
Elise Tuzman	Elise Tuzman
Douglas R[illegible]	[illegible]
Victor Harris	[illegible]

Meeting Conducted By: ______________________ ______________
Name Printed Signature

Projected Safety Officer: ______________ Project Manager: ______________

Army Corps of Engineers

Northeast Cape, Alaska

Field Note Books

MONTGOMERY WATSON

FIELD NOTEBOOK
ST. LAWRENCE ISLAND
AUGUST, 1996
VEH

"Rite in the Rain"®
ALL-WEATHER
Horizontal Line
No. 390 NF

PROJ 2198.0460
(NEC)
2198.0450
(GAM)

MEASUREMENT CONVERSIONS

IF YOU KNOW	MULTIPLY BY	TO FIND
LENGTH		
inches	2.540	centimeters
feet	30.480	centimeters
yards	0.914	meters
miles	1.609	kilometers
millimeters	0.039	inches
centimeters	0.393	inches
meters	3.280	feet
meters	1.093	yards
kilometers	0.621	miles
WEIGHT		
ounces	28.350	grams
pounds	0.453	kilograms
grams	0.035	ounces
kilograms	2.201	pounds
VOLUME		
fluid ounces	29.573	milliliters
pints	0.473	liters
quarts	0.946	liters
gallons (U.S.)	3.786	liters
milliliters	0.033	fluid ounces
liters	1.058	quarts
liters	0.264	gallons

TEMPERATURE

°C = (°F - 32) x .555
°F = (°C x 1.8) + 32

Inches	Decimals of feet	Millimeters
1/16	.0052	1.5875
1/8	.0104	3.1750
3/16	.0156	4.7625
1/4	.0208	6.3500
5/16	.0260	7.9350
3/8	.0313	9.5250
1/2	.0417	12.700
5/8	.0521	15.875
3/4	.0625	19.050
7/8	.0729	22.225
1"	.0833	25.400
2"	.1667	50.800
3"	.2500	76.200
4"	.3333	101.60
5"	.4167	127.00
6"	.5000	152.40
7"	.5833	177.80
8"	.6667	203.20
9"	.7500	228.60
10"	.8333	254.00
11"	.9167	279.40
1 foot	1.0000	304.80

96 NEL (SITE) SS

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name Victor Harris
Montgomery Watson
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Anchorage, Alaska 99517
Phone (907) 248-8883

Project St. Lawrence Island Phase II RI's
Gambell 2198.0450
NEL 2198.0460

"Rite In the Rain" - a unique all-weather writing surface created to shed water and to enhance the written image. Makes it possible to write sharp, legible field data in any kind of weather.

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J. L. DARLING CORPORATION
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CONTENTS

1

FAX - Sitnasaq

Sitnusaq (BONANZA, NANAUQ) 443-5296

Doug, Elise (#8) 443-2945

Vic, BONNIE (#12) 443-2998

Cape Smythe 443-2414

Kenny Burnett

Wayne Meyer - CHIEF PILOT

Ben - warehouse

Bob Sanders 753-5617

CB channel - Savoonga = Ch 29

Wayne Meyer (Home) 443-5884

Home 345-0203

310 699 1256

NAC 4432215

Grimbell ~~985-5015~~ 5335 Creighton

Boeing 985 5646

Cape Smythe 5836

Baker 5612

Olson 5214

869 143 1319 5539

FRUIT, MAR lights, sanc rose

MER CRP EXPENSES

2 $100 BAGGAGE
$100 Savoonga Rm
$118 Gambell Rm.
$36 CAB (3 x $12)
Dinner - Pizza Joint
$30 Gambell Store

7-31 $45 Oversize 7.89 - GASOLINE
39.32 Niches Rest. $160.39 AC Store

7-31-96 Victor Hurr 3

CHRONOLOGICAL NOTES - NEC

WEDS 7-31-96
LV ANC 9:15 AM w/ McLean, Tuzman, Quist
ARR Nome 12:15
13:00 Pick up van
13:15 Visit w/ Wayne MEYER (chief pilot - Cape Smythe) Need fire bottle for DC-3. Enroute from LOWER 48. EARLIEST to fly 18:00 1-AUG (THUR)
Paid charter 1,900 lbs VFR
2,400 lbs. IFR

13:45 LUNCH
14:00 Go to bank, sort gear
TAKE SEATS FROM van
CHECK IN Nanaq
18:00 - 19:00 Buy Groceries
19:00 - 22:00 Stow gear, EAT

NOT USED

VH

4

1-AUG-96 (THURSDAY) NEC

Harris, Tuzman, McLean, Quast
ARR Cape Smythe 8:00
-check ATV's, fuel
9:20A depart for NEC
in Piper Cheyene N218CS
pilot co, by Larry. ARR NEC
10:10, Unload, stow gear,
build shelter. 13:30 Test
phone

13:50 Phone checks out OK
* Cut 3-1/2" guy wires
to tele pole in front of
AIR Port BLDG

19:15 Complete stream flow
measurement AND SIGN POSTING
Photos DQ1 → DQ22 taken
on 1-Aug during SF measurement
SF'd 1 (near culvert)
2 (midway stream)
3 (profile near intake)
4 (downstream of all)
5,6 immed down slope of
site 27

1X

1-AUG-96 NEC

21:00 Discussion w/ Eugene.
Eugene worked at NEC
64-69 AF
69-75 WHITE ALICE

3 spills known

'68 1). Big tank 180,000 gal '68
Not cleaned up
1970 2.) 800 gal near junction
Well cleaned up - [illegible]
Pad - Burned near paint & dope
'73 3) 40,000 gal at expansion
joint near power house

AF left Sept '69
Eugene worked at White Alice

Stream used to have
Dolly Varden / Shad, Leed

Staff Sargent Vaith
punctured tank (TANK #2 400K capacity)

Not used

HX

1-AUG-96 NEC Disc w/ Toolie con'

90 wt BARRELS where
buried near tanks

Snow gone MID June → mid Oct first

1,000 Raindeer on ISLAND
White Alice transformers
were taken AWAY 1993-abay

No spills in VICINITY
of hunt & fish camp.

IN Wildlife Area
- Polar Bear
- FOX
- Raindeer
- LOONS
- r. few ptarmigan
- Lemmings
- cranes

No Beaver
no MUSKRAT

Saw eagles
Once only (3 of them)

lots of ground
squirrel

Only game animal is
raindeer, except;

- Eugene EATS ducks
- Arctic tern
- Emperor geese
- Snow geese
- ducks

seagulls
killed by
VEH

1-Aug-96 NEC Toolie - c 4

eat Eggs (geese, duck)
No MUIR Eggs

SPOTED SEAL ON COAST

180,000 gal tank spill - went
under ROAD 2" thick - all
the way out to sea
damed by ice

MK was here in 1950-53
drums left on beach
Eugene figures burned 6-700
gal fuel/day. Barge came
1 time/year + trucks

All gravel came from
borrow pit. Rock crusher
2 - sizes 1) ROAD 2) AIRSTRIP

tanks at Hunting camp
water
2 - tanks near bldg 3 (HOOK)
were gasoline

 NEC 1-Aug-96 Con't (discussion w/ Toolie)

vuly. UST's Are

1) well
2) Power house (20,000)
3) # firehouse ~~Treatment plant~~ (gasoline) near big furnace

Typical summer 20-30 people may visit NEC come through. Mostly passing by.

Dust blows from pad AND ROAD IN summertime

- AF used to oil ROADS used DRAIN oil
- dump drain oil in dump
- 300 men at peak

Basement at ops bldg is just corridor between buildings.

#

NEC 1-Aug-96 Discussion w/ Toolie con't

Raindeer get caught in small low wire because they have their head down

TRAM - STOPPED IN '69

Antennae were top secret.

Phone was run to creek so, in emergency could get when men fishing

Bld 103 was secret ops building

Bodg 98 Body was found when Eugene was at white Ulka food, etc found - white man

- drug OD, AF

2 - men died cleaning tk tank in 66 - civilians. #

Eugene's wife name Maria Marie
Michael - son
daughter Miranna

10

C - 1-AUG-96 DISCUSSION w/Toolie CON'T

Eugene checked the POC line every ½ hr during fueling. Fuel was metered.

East Salmon berries
black crow berries

Raindeer was tested by PRL - early 1990's
Raindeer was sent to ANC. Herman Toolie knows (chief herder)

Eugene gets water from EAST side ?

PRL got water from Bridge

Only 3 usable BLDGS @ Native Village
2 by ROAD
1 behind airs (white)

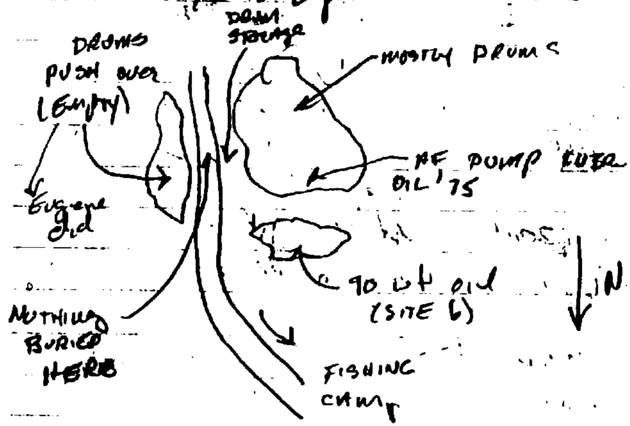
Water well #/No 15 62' dee". Other well is MK construction well

NGC 1,2-Aug-96

Summer: WIND from S-SW
Winter WIND from NO.
although can be variable
— END discussion w/Toolie

Aug 2 - 1996

Visit w/ Eugene Toolie (tour)



DRAIN OIL DUMPED ON ROAD to AIRPORT But ROAD deflated 1-2' NOW

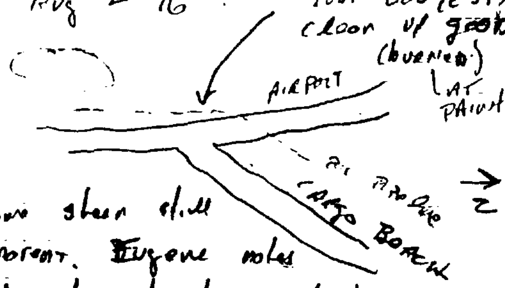
not used

TOUR W/ TOOLIE CONT NEC

12

Aug 2-96

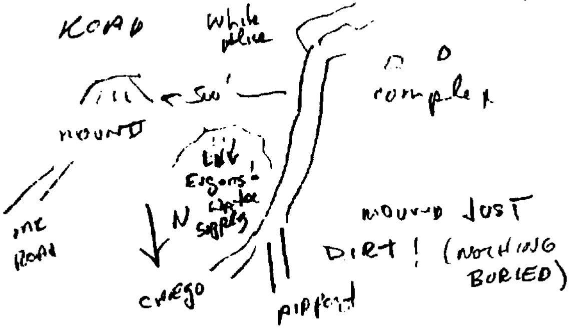
6" EXTENSION SQ. WELDED BY EUGENE JUST 800 (EST) CLOON UP GEOD (BURNED)



Some sheen still apparent. Eugene notes did not get to pond to south. Pu Hz muck cleared up w/ 5,000 gal pump truck

MK had construction ROAD 150 - 200' left (50'?) of cargo beach ROAD (unusual topography) SE (of?)

- mound of dirt E.O main ROAD



2-AUG-96 NEC

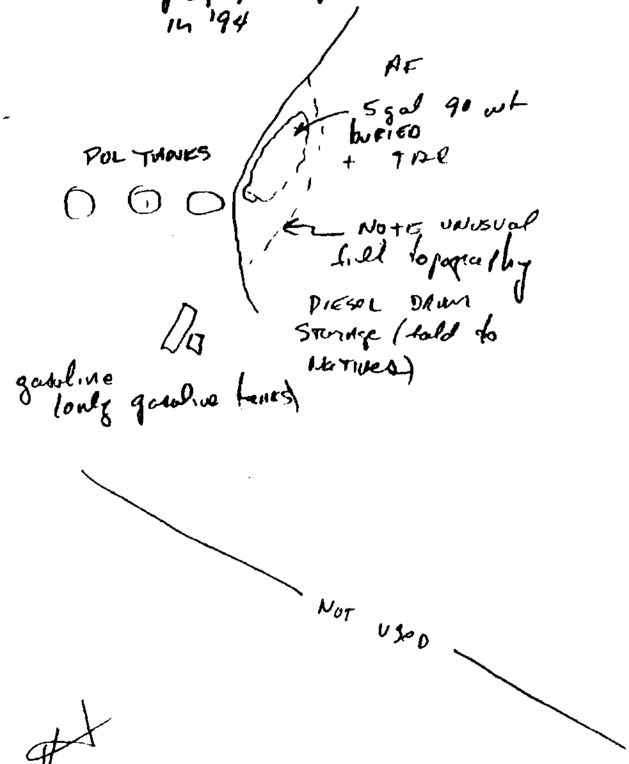
165lbs 5-6"

SEND Eugene Hodgmans

TOUR W/ TOOLIE CONT

LOCATION OF BURIED DRUMS: (90 wt + drain oil)

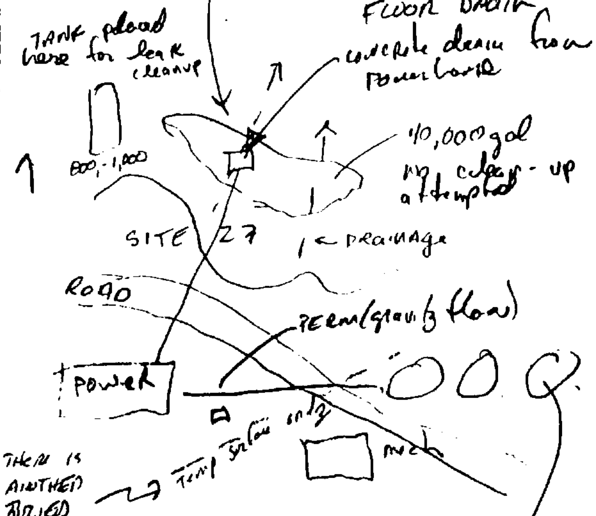
NOTE: THIS IS AREA where geophysics PERFORMED in '94



... 16 NCC
TOUR w/ Eugene con't

Perm under leaked ~40,000 gal diesel fuel. Winter - piled snow to dam it up. 2' down snow was soaked. IT Artic Services came from California said Eugene did pretty good job

ALL FLOOR DRAINS go here (FROM POWER HOUSE)

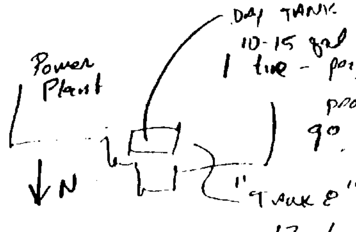


THERE IS ANOTHER BURIED PIPE (PERM) HERE

- see '94 geophysical work

cap 411,000 g
typ full 380,000

2-Aug-96 NCC TOUR w/ Eugene con't



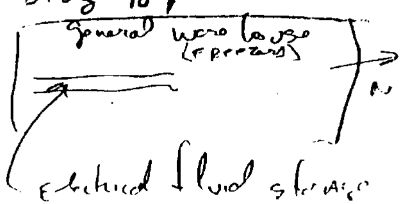
W. END OF BLDG

13-3 - 600 gal gasoline
Emergency pumping only

Pump inside near 13 1
used for firefighting emergencies

water tank inside

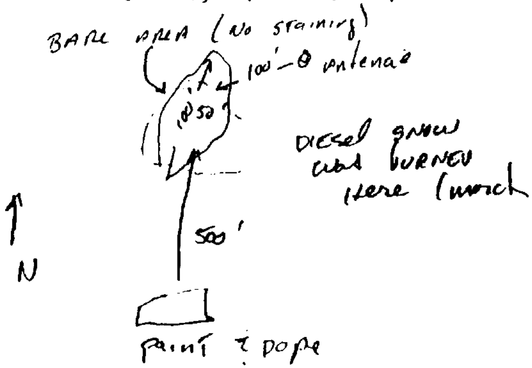
Bldg 107



Electrical fluid storage
5 gal cans

Near paint & dope

TANK 16-1 was used for
ROAD spreading (gham oil)
(N.O.) paint & dope



Raindeer get caught in 1/4" 9oz
wire near antenna E1

Dry year! little snow

White man found ops
building - dead (bld 98)

Cabin N.O. antenna build
in 1947 by Eugene's dad (Jimmy) 93 yr old

Ops building built 1959
moved because men were
lost - dead man found in
attic.

Culverts near paint could
be used by Savoonga

3 gal cans at paint & dope

Mitch & Adam
5 barrels were not picked
3 - 5 gal up by NOS
2 - 10 gal
bld 101

Cellar - not very big
pluming supplies (bld 101)

Native school in bld 111

Tank S.O. BLD 98
was diesel for power
Engines were in ops BLDS
(DIESEL)

#

2-AUG-96 NEL TOUR w/ Toolie
CONT

Water well -
UST Tank 22-1 had gasoline
for emergency engine. Power
usually Electrical. This was the
main AF water supply

69-75 - EASTERNMOST BLDGS
keep warm, 12 men

MK had own Sewer
in construction camp

Bld 103 - medic

BLD 109 - fire chief/engine
Northern most BAY was mech
pit.

Heavy Equip Bld (lower shop)
(big tanks) HAD battery ROOM.
yellow 600(?) tank was
for runway dz?e (powdered)

NEL 2-Aug-96

ROOM ON WEST - Battery
ROOM ON North - fire

torches were for runway / diesel

Herman toolie chief herder
- sludge did reindeer sampling

Steel head salmon USED to nest

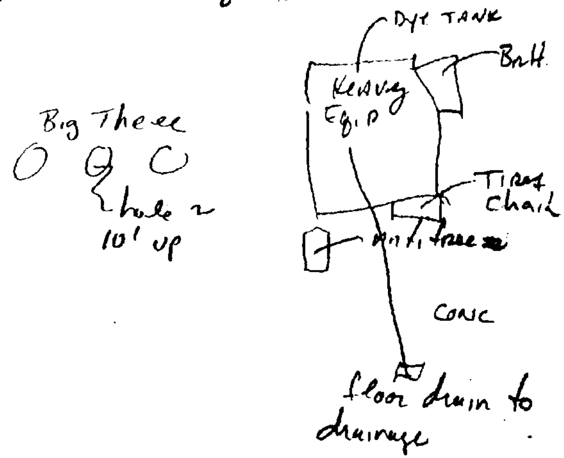
Leak in POL (TANKS → POWER)
discovered IN 1973. Prob. FROST
heave.

Tanks had winkler to prevent
draining. Hole in tank 2
is 10' up. Co. Major Jones
(Top Guy) discovered it.

Tanks SE of big 3
were gasoline - fueling vehicles

NOT USED

NEC 2-Aug-96



Eugene notes that they used drain oil on ROADS (primarily AIRPORT ROAD). He notes they did not use Electrical fluid on ROADS

13:15 - Recon of gravel pit

9 panoramic photos taken FROM KNOLL by power (OPS → WHITE PLACE) start NO. END SE.

Note LOADING Ramp - Eugene notes that this WAS BUILT
#

NEC 2-Aug-96

when the LOADER BROKE.

Entire hillside shown in photo appears to be colluvium. Thickness difficult to estimate, but probably 50' minimum. Knob (ridge) I am on appears to be native older colluvium OR POTENTIAL kame. Gravel and boulders (monzonitic?) are sub angular to sub rounded 1" → 3' ϕ. Typical 4" ϕ. Moss, grass, soil in interstices. Appears undisturbed

Photo # 10 - Spring noted AT Base of colluvial slope +/- 150' SE. O LOADING RAMP. Scale shown is 2' (TAPE). Spring appears unusual because colluvium is so permeable. Does this mean bedrock is shallow, which perches water? Spring is on ROAD from loading DOCK leading SE to training area along base of hill
Flow EST @ 15-20 gpm
#

GW is obviously shallow. And this in a "dry" year (reported by Eugene

Photo 11 NW from base of slope toward LOADING Ramp.

Photo 12 - Close up. Tape is 2' long Slope consists of angular to sub angular granitic rock. Average size seems to be 3". However, boulders to 1'→3' are common (sub Rounded).

Climb up hill slope (colluvium) + 300' elevation (from loading dock) and 500' as crow flies. Rock up here is slightly courser 6" ave. Primarily monzonitic, but has pockets of Fe-Mg rich (gabbro?) which weathers easily (relatively)

In photo 1 of 11-shot panorama)

(taken to SSW) note color change from Fe-Mg rich rock and Qtz-rich (+Kspar). Indicate plutonic contact? Entire colluvial slope is mostly the lighter Qtz-kspar rich monzonite. Appears to be evidence of dozer work at least up to my location, and perhaps 400' above. As Eugene notes, they did not blast here, but simply loaded colluvium in trucks and crushed as necessary.

Several springs (at least 4) are noted at base of colluvial slope, and ponds at g.l. between ops Area and loading dock. GW in no case probably deeper than 20'. This slope is a huge volume of fill material. See sketch overleaf.

NEC
2-Aug
96

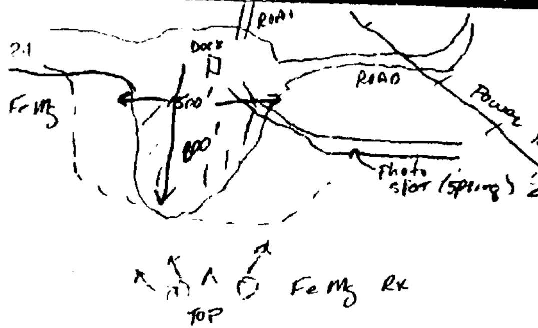
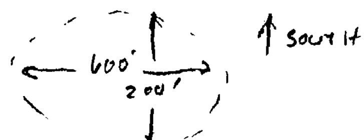


Photo 24 shows grain size at this loc. Note spring in bckgrnd

Photo 25 Taken from top of loading dock south.



Minimum volume estimated at 600 × 200 × 10' deep. And probably much more. This is obviously a good fill source, and there is no reason to search

#

2-Aug-96 NEC

elsewhere. Road to site is good, no ecological damage, close to site.
Downside is that fill would be permeable and an estimated 10-20% by volume is greater than 6".

Based on my recon of entire area, a viable low K source of fill would be difficult to find. Lowland areas are organic silts and muds (saturated). Ecological damage probable. If low K is required for fill my guess is that liner (synthetic) is best option.

Rx Samples

NEC-1 Monzonite - most common in main pit area

NEC-2 Gabbro - common at high elevation and boundary of pit

NEC-3 Aplite (rare)

Nec-4 pseudo anorthosite (rare)

#

2-Aug-96 NEC

26

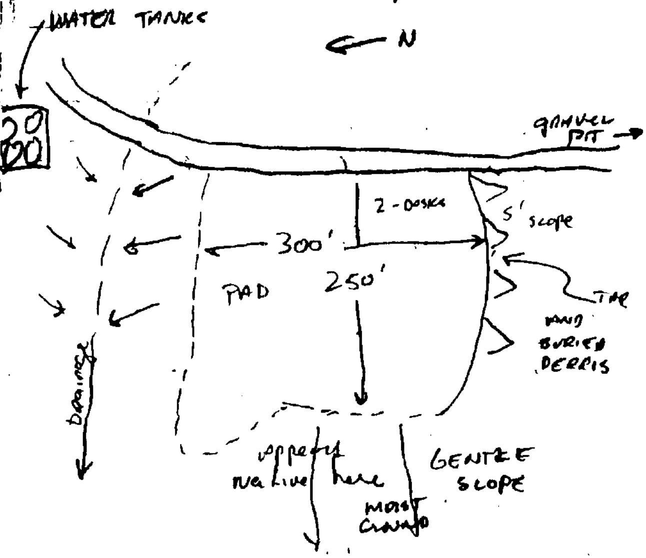
Photo 27 (Roll 1) taken at loading dock. 75' south is 50' x 70' area of uniform (relatively 3/4-1" gravel). Crusher probably not located ~~here~~. This could be used for top fill.

Roll 2 - Photo 1 View of gravel pit area from '94 camp pad. Note road to main complex area is good, and volume of fill large. Ideal! No blasting needed. Just dozer and front end loader. Don't see why crusher would be needed for NON-STRUCTURAL fill,

Roll 2 F2 - So bank of '94 camp site pad. Asphalt oozed out of bank. Partially buried wire spools, metalic debris also present. Tar is solidified. Scale in Photo is 2'.

2-Aug-96 NEC

SKETCH of '94 camp pad:



Caution may be warranted on this entire pad because south side suggests buried debris under pad.

Pad consists of 1/4 → 1" gravel - well sorted,

NEC

16:00 2-Aug-96

Visit pumphouse @ site 22
10 x 15' shingle bldg w/ UST
at SO side. UST (600 gal -
gasoline per Toolie) was for
emergency operation of turbine
pump (Fairbanks Morse). Generally,
electric motor drove pump.
2" discharge leads north
in underground ~~bldg~~ ~~to~~ corridor
3' x 2' to bld w water tanks
(probably "ells" to tanks)
55 g drum of shaft oil located
on NW side of bld (inside) - elevated.
Casing not accessable.
Contains air line. Reported
by Toolie to be 62' deep
Top of bld. has 3' x 3'
access to pull pump, but
would need pump rig
Photos (2)

→ BUD 113
Visit water tank bldg. Paint
cans (approx 50) are greyish
black material. - weathered. ⊃
HG

2-Aug-96 NEC

pipe joint compound. All contents
of 50 (+/-) cans appear same.
Inlet (from well?) is on
No side of BLDG (now 70% dislodged)

Note abandoned well casing
~ 40' NE of N. centerline (door)
of water storage bldg. Casing
is 8' ∅ 3/8" wall steel. Stickup
22". Has old pump column
and pump shaft remaining
(Photo 5). Electrical pole
shown on map is 20' SE
Pump house is shown on
map, but does not remain
(not here) Photo 5 (scale
is 1 foot.) "Rock test" indicates
water between column and
casing.

Structure (cellar cover) N.O
pump house (30') is piping
access. has "ell" to tanks,
valves. Pressure tank, and dist
line to water tanks

HG

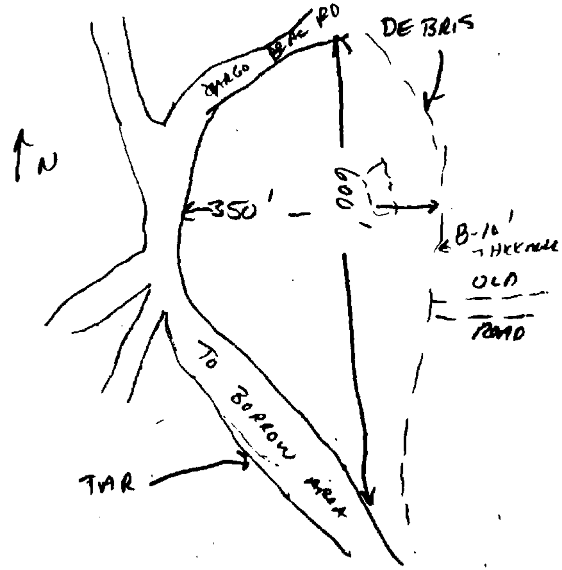
2-Aug-96 NOC

16:45 Visit construction pumphouse (MK) at construction area pad. Bldg is 10' x 15', 90% intact. Contains well casing w/ 3" discharge (casing in-accessible) w/ rusted airline. Turbine pump housing, but no motor. Contains sink and refrigerated water fountain, WL meas not possible. Has 3' x 3' access in roof to pull pump. Need pump rig. Photo 7, Roll 2

Survey pad in which construction well is located. Estimate 8' average depth of fill. Fill consists of gravel (prob from borrow area) which does not appear crushed. Poorly sorted w/ boulders to 1' ϕ. Road running through this area has crushed rk - no greater than 3". Tar on SW fill slope. Debris at NW edge hints that this pad may have

2-AUG-96 NOC

debris or buried for. Area and depth is substantial however (see map)



100' x 100' area near conc foundation has mafic rounded rxs to 3" diameter. These probably came from beach

2-Aug-96 - NEC

15:45
Visit well so. water tanks
6" ∅ steel w/ 20" stickup
pump shaft still in
Covered by debris (collapsed pump house)
Photo 8 5' so. tank [illegible]

16:00 - 18:00 Recon [illegible]
Area:

18:45 Piper Cheyenne
N110JK arr for P/U
Pilot: Kurt
19:05 Take off (Quist, Tuzman
McLean, Harris) for OME

PS. - at 18:30 inspected
creek at road crossing
near airport. No fish observed.
Per Eugene Toalie, no
fish in creek (since spill)
except in ocean embayment.
Used to net steelhead and
DV at bridge.

19:40 Arr OME - Cape Smythe

NEC 2-Aug
19:45 - Discussion w/ Wayne Moger
8:00 DC-3 w/ 2 cargo loaders
11:00 DC-3 w/ 2 cargo loaders
[illegible] 4-wheeler
fuel
Karen - load counter

3-AUG-96 NEC Saturday

8:15 Discussion w/ Pat at
counter at Cape Smythe
2 pax on first DC-3
Harris, McLean
(scheduled for 8:00, but obviously
running late)

At 11:00 - 2nd load w/
"cargo handlers" Tuzman,
Quist

Victor arrange charter
from NEC to OME
on Sunday 4-Aug 16:00

9:07 - load DC-3
N 19454
Pilot Jason Wells
Co Pilot Amy

NEC - 3-Aug-96

9:12 Warm up (run-up)
9:19 - Rotate.
10:18 - Pass over NEC
10:22 Touch down
10:58 - DC-3 LV NEC

13:00 → 14:00 Bonnie, Vic mob
Equip to Bldg 98
SET TRASH PUMP ON
STAIR WELL. Water clear -
Odorless. Start pump
@ 14:01 - prevent Erosion -
discharge to lower pad

15:30 Doug & Elise arr ~ 14:15
work on generator, phone
stow gear

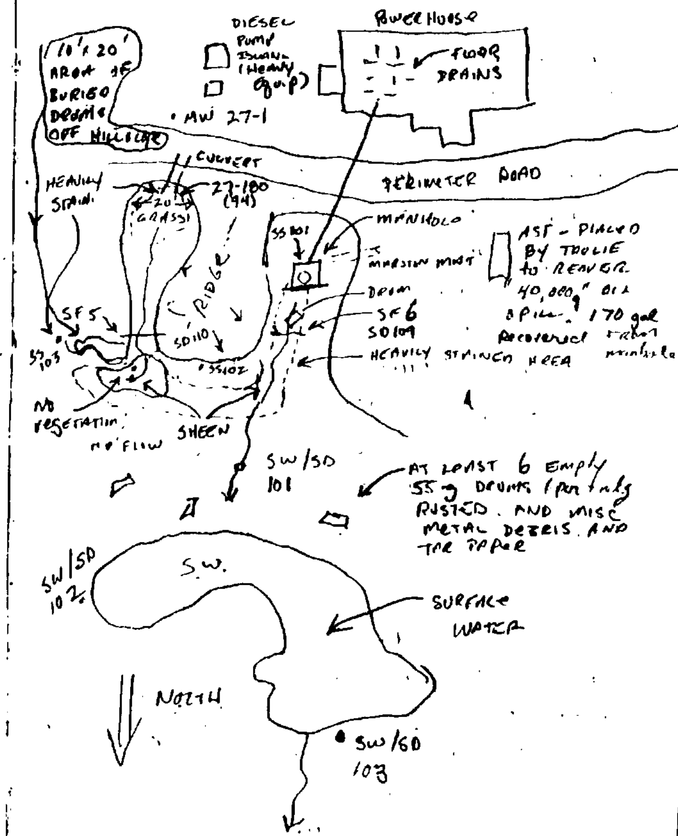
16:15 Check trash pump @
bldg 98 Dropped 21"
and out of gas. 1 tank
= ~1.5 HRS. Check at 5:30.

Not used

X

NEC 3-AUG 96

16:30
Elise & Vic stake locs for
SW/SD in drainage basin



Note drums scattered
in DB (at least 10)

NEC 3-AUG-96 (SATURDAY)

GENERAL OBSERVATIONS OF AREA N.O. PUMP STATION AND POWERHOUSE:

There are two (2) artificially created (at least partially) drainages N.O the perimeter road. The easternmost comes from a culvert from pump station. (Toolie notes that this was diesel station for heavy equip only - no MOGAS). The westernmost has a manhole encased in about 3'x3' concrete slab. (Toolie reports that this was floor ~~drain~~ drain from power house, and that after "40K" spill, the manhole was full of diesel, could be from spills in bldg).

WEST DRAINAGE: 10' wide by 40' long surface water down from MH has no sheen, but seds N.O. drum are stained brn/black and have heavy sheen, especially when disturbed. Terminus of drainage at end of ridge is heavily stained. Ridge is staind black about 2' up bank - probably from ice dam during spill as reported

#

NEC 3-AUG-96

by Toolie. Vegetation consisting of seasonal grass grows freely in drainage and does not seem to be affected by H.C.

EAST Drainage:

40'x20' rectangular ponded area immediately N.O. culvert under road is choked w/grass which is apparently unaffected by diesel. However staining (black) is very apparent around culvert and on rocks in pond. Water drains to smaller drainage formed in cat trail which curves to east slightly. ~~Flo~~ This area has 2-3' gravel where water flows which is heavily Fe ox stained. Terminus of this drainage at end of ridge (lower elevation) goes to 30'x20' area where the soils are stained black and no veg. grows. On embankment 40' east of terminus is stained black soil 2-5' up

#

NEC 3-Aug-96

EMBANKMENT AND AN 10' x 20' AREA of BURIED DRUMS

In general, this area is heavily vegitated with the exception of END of EAST Drainage AND 800 SF of CAT TRAIL AREA (disturbed)

Veg. does not grow in the 1 very stained area E.O. ridge and because H.C. is so concentrated (like tar). The lower elevations are 100% veg-itated (Except where SW is). Estimate area of distressed veg to be 40 x 20'.

18:50

OBSERVATIONS AT 400K TANKS.

MARKINGS ON TANK, No 2

NOMINAL DIAMETER: 50'
Nominal capacity: ~~9790~~ 9790 BBLS (42g)
MANUFACTURER
"Chicago Bridge & TANK CO"

Nominal ht: 28'

YEAR 1951

"CLE[illegible] June 1971" - yellow paint by Toolie

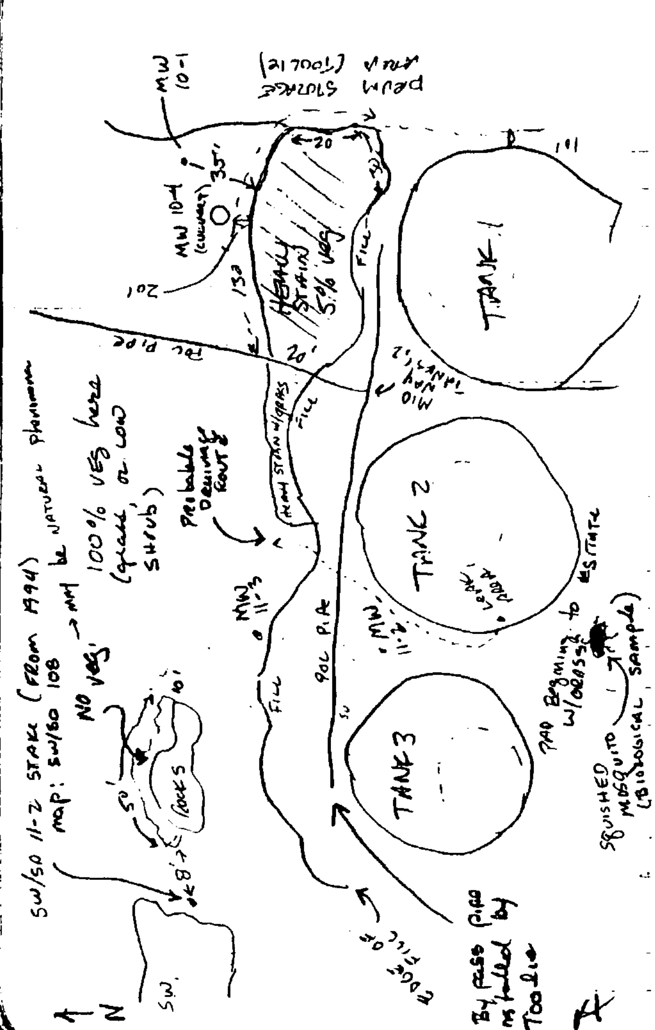
NEC 3-AUG-96

staining is generally not apparent on elevated pad in which TANKS SIT (possibly weathered away). Pad ~~go~~ CONSISTS of Angular 1"-3" gravel.

No STAINING obSERVED (H.C. staining) EVEN IN LOCATION OF PUNCTURE ON SW side of TANK 2 (~10') UP. Drain points ON NE side of all 3 tanks have FO or staining draining no., but speculate that this is FROM cleaning out (RUST ETC. Pol pipe from cargo beach (RUNS N.O. TANKS) NO observed to have evidence of leak. At Tank 3, 2 (3") inch gal pipe compression ~~[illegible]~~ fitting where Eugene noted fixing "temporary" pipe to powerhouse after discovery of the "40K" underground pipeline leak. Pad slopes down 30-50' N.O. TANKS TO TUNDRA and WETLANDS.

[illegible]

NEL 3-AUG 96



NEL-3-Aug-96

Observations of BASIN NO TANKS:

LOW TUNDRA AREA (WETLANDS) N.O.
TANKS IS 100% VEGETATED, WITH
THE Exception OF AREA N.O. TANK
1 AND AREA N.O. ROCK FIELD (THIS may be
natural phenomena). Interesting observation
is that the EASTERN EDGE OF THE
5% veg (DISSTRESSED) IS APPROX 3' higher
elevation then the probable drainage
route of the Tank 2 leak. Two
possibilities come to mind;

1) SNOW AND ICE Altered DRAINAGE ROUTE OF THE TANK 2 spill

2) Source is NOT Tank 2 spill
 - DRUM storage area? or leakage from buried DRUMS?

21:00 8-wheel ATV IN
Site 2 terminal bld.
 - plastic (fiberglass) body
10' x 4'
ENGINE VIN SAYS
KORCER? KOHMER OF CANADA
SERIAL 732701243
Model ~~K59920T~~? K399ST

BREC BRDC 398 cc No. 10900Z

NEC 3-AUG-96

21.15 - EXAMINE TRACTOR at SO. corner of TARMAC (WIRE AREA) SE of Terminal BLDG about 500'

"OLIVER" manufacture (SAYS on water temp. gauge)

ENGINE VIN PLATE:

"The Oliver Corp
Cleveland Ohio"

ENGINE NO. 3750222

MODEL 60-130

Size 3-1/2 x 4 1/2

Photos RZ F 20-23

Photos RZ 24 → 26 - 8 wheeler

21:45 - mob to fish camp

22:30 FURTHER DISCUSSION W/ Eugene

1977 - 2 yrs after shutdown White Alice, 50 GI's from Elmendorf - job was to clean up drums. They were the ones who buried the drums and 90 wt.

Bldg 69 - Eugene buried beer, tables, etc - No chemicals in dump

480 cases beer.

NEC 3-AUG-96

Schlitz, Hamm, Blue Ribbon

ITT SERVICES ran White Alice

White Alice was communication relay

TIN CITY 2-each

NEC relay

OME

Eugene notes that 50 GI's had many rifles and shotguns. They shot up everything (anything that moved) and also things inside bld and POL pipeline.

Regarding tractor near Site 2; Brought in by Gem construction in 1966. It was left on runway and caused snow drifts, so Eugene pushed it off the side.

3-AUG-96 NWC

GENERAL OBSERVATIONS made today:

- MW's from '94 all in good shape, except locks corroded, AND surface cone is CRACKED (WETLANDS AREAS HAVE SACKED)
- SUPERSACKS ARE well Marked AND IN GOOD Shape. ESTIMATE they will last 3-5 yrs before they weather apart.
- If PCBs present in drainage basin as suggested by '94 sampling, they came from Powerhouse floor drain/man hole discharge, or Site 10
- ADDITIONAL SAMPLING WARRANTED:
  - ✓ -PCBs AT FLOOR drain discharge
  - -PCBs AT WW discharge
  - - DRO @ POL 800-gal leak
- ✓ Need samples of vegetation
- ✓ Need good VIDEO of Drainage basin

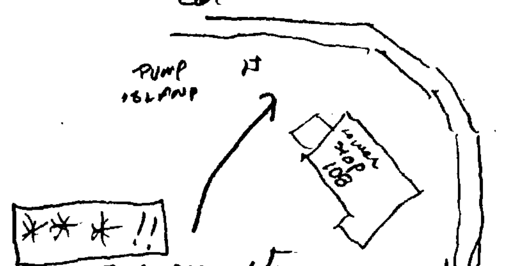
4-Aug-96 NWC

9:00 Discussion w/ Eugene

When 50 GI's came they were to be here for a week, but when found Dead Man.

Had 2 fuel bladders ~~from~~ stored (at least 5,000 gallons. 1 gasoline, 1 diesel?)

jeeps loader cat



BLADDER storage - they probably drained in place

Marston mat on airstrip from C130 that CRASHED off RUNWAY

4-AUG NEC

10:15 Mob to site from camp

Eugene told me that 8-wheeler at Site 2 belonged to Savoonga man and was parked in Garage in 1979

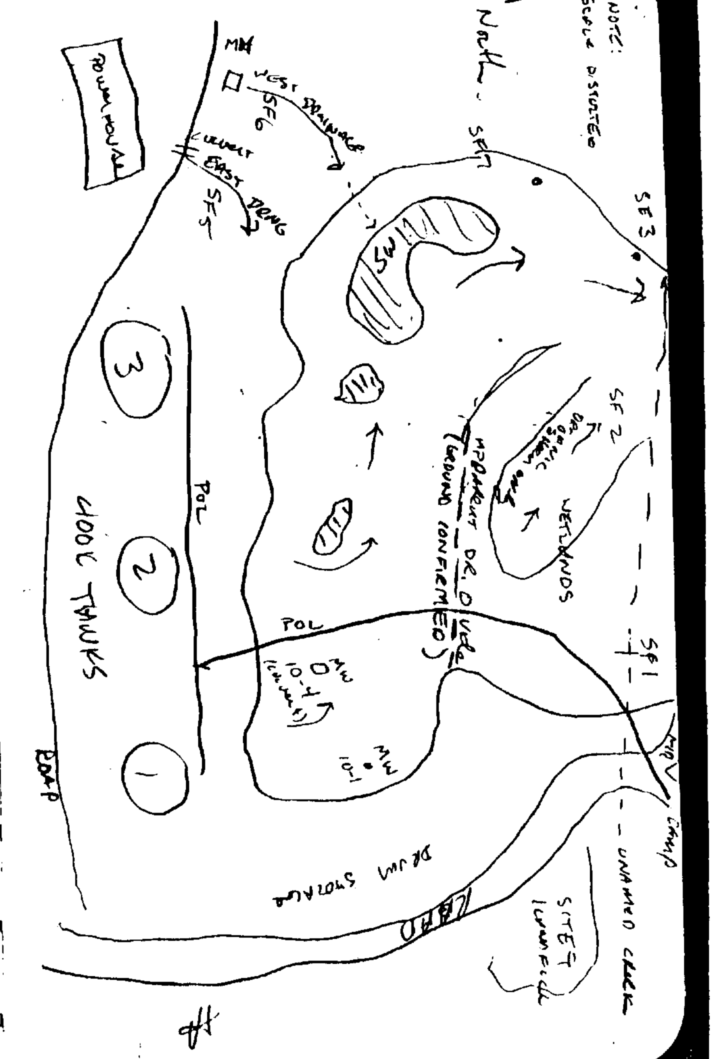
12:00 Site SDDB109 (WEST DRAINAGE)
SDDB 110 (EAST DRAINAGE)
SS 101 DB (S.O. manhole)
SS 102 DB (END of RIDGE)
SS 103 V. DRK STAINED AREA on BANK ~40' E.O TERMINUS EAST DRAINAGE (APPROX 1.5 up bank)

13.15 Observations FROM TOP of TANK No 2:

SEE SKETCH OVER LEAF.

THE DRAINAGE FROM THE TANKS APPEAR to go EAST, ~~adn~~ and the POL line goes over a divide. YET, there ~~is~~ IS a wetlands N.O. the divide which has HC, in the SEDS, FROM POL line? or tank?

4-AUG-96



4-AUG-NEC

swing ties:

SO toward TANK @ Powerhouse

MANHOLE ~~NO~~ to SS SO 101 = 4' (south)

MANHOLE → SF 6, ~~SW~~ SO 109 DB = 43' NO (down drainage)

MH → DBSS 102 98' ACROSS RIDGE

MH → SF 5 79' ACCROSS RIDGE

MH → SD 110 (DB) 94' ACCROSS RIDGE

MH → SS 103 (DB) 134' " "

MH → SW/SD 101 (DB) = 142'

27-1 → SF 5 = 131'

27-1 → SD 110 = 132.5'

27-1 → SS 103 = 131'

27-1 → SW/SD 101 = 202.5

NOTE: SS 103 IS IN-LINE between MW-27-1 AND SW/SD 101 (DB)

14:15 Eugene stopt by. He forgot to tell me that AF had 1 or two locations where they stored live AMMO in "caves". gloved pit? MK well? The AMMO is still there - DIAMOND shaped

4-Aug-NEC

Note: the 5 PCB samples (2 seds, 3 SS) are for the purpose of finding potential source of PCBs. DRO not taken, because there is no doubt that they will come up very high. HC contamination is obvious based on visual/sheen/odor

SWING TIES con't

DB SW/SD 1 → 2 = 133'

GROUND TRUTH AREA N.O. DIVIDE N.O TANK DRAINAGE NOTED EARLIER during 1-AUG SF w/ Quist. This appears to be organic sheen, NOT HC - NO ODOR - Resolves question of how they got there (p 46)

14:45 Eugene could not find loc of buried ammo (he never saw it personally during AF occupation, it was reported to him by "KIDS". He did find lots of 12-gauge SG shells near MK well - probably skeet shoot area

4-AUG-96 NEC

SWING TIES CONT' (DB).
SW/SD 101 → 103 = 221'
AT THIS LOC SW ENDS AND
~~con~~ channel CONSTRICTS to about
30' of grass w/ SHALLOW SW

BEGIN TRAVERSE down DB
LOCATION OF SF7 observation
IS SW/SD 103 + 130'. at this loc
3 drums and ~~sheet~~ metal (aluminum)
NOTED

SW/SD
DB/103 + 200' = 20' NARROW GRASSY
channel w/ ~2' STREAM bed flow
(surface > 10gpm ?)

SW/SD 104 IS 200' + 44' from
SW/SD 103 channel (2-3')
WINDS THROUGH LOW grassy
AREA - no ~~stain~~ Veg effect

200' from SW/SD 104 - BROAD
GRASSY channel ~50' wide

DOUG'S SW/SD 10-2 '94 stake
IS 80' FURTHER

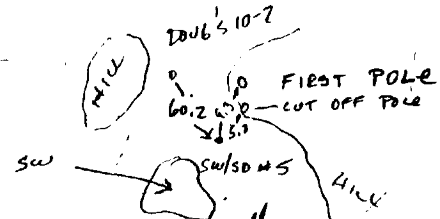
H

4-AUG-96 NEC

START AT SW/SD 103 (221' from 101)
SF 7 = SW 103 + 130
(200 SPOT)
SW 104 = SW 103 + 244
(200 SPOT)
Doug's 10-2 = SW 104 + 200 + 80

FIRST POLE IS SW 104 + 200 + 80 + 38

SW 5 IS SW 104 + 200 + 80 + 47



SW 5 is laterally
ADJ TO CUT OFF & pole #1

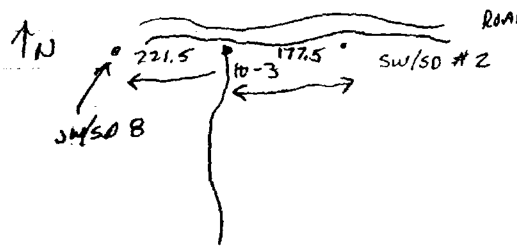
MARK SD 5 + 200. Mouse (vole ?) Noted
MARK ANOTHER 200
SD 6 IS SD5 + 200 + 200 + 74
SECOND pole IS SD5 + 200 + 200 + 79
Note this is loc of SF3

H

81 96 4-Aug-96 NEC

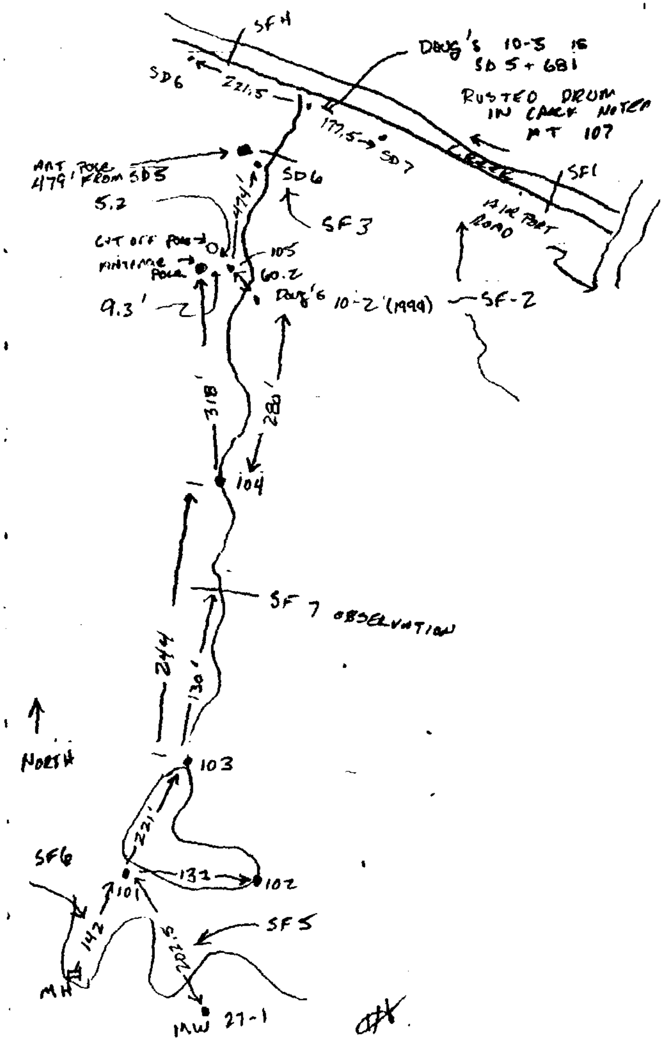
Mock location ~~SF~~ SD 5 + 600
PHOTO
Doug's SW/SD 10-3 (94) is
DB SD 5 + 600 + 81
℄ Main creek is SD5 + 600 + 96
Photo

. Loc of SF 4 ≈ 50' EAST



16.15 Mots to airport
Note that SD 8 may
~~be~~ resampled (did not get H.C)
Mots gear for partial demob
4 pax + 1300 lbs gear
piper cheyenne N218CS
pilot: Kevin
Rotate 17:18
Land OME 17:59.

4-AUG-96 NEC



5-AUG-96

SUMMARY of Water Quality

	ph	EC	T	DO/mg/L
1	6.29	75	10	11
2	6.66	90	8	9.8
3	7.13	100	9.8	7.9
4	7.15	190 Repeat 110	4	5.7
5	6.98	75 Tuzman stand	10	8.1
6	7.03	~~Did not work~~ 80	9	8.0
7	7.29	50	9	7.9
8	7.17	50 Tuzman stand	9	7.3

(From Elsae' Notes)

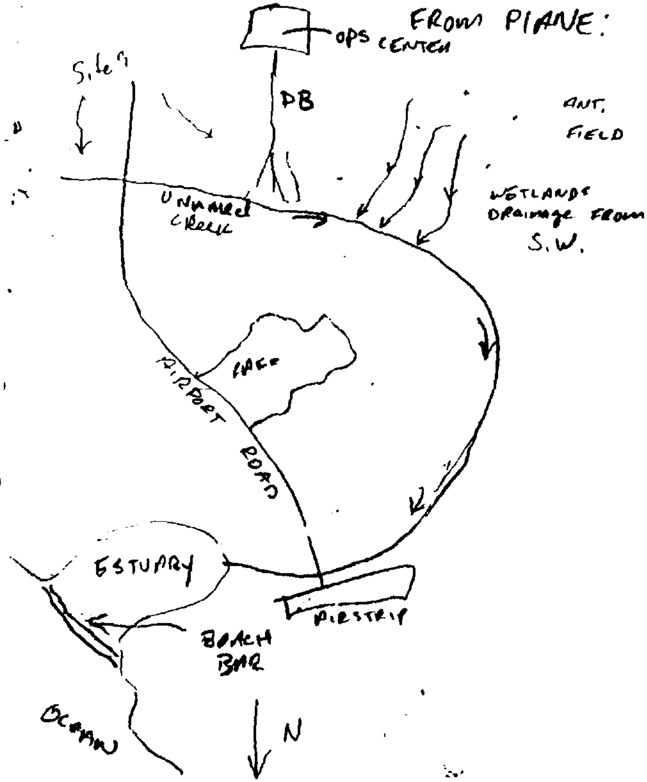
8:30 (5-AUG) ARR Cape Smythe
Rotate 9:02
PILOT KEVIN Piper N2172S

THINGS TO DO:

✓ WW TREATMENT RECON
✓ Painder photo (sample PCB's
✓ DOCUMENTATION OF TOL 800 asbestos check

Touch down NEC 9:42
Tuzman, McLaw, Hareeis
(Quist packing)

5-AUG-96 NEC
VIEW OF DRAINAGE FROM PLANE:

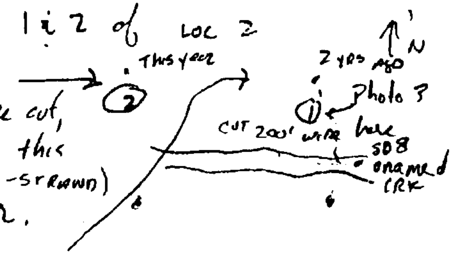


5-AUG-96 NEC

11:00 - Inspect 2 reindeer sites in Antenna field w/ Eugene BOTH ARE HORRIBLY tangled

Photos 1 & 2 of LOC 2

roughly 100' of wire cut, collected at this LOCATION. (3-STRAND) solid copper.



3 drums noted (blown)

SF 3

12:15 Call Bob - Discuss progress

16 MIN 47 SEC

DISCUSS: TANKS / vessel sampling
WIRE
PCBs

5-AUG-96 NEC

Doug - 12:20
IAN guaranteed Thursday
Are WED None THURSDAY
FRIDAY MAN - WORK

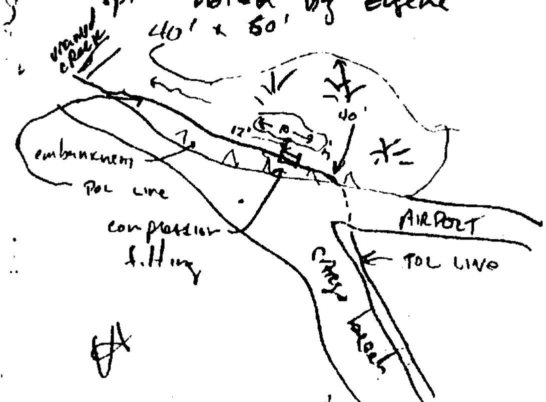
Jim Riss - Elisa back money

Work Plan - Vessels
14 - PCBs

Came to call In Situ
PCB's VESSEL

Doug 5 min 46 sec

13:00 Visit LOCATION of 800g spill noted by Eugene
40' x 60'



At road juncture location wetlands area about 40' wide (drains to creek) is vetted w/ healthy cotton weed grass. A 10' x 3' area // to the embankment is noted where sheen and diesel odor is apparent in SW. Eugene reports that this spill was cleaned up "pretty good" - before it reached the unnamed creek. This is substantiated by field observation today. Diesel area appears to be restricted (localized) to the 10 x 3' area on the wetland and probably (though not observed) the 12' distance from POL → wetlands down the embankment. No reason to sample here - POL obvious, TCBs not present in fuel, and area appears localized.

13:10 - Eugene stopped by. He noted 4 more dead Reindeer near mls 601 SW end of antenna field. He would be willing

to cut the wires

← DISSUSSION w/ Eugene

13:40 Start (video) SF2

NOTE ~~that~~ this is ~150' S.O. unnamed creek.

15:20 HEART LIVER sent to UNIV FAIRBANKS (Eugene talked to Herman Toolie) killed above White Alice 3-4 years. Check out AK. Debris at WK pad are remnants of barracks, offices etc. They stayed till '65-66, Then they were burned and dozed over

Drum Storage - AV GAS, Diesel, (emergency) and grout, TAR

Patty Mac used when operation about '58. Eugene worked '57 for Petty Mac

Blue tank at camp near big water tank at village was used to haul water to top of tram

5-Aug-96 NEL

600 gal water tank on from clean tanks (400K) every 2-3 years because of RUST. Water flush-out drain holes NE side,

Tank 2 winch pipe broken. 700 gallons never used 7' was not used except fixed,

Wind blew small tank (gasoline)

- All Raindeer travel into wind
- so do Polar Bear
- Polar Bear only turn and look in 1 direction)

Not used

5-AUG-96 NEL

SWING TIES AT SITE 10

LOCATION	10-1 DIST (feet)	T-1 DISTANCE (FEET)	
10 SS 107	36.2	143.3	PCB, DRO, TRPH (6-Aug)
108	34.3	127	DRO, TRPH
102	67.7	159.8	
103	80	181	
104	98.2	203.6	
101	79'	142	

BARREL reference → T-1 137.8
T-1 → GRID REF 1 133'

LOCATION	10-1 DIST (ft)	10-4 DIST (ft)
104	98.2	124.7
105	118'	131.3
106	148'	144.8

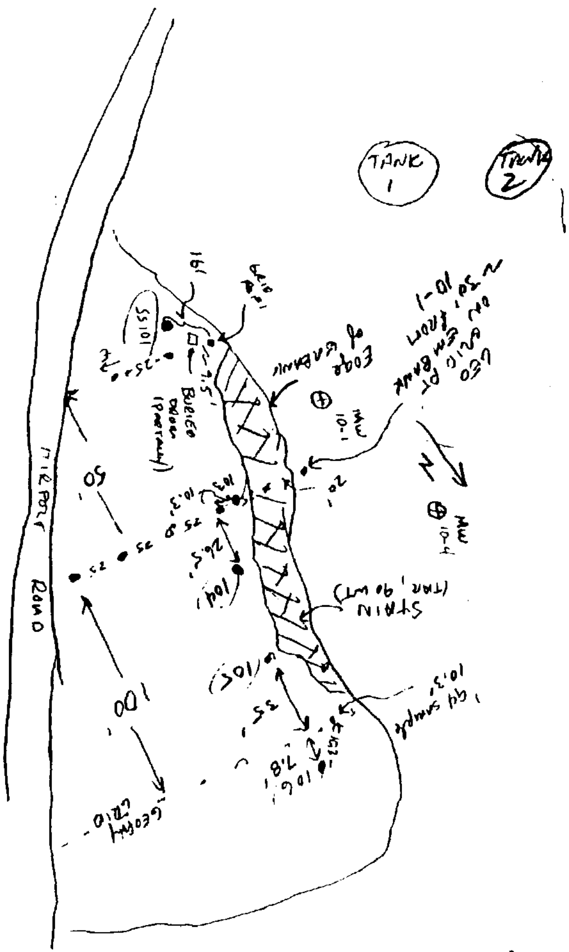
Depth to water 10-1
54 1/8" BTOC PVC PVC STICKUP 1.8'

PAD BROKEN 10-3
DTW 3.85 BTOC PVC PVC STICKUP 2.3'

Not used

5-AUG-96 NEC

SKETCH OF SAMPLING - Site 10



Further swing ties
Site 10

5-AUG-..
NEC

DRO, TR PIT

101 → BANK	39.3
101 → 102	42.6
101 → 103	68.5
101 → 104	99'
101 → 105	132.5
101 → 106	178.5
102 → BANK	17.8
103 → BANK	34.7
104 → BANK	42.5
105 → BANK	34.5
106 → BANK	18.6

"BANK" = area where relatively flat pad slopes down to D.B.

LS-8535 1994 Lounsbury → 106 35.7'

NOT USED

NOT USED

5-AUG-96 NEC

18:30 TAKE OFF FROM NEC for OME
Piper N110JK w/ PILOT Nait
and 3 SOBs (Harris, McLean, Turman)
Touch down 19:14

Yet to:
✓ - STREAM FLOW
✓ - RADiological survey
6-AUG ✓ - Sampling at Site 27 - PCB's
- complete BORROW/fill pad
6-AUG ✓ - Samples downstream
in CREEK
6-AUG ✓ - ASK Eugene about trucks
- fill out Site forms
6-AUG ✓ - PIT SAMPLING
6-AUG ✓ - volume of BASEMENTS

6-AUG-96 NEC

7:30 - PACK TB IN COOLERS
for shipment Ship yesterday's
samples, COC's.
8:00 - 9:00 ARRANGE FOR sample.
SHIPMENT 8 coolers

9:21 Rotate Piper Cheyenne
N217CS Pilot: Lowry + 4
Ome → NEC
HARRIS, TURMAN, McLean
Touch down NEC 10:58

6-AUG-96 NEC

Discussion w/ Eugene
Two vechicles
1- electrical truck
2- old pickup
Owned by Contractor ~~for~~
Patty Mac? sold to native
1959 - sitting there since then

Cats used to be 2
used for anchor for barge
for a while. Left 1962
Both D-8 cats

Backhoe on runway - Gem
Co. - Fairbanks

AF left weasel way off
NW of runway

Marston mat - put there
by AF to repair C-130
that ran off. Through
the nose area in dump
near POL tanks
Radios in Airport bld
used to contact Aircraft

#

6-AUG-96 NEC

15 mi only. Eugene used
to let helium ballons
go. Entire area in front
of garage used to be flat
- Now deflated

5 reindeer saw yesterday
3-4 die / year

10:45 - Elise, Doug mob to garage
to sample pit

12:30 Have started samples at
site 27
Walk over to see 16-1 sludge
sampling (photo)

- INSPECT Burn area noted by
Toolie ~325' N.O. Tank 16-1
Area here is disturbed
by dozer work. Marlons mat
electrical junction box, Poles (wood)
and metalic Debris Vegetation
is "typical" disturbed fill pad
type. 20-50% regrowth with
grass. Soils do not smell,

#

6-Aug-96 NEC

although some die back vegetation is noted (natural phenomena?) Large (1" ø) insulated (5 strands) running through an [illegible] field here

SWING TIES - SITE 27

MW 27-1 to:

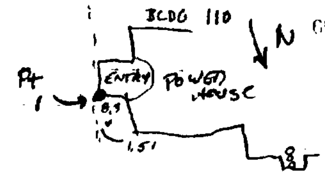
LOC	FT
105	61' (across ROAD)
104	64.5
102	88.0
101	81.6
103	47.5
109	74.8
106	42.8
107	77.6
108	103.9

MW 13-1 to

108	29.5
107	46.3
106	77.5
109	66.4
101	133.1

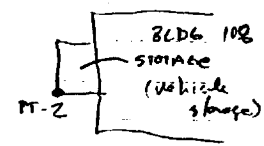
6-AUG- NEC

103	131.1'
104	160.3'
102	167.5'
105	177.3'



Pt 1 to:

109	8.3'
106	61.4'
107	64.2'
108	77.8'



Pt 2 to:

101	12'
103	45'
105	100.1'
104	52.9
102	33.1

NOTE ROAD (current) IS 65' to 85' ALONG THIS TRAVERSE

NOTE 102 IS IN LINE W/ face of GARAGE BAY 19.7 from edge 1.5' from 19-1 MARK

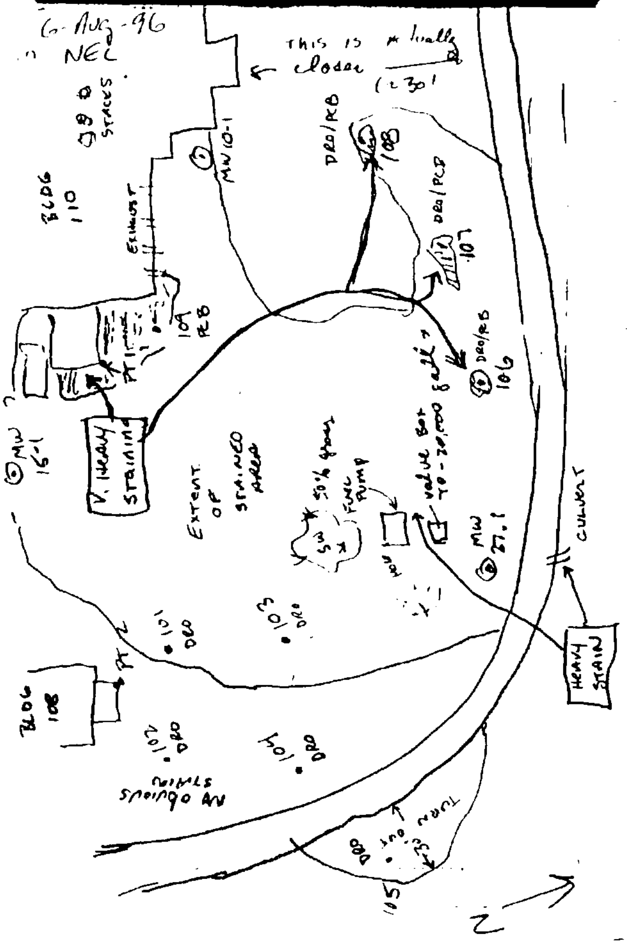
5lb can of grease noted at 20,000 gallon UST

Rationale for sampling
- entire area noted on p 70

p 70 IS STAINED to some degree
- obviously contaminated

(cont p 71)

6-Aug-96
NEL



6-AUG-96
NEL

Samples 101 → 105 placed to find the EASTERN EXTENT of IT, Rationale for PCB's is to confirm absence or presence of PCB's from power house as source for PB (106 → 109). I used THE Remaining DRO (only took 8) AND replaced it w/ PCB Analysis. DRO contamination is well documented by '94 work, and visual observation of staining. PCBs are larger issue.

MW 15-1 measured @ 11.7 BTOC (TOC) stickup 3.2 (steel) PVC 3.02 No product NOTED, but obvious odor in water. No Jacking apparent

Gravel pad in this vicinity (Site 10, 27) is M-C sand, gravel to 6" boulders to 1' diameter. Revegitation Super sacks present and in good order @ 13-3, 15-1 and 27-1

NEC 6-Aug-96

27-1 DTW Meas

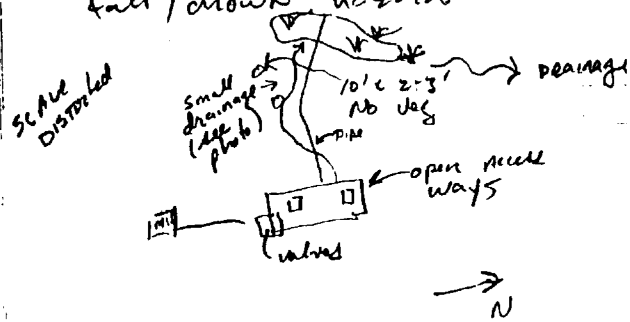
H:10 -

5.15 PVC 5.3 steel

No odor or product
No jacking apparent

16:45 Finish recon of plumbing cellar at BLD 101. (Bonnie has notes)

17:00 Recon WW treatment area (site 21). Septic tank and AOS manhole present obvious HAZARDS. 2 open holes in TANK (conc) about 3 x 3.5 one open tank has water ~4' from top. Serious fall/drown hazard



H

6-AUG-96 NEC

In general drainage to west to the terminus of the pipe, then appears to turn north. Unclear on eventual discharge area, but based on aerial view (p55) THIS AREA drains to the unnamed creek to the north. Low wetlands area have healthy-appearing grass. slightly higher micro topography has rocks covered w/ crowberry and low shrubs

17:30 UK AND BONNIE cut wire at ops Area near water tanks → White Alice. Collect wire on AIRPORT ROAD

Rotate NEC 19:21 Kevin
- sight see. N217CS
- take VIDEO

Touch down OME 20:03
4 SOB's - Harris, Truzman, Quist McLean.

Shop for Eugene

Not used

H

7 Aug-96 NEC

TAKE OFF DME - GAM
Pilot: Nate Piper N218CS
SOB's: Turner, Harris, McLean
ROTATE: 8:57

Touch down GAM 10:02 - off load
Elise, cargo

Rotate GAM 10:15

To Do today
✓. FINISH pad recon
~~. STREAM FLOW AT AIRPORT~~
~~. FINISH BORROW recon (video)~~
✓. Rice field form completion
✓. photo of antenna
✓. Bonnie to inspect ACM
~~. map stains @ Site 10~~

ARR NEC 10:48
Weather bad 30-40 mph
Wind and Rain

7-Aug-96 NEC
Phone disscussion w/ Doug

1 JAR w/ H_2SO_4
TNK 4-2
pit 19
TNK 14-1 DUP, Sol. L
16-1 NOT PRESERVED
13-2

Phone discussion w/ Bob Sanders
1965 9 families village
40-60 persons

1968 Local Village
Cafe' - big head
ppowa gone now (blg)

1965 Rec camp. Biri
boat / vehicle
military burial

ASK EXPERT

N.E. about 10' miles
built a building
gave them to Kyoz
Soroonga 14, 201
that when - gasoline
Weasel was lost

Expert Toolie's answers

13:00 VEN & Bonnie M/B to SF STATION 8 near airport at end of APRON ~ ~~800~~ 500? W.O bridge. Measurements

START N. SIDE - bank undercut .6'

Station (FT)	GROUND (FT)	Water (FT)
0	0.35'	0
1	.88	0
2	1.19	0
2.5	1.40	0
2.9	2.10	BANK EDGE
3.0	4.04	~~1.99~~ 1.99
3.5	4.42	2.34
4.0	4.38	2.22
5.0	4.14	1.96
5.5	4.02	1.86
6.0	4.10	1.96
6.5	4.16	1.97
7.0	4.18	1.95
7.5	4.12	1.85
8.0	4.09	1.80
8.5	3.96	1.68
8.8	3.88	Bank edge 1.58
	undercut .5'	0
9.0	1.53	0
9.5	1.34	0
10.0	1.25	0

8-7 Nec Stream Flow #8

Bottom material

Sand | Moss 1-2.5' Boulders

Note: At this loc., sheen noted when organic bank is disturbed, but not sandy bottom

10.5	0.98	0
11.0	0.88	0
12.0	0.34	?

Orange & bottle used as floats

run	Flow over 30' (sec)	
#1.	38.15	O
2.	31.19	O
3	27.01	B
4	29.57	O
5	36.21	B
6.	20.97	O
7.	27.81	B

14:00 → 17:30 Vic and bonnie recon antennae area / reindeer and lower DB. Sample at loc SF 8 for DRO/PCB (96 NEC DB SD 113), (17:00)

7-Aug-96 NEC

17:30 → 19:00 Pack gear, dismantle telephone, stow gear for DC-3 flight in morning.

19:15 Rotate for OME
Pilot: Kevin Piper N2172S
+ 2 SOBs (Harris, McLean)
ARR OME 19:50

Note: On 7-Aug
Bonnie spoke with Eugene when she demobed equipment at Eugene's house, she ASKED "if there was limited money for cleanup - what would you spend it on?
Eugene replied:
1) DRUMS (STREWN ABOUT)
2) Wires

- Bldg are lesser priority

20:30 - Dinner

8-Aug-96 (Thursday)

8:00 Arr Cape Smythe to cargo handle final DC-3 loads from NEC (McLean, Harris)
- Quist took 7:30 flt to Ccain 7-Aug. Informed could not fly on DC-3. Left instructions (Jason, Doug)

8:30 Mob to NAC to pack gear for demob. Fill rental van w/ MOGAS. Stop for food for Gambell

10:00 Ret to Apt.

10:30 Go to Sitnasak office to pick up fax and INSPECT van DAMAGE
Julie - review damage
Julie takes 2 polaroids
VEH takes 3 in addition to those taken by pole
2" dent below rear right window 1/4 x 1" paint gone
1/8" dent (slight bend) in roof rain gutter

8-AUG-96
NEC/GAM

11:30 - Discussion w/ Bob Sanders
Bill Sherrow - special asst
to Don Young - letter about
NEC

- discrepancy noticed
- wired (MW line?)

Ninja Turtle -
Plastic toy
FLAT FACE - DARKER older
SNAKE SKIN
for other

12:00 Mob to Cape Smythe to
PICK UP DC-3 load. Move to
NAC Meet Ivan.
3:30 - INFORMED GAMBELL FLT
Held per weather. Demob
Cape Smythe for dinner

15:30 Standby for GAM (Harris, Bishop)
weather

18:25 Take off OME for
Gambell. Stop in SAV

8-AUG-96 GAM

fuel due to weather
Piper N 1106K
Pilot Nate w/ 4 SOB's
- Bishop, Harris, Ivan, Girl
Apassingwa

Take off SVA 7:40
LAND Gambell 8:05

Not Used

GAM 9-Aug-96

9-Aug-96

8:45 Mob to Site 5 for geophysical work w/ Ian

9:45 meet Winnie at Site

VSW on SITE NOW at FAA HOUSING

Transformers were found in to "RIGHT" of ROCK if facing mountain. Road was done when transformers buried, they buried off the road. Winnie says our grid encompasses the transformer area

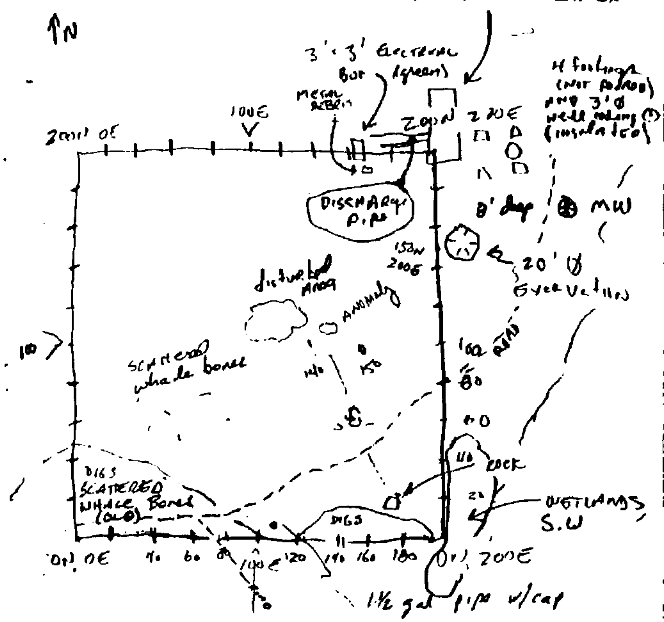
10:30 Winnie points out area to Elise where live ammo boxes were buried. IAN does recon scan w/ EM 31 and finds only minor anomalies. Generally covers area south of Site 2 1994 grid (informal survey).

Winnie reports that 2 – 2½ copper cable ran from rock to power house. Ian thinks he got these

GAM

9-AUG-96

SKETCH OF GEOPHYSICAL GRID



@ ROCK 35N, 170E

BREAK IN SLOPE

NOTE: "DIGS" go all the way to the south to the infiltration gallery ROAD

81

9-AUG-96 GAM

Soils in the vicinity of Site 5 consist of rounded to subrounded gravels 1/8-1" ϕ, Typical grain size 1/4' oblate spheroid, Very little fines. Obviously very permeable

14:40 Take sample of white powder ~ 80 E,0 culvert at lake, ~~at~~ ~20' from shore. Powder is eroding from lake berm. Can be located by lg black cable, copper cable, directly S,0 of water tank area 3' x 1' (Elise photos)

Leave 8' x 12' 1/4" steel plate marked "LARGE ANAMOLY 9-AUG-96"

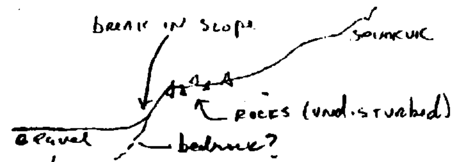
EM-61 – Time domain. Can estimate depth of single target. Depth less than loop (1m)
– short BURSTS – shut off

EM-31 Frequency domain – continuous Radio ~~the~~ signal

9-AUG-96 GAM

Paced due EAST from grid to break in slope

0 N	15'
25N	30'
50N	32'
75N	38'
100N	60'
125N	85' .. new projection
150W (hole)	
200N	160' (ROAD ℄ ~25' from slope



PER Jeanna –

USW – Holoie Shield
985-5121 –
working on landing and water for new houses

18:25 LV GAMBELL
Piper Cheyenne N218CS
Pilot: Nate + ~50Bs
DOG, KID, Native guy, 2 school leaders
PIRATE 18:25

18:32 Stopover in Savoonga
3 PAX (native elders)

9-AUG - 8AM

19:29 touch down at Cape Smythe - "Mike" takes baggage to AK AIR CARGO

20:25 LV OME AK AIR FLT 153 for ANC

END FIELD NOTES

20:30 9-AUG-96

Victor E. [signature]

not used

[initials]

a product of
J. L. Darling Corporation
2212 Port of Tacoma Road
Tacoma, WA 98421 USA
(206) 383-1714

DURA Rite
WATERPROOF

HORIZONTAL LINE

NOTEBOOK NO. 691

NEC Phase II
Aug 1 1996

Bonnie McLean

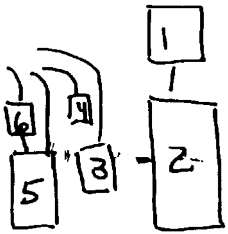
Sawgoona
CB 29

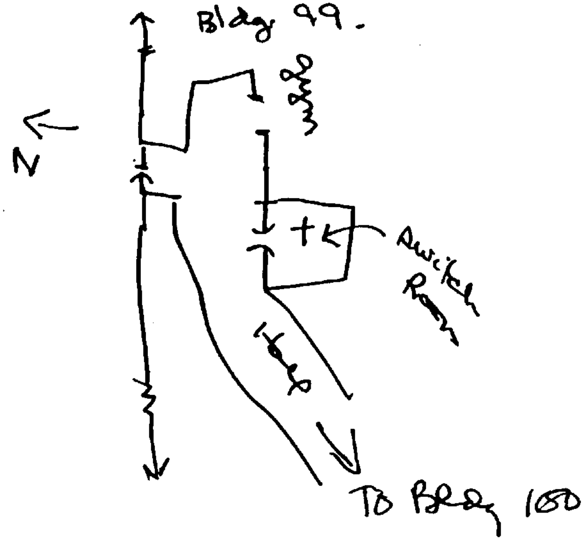
Cerpa Smythe
443
2414

NAC 443-
2215

46-47 Photo Log BM91
48 Eugene's Cost

8-1-96 NEC (Thurs)
In Bldg. 99 viewed an assort wall mounted boxes. ment





Bzgm

8-1-96 NEC - Phase II
In Bldg. 99, a small rm W of gym
"Rec. Bldg"
Entered ~~South~~ North side - 15' to the South
in a "breaker Rm" found the following. (see pg. 4)

#1. 3 - fuse Box
Square D Safety Switch
Single Throw, fusible
D322N
60 Amp 240 V A C
Square D. Co.
Lexington KY

#2. Westinghouse Panel Box
Automatic Tripped
15 switchs (breakers)
+ main

#3. double fuse box -
screw in fuses

#4. fire pull, fire alarm
#5. protectowire, Beebee electrical
Bzgm

8-1-96 NEC Phase II
*5. fire alarm box
*6. Alnyca - fuse, screen
- electric switch
in line w/ fire protection
box # -
Box 2 -
all switches in tack and
fuses (3) still in
box 1
N[illegible] of these should [illegible]
environmental risk [illegible]
concern.

B[illegible]

8-1-96 NEC Phase II
Note "Danger" signs Posted
Bldg 105 * N.E Dock door

While posting "Danger" Sign
in Bldg 112 - viewed 5 drums.
- Located in Storage Bldg. Shelves
in Overpack steel open-lip
drums recently drummed!
3 - 5 gal -
2 - 10 gal
Unknown contains - liquid
NO Markings on drum sides.

In General Warehouse, Bldg.
111 - found on shelves
20 - 25# Tubs Labels state
"Dish washing Compound
Containing stain removing
Chlorine - releasing Type"

Washington Chem - sales
Fed Spec P-D-435 D

on shelves mid-center
to the east.

B[illegible]

8-1-96 NEC Phase II

1980 Completed posting "Danger sign"

Weather all fine - will stay

Packed up stuff for night.

Went to Eugene's house — we arranged previously ~~to rent~~ for backup $100 ~~@ $50~~/d. while on site.

ATV $100/d

Polar bear watch $100/d

2100 Eugene & VK go over site history.

Bgm

8-2-96 NEC (FRI)

Packed equipment & gear

Moved from Eugene Eng. shelter to Mob area (Terminal Bldg).

Collected needed gear to Main site.

Mounted "Danger" signs

1. corridor Bldg 104 & 110 W side D
2. Bldg. 104 N. door
3. Bldg. 103 N door
4. Bldg 102 S door
5. Bldg 119 N door

NE of Bldg 119
8" x 6' ASM concrete pipe

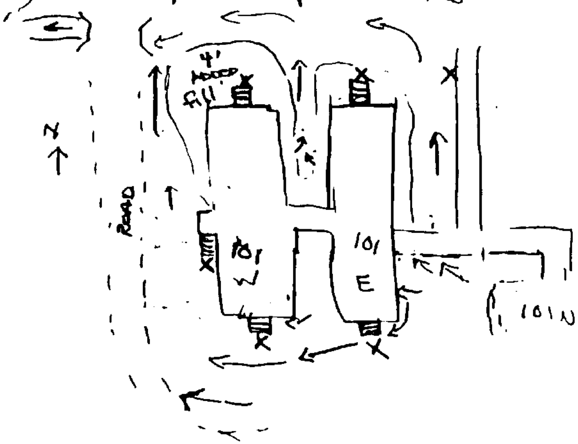
8-2-96 NEC (FRI)

WIRE removal FROM ⇒ TO

1. W. side B. 99 ⇒ B.99 W. entrance
2. W. B102 ⇒ B102 W. entrance
3. S. of Pumphouse ⇒ B.98

Site 18 NEC. 8-2-96 (Fe)

Drainage – Bldg. 101 E & W



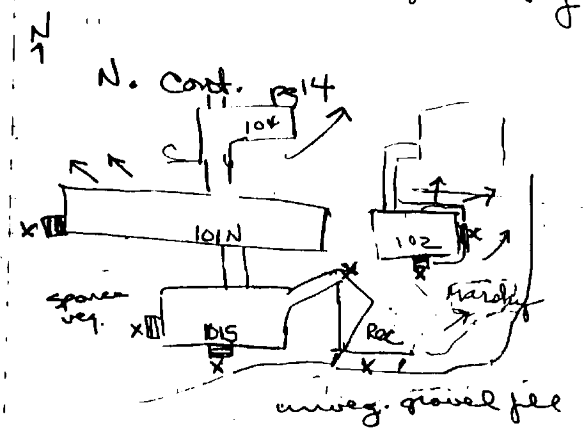
X "Danger" signs posted this date

No entry

Bgm

8-2-96 NEC Phase II

Site 18 Drainage & Veg



X Danger Signs Posted

→ Flow, surface water

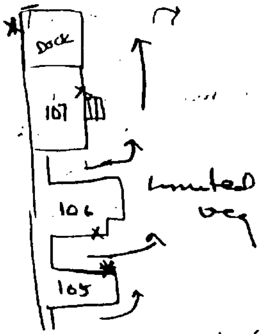
114

Bldg 102 – Tall grasses surround 102 sits on 2-3' higher fill

Collapsed Utilidor outside S. side B. 102

Bgm

8-2-96 NEC Phase II (Fri)
Site 18 · Housing

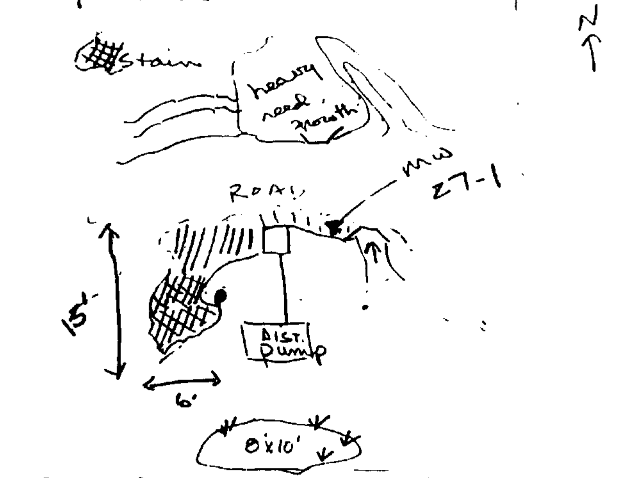


no visual staining

X Danger signs Posted

(3gm

NEC Phase II 8-2-96 (Fri)
Site 27 - Pump Island
(NE corner of site)
previous docs note spill —
Concrete pump housing has approx. 1'
standing water w/ light petro sheen
Bare gravel & rock fill surrounds
area. A small puddle S is clean.
□ 3'x3' concrete - pump housing
• light stand



Depth >5', Shallow standing water, some
veg. clean, No sheen

8-2-96 NEC Phase II (Fri)
Site 27
on fill pad.
culvert under rd. to
the N clogged - water
still seeps downgradient
Site remains as noted in
1994 notes.
2 MW locked.
Bgm

Wet, WINDY, Cold
NW winds 25 knots
Bgm

no entry

8-2-96 NEC Phase II (Fri)
Site 19
Bldg. 109 E - Automent
Built on gravel pad
Poll of concern: present in garage
ACM, smoke pots (military)
20 mostly empty
2 - 1 gal cans - paint
1 - pint cans, unk. contents
1 - generator on skid, diesel

Floor drains - drain too?
drains are filled w/water - no sheen
250 gal. oblong - NE corner outside
- small tank on skid - some liq
in 1994 - tested (field) glycol.
is now on side & contain less liq.
No visual staining seen
ground is very sparsely pop.
with veg growth on E side (door)
There's about a 6' relief from
the E Bldg pad to the W Bldg pad
Drainage is N along road.
No staining seen
MW - locked.
Bgm

8-2-96 NEC (Fri)
Site 19 — 109 W. Maint.
w/ office on SSIdo, viewed & photos
POC - ACM, diesel, tube
oils, gas.
Wet, windy
Bgm
1815
Back to Terminal
Pack up for flight to
Nome
1845 left NEC
1940 Arrive Nome
off load equipment
started recharge
- of camera, radio, laser
discs
2100 end
Bingham

8-3-95 NEC (SAT)
0800 at airport.
verified loading DC-3 #1.
0920 Take off to NEC with Victor
1010 - arrive NEC
off load equipment
Eugene arrives to help
1100 DC 3 off to Nome
will return w/ remaining
gear, Doug, & Elise.

Set up gear, gasoline pump
1230 - take pumps to
Bldg 98 & 101. w to dewater
basements.
Eugene says its only
corridor Bust. Bldgs.
Set-up 2" trash pump
in B.98 - start 1400 pump
DC-3 #2 1410.
1430 To Terminal
Prepare for WQ parameter
work (Elise & Vic)
and TANK recon (me & Doug)
Calibrate pH Beckman w/ STD.
4 & 7, go over all
Bgm

8-3-96 NEC (SAT)

Equipment w/ Elise & Vic.

1. pH, EC, Temp, DO
2. Wiec; not.. from the rest
3. sample procedure
4. Forms
5. Bottles

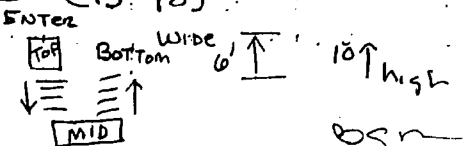
Cold wet, windy day.
Unable to loc. - turkey
Butts, scoop head, &
flagging material.

Spot Cross fox w/ 3 kids
They seem to live in
culvert by road to
terminal Bldg. - Warned all
personnel
Tail gate meeting completed
1000 at B 98 - Pump stopped
Restarted after refueling - Water
Dropped 21"
Doug & I started tank sam.
site 14 - B98 S. side 14-1
& 14-2 (anti freeze drum)
Doug to keep all notes.
I completed photos & measuremts.

8-3-96 NEC (SAT)

1730 Pump stopped - refueling
1800 Refueled Pump B.98
Continued Tank sam..
1830 at Well house
confirmed cans stored there
are AEM paint over 150
1 gal cans on N. wall
All hand
1845 B.98 Pumping near
completion -
Doug to Terminal for
trailer.
moved intake line further
into corridors - seems
like utility corridor goes
to the W & walkway to the
E (toward B101 W))

The area B.101W. is near
dry.
Can't get the last 6" from
W. end (B.98)

B.98


8-3-96 NEC (SAT)
B 101 W MID dock entrance
1st corridor on rt, 1st rm - RT.
Steel containers STP & DS2 - Reported before found in 1994 - this mixture is a fire & environmental hazard. Took photo. Did not move anything.

Marked all tanks w/ same ID as '94 added this date ei 14-1 (first tank/drum of site 14), added the current (96) liquid level and photo was taken.
Measurements (OD) completed
1900
Pull Pump & Hose from B78.
Drained fuel. Prepared for air shipping.
Changed out batteries on radios & ?edco's.
2200 To fish camp
Cold & wet, windy 25 knots

Bgm

8-4-96 NEC (SUN)
0930 Late start -
Haul(?) stuff to Terminal
Prepare Bottles - The lab mixed bottles in same box sorted out for today's samples.
1135 off to Site 4
Doug collected samples

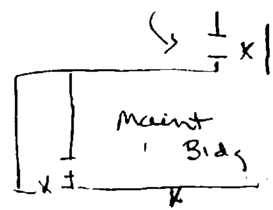
1115 Complete - Radiological survey & counseling
(Long Technical Assoc
Model PUG 1
w/ probe P-6A/8
mR/Hr
BKg. reading 30-50 mR
Walked area starting at Eugene's house following the board walkway N. to E to the beach the beach S to the road, then the debris piles around Regard's house the site 4 area and site 3 pumphouse. No reading above BKg noted.

Bgm

8-4-96 NEC
Site 14 (sample) S. Videos
Doug to sample TK 1
I sampled SD in basement
B. 98, ID. # 14 SD 101
@ 1400
Shot videos of Site 14, and southern end of site, all 4 pumps, the well houses (3), generator in wellhouse B. 114, ACM paint in tankhouse B. 98, B. 101, B. 100, & REC. S. sides, Tried to show basements B98 B101 W, water treatment (zoom) and drainages on S side.
All batteries consumed.
Great Weather - partly cldy. No wind
"Danger" Signs
Posted
(1) Gen. Warehouse
N dock, W. side
(2) B110 W - Transformer shed door to outside enclosure
(3) B110 W - Door to generators' frame
Begin

8-4-96 NEC Site 13.
1430 at TANK 13-2. UST with a concrete cell surrounding main cover (assorted pipes) latch open - filled with water, slight (thin) sheen on top, no layer seen, NO sludge felt or seen with sludge sampler, bottom has mat'l down.
Collected sample top 3' with disposable bailer
Bot. & TR PH ... ...
96 NEC 13 TK 101 @ 1520.
Reviewed WP Text.
1530 at TANK 16-1
Helped Doug collect sample from TK 16-1 (QA/QC/MS/MSD)
1615 To Terminal.

(4) BACK door (W. side) B119 W

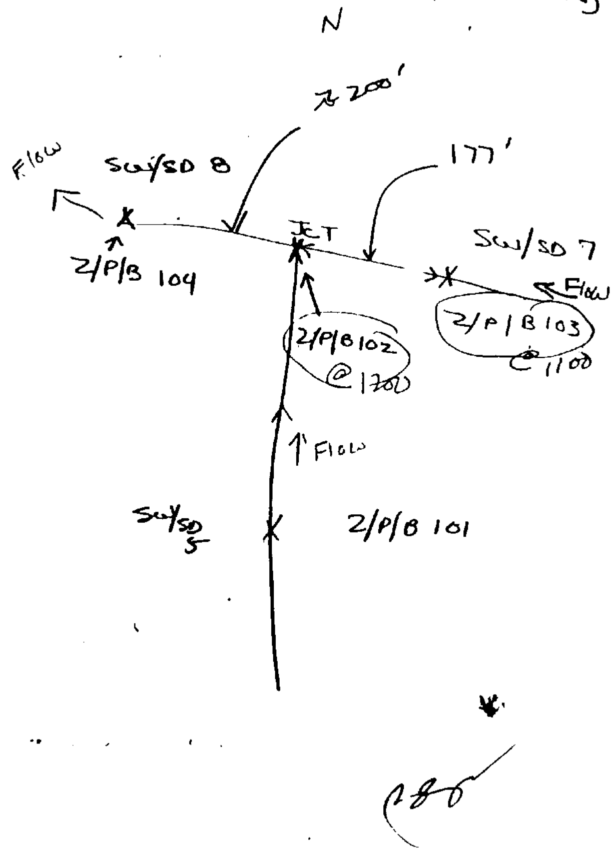


84-96. NEC (Sun)
Prepared Equipmt for flight to Nome
1615 plane on ground, on load
1715 Take off to Nome
Cp. Smythe/Kevin. w/est #1000 gear
1800 arriving Nome
To AC. Joe 16 l. off food
1915 AT Apt
1930 Pack samples in Blue Ice
2015 Complete – Eat

Bogu

8-5-96 NEC (Mon)
0800 To Cp. Smythe
0830 off-load equip.
0845 Take off, Vic Elise & me
Dorg to stay back and pack
8-4 samples for shipment
0915 Arrive NEC
Prepare equipment
Elise & I to complete
ZO, PL, BT sample
Vic to cut wire (reindeer dead)
Flow loc, stake out surface soil
sampling loc.
AT Drainage to the westerflow
1100 arriving loc SW/SD7 (see pg 30)
Sample # ZO/PL/BT 103
Completed: ① Plankton –
w/ Wisc.net + 60 l. water
② ZO – 4 l. per
Collected thru Wisc net
③ Benthos – in
triplicate collected w/
Wildco dredge (6"x6"x2")
103A, B, & C, strain in net
until all soils removed
Mostly organic material Bogu

8-5-96 NEC (Mon)



8-5-96 NEC — Mon
Z/P/B 104
1145 at ZPB 102 station
This is at Junction of streams
Collected Plankton, Zoo, Benthic
1200, small drainage
177' west of ZPB 103
only a few inches deep to .5'
brown silt organic material
grass on edges.
petrol sheen seen when bottom broken

1240 at ZPB 104 —
Most downgradient
NO sheen on water, when you
break up bottom material
sheen appears — unable to collect
3 BN samples no sediment on bottom
- silty / gravelly bottom -
Sample time 1300 P.B.Z complete
only PLA & B.
1320 at ZPB 101 —
Most Southernly. Same area
as 96 SW/SD5 and 94 SW/SD 1-2
very little flow, braided creek
standing water on the W side
smelling of petro odor when bottom
BSW

8-5-96 NEC (MON.)

Material released - skin and black stuff released. organic

1430 AT Terminal - prepared Formalin - 10% Fixed BN & PL samples collected earlier today. Packed in vermiculite for shipping

AT site 10 - for surface pits to delineate heavy oil spill. Tried to locate '94 geophysical grid to reference locations.

Laid out 11-55 locs delineating the stained area on the S. 101—106 (Flies collected) Loc 107 @ 1645 on perimeter (NW) are highly stained area

1700 loc 108 in the wetland - also stained

petro. odor from # 107 & # 108 noted.

Vic completed tie ins.

Vedio completed site 10.

Bagm

8-5-96 NEC (Mon.)

1800 at Terminal, pack equipment

1815 plane arrives

1830 off to nome, Vic takes aerials of site

1930 at nome,

Confirm TB not in samples packed by Doug. Will add in AM

Bagm

Notes

Equipment to NAC shippment

Gambel needs radio's bottles & radiocarbon meter.

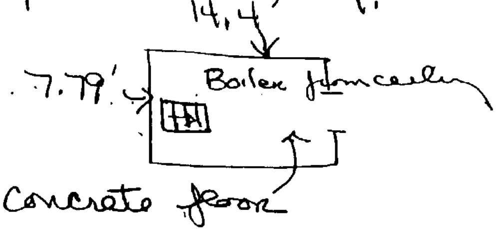
Bagm

8-6-96, NEC (Tues)
0730 at AK. A L. to add TB's and samples from 8-5-96.
7-NPDL sent Fed X, 8-MAS sent Gold.
0900 Take off to NEC
0930 arrived NEC
Prepare Equipment - Tailgate safety meeting completed
Doug & Sluse to sample
A PT 101
Vic to set-up SS sample points Site 27
I will complete radiac survey - Using Victoreen model 490
1100 Survey meter from HAZCO Co.
maps will be marked w/ yellow grease pencil when complete
Any area exceeding background will be spray painted orange & photography
1115 at Barrow site for Background readings were from .00 to .10 mR/hr
Establish BKg at .07
*2 = .14 to be report limit
Bsn

8-6-96 Radiac Survey NEC
Areas Completed Reported Reading
1. site 5 - Beach BKg
2. Site 4 - Fish Camp, Tanks, vechicles, BKg.
3. site 3. Fuel Pump House BKg.
4. Range Beach Drum field BKg.
5. Site 6 "
6. site 7 "
7. Site 10 Drum Storage - .14
WEST END of filled area, W of exposed drum
8. Site 27 Dist Pump BKG OR .14
around fuel pump housing -
9. Site 19 - B.109, B.108 BKG
10. Site 20 - B.103, Ops. BKG
11. Site 18 B.104 BKG
12 site 18 B.102, B.101 BKG
13 Site 19 B.98
1310 at Site 27/15, issued completed
1400 at Terminal Called Chris ref 8 coolers sent MAS
1500 at Site 18 Bldg 101 W.
Enter the plumbers Storage by Victor [illegible]
Bsn

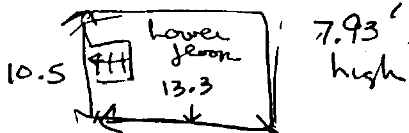
8-6-96 NEC

Bldg. 101W - Midway, N. Side



entrance to plumbing
Basement = 3.5' X 3.5'
w/ 12 steps, wooden

moist floor - no standing
water this date. Ch 8-1 viewed
2' (est.) standing water



No sludge, No sheen, No odor
Pipes leading from Boiler (PACM)
1 wooden storage shelves - 1 ft 3
Assort. supplies, pipe (gal. & copper),
Tank 2'X1.5', empty, clean
BGM

8-6-96 NEC (Tues)

distance Bet. Bldg 98 & 101W
86' long X 6' X 10' concrete
corridor, debris laden
Previous sample collected -
of water soluble material

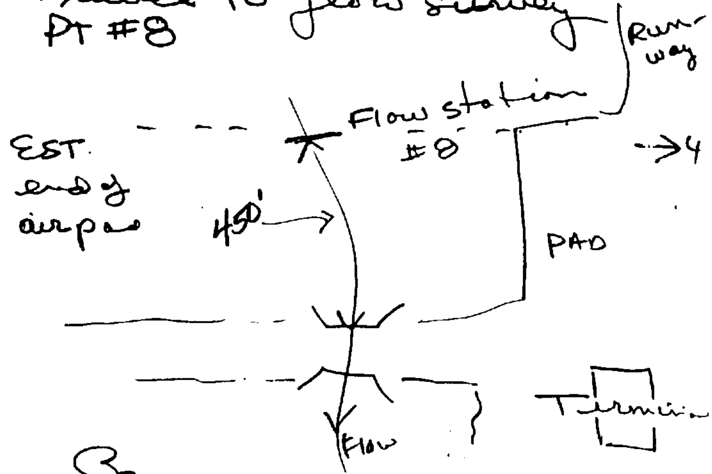
Ran radiac meter thru
Bldg 101 W. - to include
a microwave component,
labeled "CO60" and had
"Δ" radiation symbol =>
no reading above BKG.
1 quart al. BOE glass slide box, Box empty
Bldg 98 = BKG throughout
interior & exterior.
Completed B.98 radiation survey
no readings > .04. Then at
Terminal Bldg. > .03 .
Put equipment away -
Prepare cut saw fuel/oil
mix. At site S of water
tanks were heavy (3) cables
cross the road (on road)
Cut here and a few to
the SE along pole line. Vic
collected samples.
BGM

8-6-96 NEC
Back at Terminal.
Prepare to go to Nome.

1910 plane arrives.
2015 in Nome

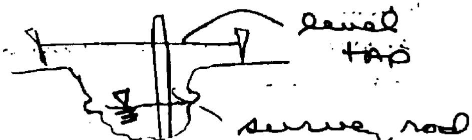
7-9-96 NEC
0730 at terminal with
Udo (Vic & I) to Gambell and then
NEC (a direct charter not available)
Elise to Gambell, Doug stays in
Nome to prepare bottles.
930 Land Gambell
1015 Land NEC.
Heavy rain & wind. 25 mph SW
Prepare equipment.
Flow meter inoperative.
Eugene arrives to transfer
fuel to his drums.

Travel to flow survey
Pt #8



8-7-96 NEC Wed.

1200 Set-up & completed profile (see Vic's notes)



Pt.'s start N side w/ 0, proceeding S. recorded Dist. But ground & line Dist to water from bottom

Then. 7 flow times were taken from 30' to the west. (See Vic's notes for results)

A Stop watch was used to record the time it took an orange or a bottle to reach the 30' mark. in a stream bed which was fairly uniform in width and depth.

Returned to Terminal. Vic went to complete gravel pad survey.

Bgm

8-7-96 NEC

1345 I started packing equip
1500 Cut wires around terminal
Winds - SW 40 mph - Raining.

1700 Collect sample at Flow station #8 (see pg 39)
DRO/PCB 96NE DB SS 113

1130 Recon - reindeer killed by wires - 2 in antenna to the NW, Eugene found 3 more near the mt. in 94 we found 1 - at the landfill & another N of the White Alice site in the open. wires entangled - Winds growing
1800 at terminal complete Packing - I traveled to fish camp - Pu stuff & pay Eugene -

Bgm

8-7-96 NEC (Wed)

I spoke w/ Eugene about priorities of cleanup if $ was limited. He said drum removal, wire clean-up, down stream water and then buildings. I thanked he and his family for all they had done. Returned to Tenuniod. Unsure if plane can land w/ fierce cross winds.

1910 Plane at Tenuniod

Take off -

2005 at Nome, off load equipment.

Bo

8-8-96 NEC

0800 at Cape Smythe, can't go w/ DC-3 per Wayne FAA called late last night about "passangers". We looked into following w/ charter - no budget - flight crew will load equipment. I gave them a map of wire & what equipment leaves. and what stays for Eugene.

915 at NAC, palletize Equipment

1020 Vic shows Van (Doug's accident) to Sitnasuak. We take photo's of pole wire & van.

MAS Airbill - Goldstreak
8/6 4369 8126 8coolers

NPDL - Fedx
036697253J-

BGM2 Photo Log

1. LOAD DC-3
unable to locate 8/3
DQ 4
B/P/Z 103, sampling, 8/5
102
104
101

Site 10, SS sampling, stained area
looking NE, 10 SS 101
10-SS-103 → 106
10 SS 107
10 SS 108

Photolog
BGM 1 NEC 8-96
site 18 8-27-96-5

1. Standing N. toward site 18, Bldgs. 101 — 100
2. looking NE — toward site 18, Bldg's 101 & Rec. to the east
3. S. toward, N. End Bldg. 101 E
4, 5. MW 21-1
6. lookin S. at W end 101 N (concrete foundation)
7. looking NW toward SE corner site 18, Bldg. 99
8 Looking N, Toward site 18, Bldg.
9. Looking SW Toward B 106
10. Looking SW Toward B 105
11 Looking N. Toward drainage from B 105 & 106
12 Looking NW Toward B 107
13 Looking S. toward site 27 from CL
14. Looking N, Toward downgradient from CL road (road)
15/16 Bldg 109 - smoke pots
17, 18 Site 19 - looking W. B109 E
20 Site 19 - Looking W. B109 W
21/22 Foam Conc B109 W
23 Lube Pit, B109 W

BGM

Photo Log NEC 8-96
Roll BGM 1 8-20-96

24 Bird suspended in Wind by Antenna

Eugene Tooley

	8/1	8/2	8/3	8/4	8/5	8/6	8/7
Air	100	100	N/A	N/A	N/A	N/A	
Here	50	–	50	—	—	—	
Share	100	100	100	100	100.		
Daily Total	200	200	150	100	100		
Extend Total		450	600	700	800		
Debit	∅	322.17 (Vic)	36.30 (Elise)	∅	77.85 ([illegible])		
Total [illegible]	23	128	242	342	364	464	564

Cape Smythe (10)

AIR NOME

8/1	8/2	8/3	8/4	8/5	8/6	8/7
OUT (1)	IN (2)	↓ DC-3 DC-3	IN (3)	OUT (4) IN (5)	OUT (6) IN (7)	OUT (8)

gene 1800# 1300 650 600

PASSANGER WT. VH 230 + BGM 200 + DQ 165 + ET 130 = 725#

Budget

85/d
50/d
100/d

278
36
242

442
78
364

Sun
List what's at NER

Mon dinner.

161 oil ✓
Tums ✓
P. Towel ✓

"Rite in the Rain"®

ALL-WEATHER

LINE RULE

Notebook No. 391

Northeast Cape 1996 0198 0460

Doug [illegible]

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name Douglas Quist

Address

Phone

Project Northeast Cape. 1996

INCHES

July 31, 1996 Northeast Cape Phase II

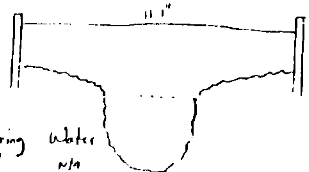
0815 - Arrive Airport for transportation to Nome
1115 - Arrive Nome
Arrange Flight Schedule, Storage, and Lodging
Sort Cargo for Northeast Cape and Gambell
shipments by day and priority.
Start Blue Ice supply in Freezer @ Cape Smythe

[illegible] 7/31/96

Northeast Cape Phase II August 1, 1996

0700 - Depart for Northeast Cape via Cape Smythe Air
0900 Arrive @ Northeast Cape - Eugene @ runway to greet
Begin Staging of Equipment, Eliot to get ATV from
Eugene @ Fish Camp.
1200 Set-up Satellite telephone and make initial
phone call - Spoke with Janet and relayed phone
number info and then spoke c Deb and relayed
request for EE/CA table referencing all UST's and AST's
on site, Phone Call lasted 12 minutes and 07 seconds.
1330 Bonnie and Eliot to post signs on Buildings
Doug and Victor to do Stream Flow Measurements.

Stream Flow and Cross Section are located @
Culvert [illegible] - Flow in generally Westerly direction.
Bottom Material - Sand/gravel 50/50



[illegible], No [illegible], No
Sheen

Measurement taken @
approximately 50' reach
with no bends
± 100' West of Culvert.

FT	String	Water
0	34"	N/A
1	35"	N/A
2	38.5"	N/A
3	42.25"	N/A
4	43.5"	N/A
5	75.0"	31.5"
6	76.0"	32.0"
7	76.0"	32.25"
7.5	76.0	32.0"
8	72.0"	28.00
8.5	40.75"	N/A
9	41.75"	N/A

Edge of Bank @ 4.3

Edge of Bank @

	S	W
3.5'	43.5"	N/A
4.5'	72.0	29.5
5.5'	76.0	32 1/8
7.9	72.0	28.75

S W
[illegible] N/A

[illegible] 8/1/96

August 1, 1996

Northeast Cape Phase II

Stream flow location #1

Time for floating object to travel 50'

47, 46, 46, 38, 37, 37, 37

Stream Flow location #2

0	10.25	[illegible]
1	11.02	
2	12.50	
3	13.00	
4	14.03	
5	14.25	
6	15.50	
6.5	17.25	
6.8	20.00	edge
7.0	22.5	1.75
7.2	23	1.75
7.4	20.75	2 1/8
7.6	23.75	2 3/4
7.8	21.00	2 3/4
8.0	23.5	2 1/4
8.1	21	0
[illegible]	20.5	1/2
8.5	21.4	1/2
9.5	19.00	Moist ground
10.0	16.5	
10.5	15.5	Mossy Bank
11.0	13.5	
11.5	12.0	Hummock Moss
12.0	11.5	
13.0	11.5	
14.0	10.75	
15.0	11.5	
15.8	11.0	End

Edge grass

Stream joins Main Unnamed Stream - Upstream it peters out and then reemerges. [illegible]

Bottom Silty organics with occasional rocks

Water [illegible] towards the North.

The stream connects with the larger Unnamed Stream

& it passes through the Culvert (i.e. Stream location #1)

[illegible] 9, 9, 10, 10, 8, 9 [illegible] seconds to travel 10'

[signature] 8/1/96

Northeast Cape Phase II

August 1, 1996

Stream Flow Location #3

Drainage basin 107' across

105'	35"
100'	48"
95'	67"
90'	72"
85'	76"
80'	75.5"
75'	78.5"
70'	72.0"
65'	61.0"
60'	51.0"
55'	80.5"
50'	73.0"
45'	77.0"
40'	78 1/4"
35'	86 1/4" → 7 1/8" Water
30'	84" → 5 1/4" Water
25'	81" → 2 1/2" Water
20'	81.5" → 1 1/2" Water
19	[illegible]
15	48" → [illegible]
10	67 1/2"
5	51"
0	52"

Water @ Surface

Mud

[illegible]

Flow negligible → N

[illegible]

Boundaries: Channel

[illegible]

Mushy grass [illegible]

[illegible] on [illegible] [illegible] Established the [illegible] effect on Vegetation

[illegible]

Bottom Consists of [illegible] Silts [illegible] [illegible] and [illegible]

[signature] 8/1/96

August 1, 1996 Northeast Cape Phase II

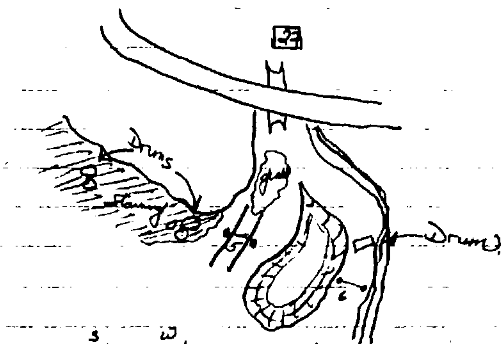
Stream Flow # 4 Located 117' west of Confluence

	S	W	
1'	.5'	N/A	organic matt ō sand
2'	6 5/8"	N/a	small sand
3'	6 3/4"	N/a	Silts and occasional Rocks and pebbles 1/2" → 3"
4'	10 1/2"	N/a	Med Coarse Sand.
5'	11 7/8"	N/a	– Bank Sloughs.
6'	27 1/4"	N/a	
7'	25 1/4"	N/A	after Disturbing Sediment
7.6'	30 3/4"	N/a	Sheen appears and odors very apparent
7.8			edge
8.0'	38"	4.5"	
8.5'	55"	21"	
9.0'	57"	23 1/4"	Stream Flow for 5 Q
10.0	59 1/4"	25 5/8"	46, (53 Hang), 46, 46, 46, 46, 46
11.0	58"	24 1/4"	
12.0	59 1/2"	26 3/8"	
13.0	60"	26 7/8"	Bottoms Consists of
14.0	57"	26"	(Sand gravel) 50% (Organic Matt
14.5	42 1/4"	9 1/4"	Mass) 50%, of S+G portion
15.0	37 1/2"	4 1/2"	≈ 30% surface area is gravel
15.5	34 3/4"	0	– edge of Stream. Poorly Sorted fine
16.0	21 1/2"	N/a	to coarse Sands.
17.0	17 1/2"	N/a	1/4" → 3" gravel subrounded
18.0	13"	N/a	3/4" typical
19.0	12"	N/a	
20.0	4"	N/a	
21.0	0"	N/a	Top of Bank

[signature] 8/1/96

August 1, 1996 Northeast Cape Phase II

Stream Flow #5 Located North of culvert @ Site 27



	S	W	
0	11"	N/a	Rust
1	14 1/2"	N/a	
2	19 1/2"	N/a	
3	24"	N/a	3.5 – Edge.
4	26"	3/8"	Center of Channel
5	25 3/4"	N/a	– Edge
6	19 1/2"	N/a	
7	13"		

Flow estimated @ 173 gallons per minute

Materials consist of disturbed gravel and sand no sheen. Vegetation sparse due to disturbed nature of soils Staining on exposed Northern Embankment due to seepage. Vegetation up stream does not appear to be affected.

[signature] 8/1/96

August 1, 1996 Northeast Cape Phase II

Stream flow #6 Located Downstream of Site 27 Culvert

S	W	
13'	28"	
12'	34"	
11'	42.5"	
10'	49"	Soils Moist
9'	51"	1/2" Stagnant Water
8'	50"	Moist / No Water
7'	51"	1/4" Stagnant Water
6'	52"	3/4"
6.2'		
5.0	54"	2"
4.0	50"	1/2" Stagnant Water
3.0	45"	N/a dry
2.0	40"	N/a
1.0	35.5"	
0	30.0"	

4.6

--Total depth of Channel from Crest to Bottom Approximately 8' - But artificially created, Subsurface Contamination Sheen Present when Sediments Disturbed.

—Flow visually estimated @ 3 to 5 gallons per Minute

8/1/96

August 1, 1996 Northeast Cape Phase II

300 → 400' Downstream of 5 and 6

Drainage from pump island and #1

have coalesced into a series of 4 braided streams each approx 20-30' wide Largest and deepest being the West. All are choked with grass maximum depth 3 feet. No flow, Sheen is observed on the Westernmost Channel when the Sediments are disturbed maximum relief is four feet. No apparent effect on Vegetation. Drums Scattered about, as Well as corrugated Metal. Area of observation is approximately 500' south of last antenna Pole from which Cross section of Stream flow #3 was taken. Photo from site has Chisel @ far end and auger @ west end.

Interview with Eugene Toolie - Victor and Bernice thoroughly documented.

Prepare for Overnight Stay @ Fish Camp

Visit made with Eugene, his wife Mary, and son Michael

8/1/96

 Northeast Cape Phase II

August 8, 1996 Circles Represent Completed Site

Began Site Recon @ Sites 4, 10, 11, 13, 14, 16, 18, 19, 21, 27

and Drainage Basin, POL pipeline, and Stream near

Runway.

Site 16 - Paint Dope Storage Building

5 (five) Overpacks noted within the Building, 3 (three) are ≈ 25 gallons, the other two are 5 gallons. No markings present on any of the drums. Most likely left during 1994 HTW removal by Burlington (AKA NWES). Area has sparse vegetation where ground has been physically disturbed, otherwise vegetation appears normal and healthy. Debris at the site includes Masonry bricks (≈ 200+), Corrugated Copper Steel half rounds (≈ 150 pieces), Two drum Rollers, One (1) AST, Oval, Previously marked by MW on 7/15/94 as 16-1. This AST Contains waste oil used to cover the roads for dust control (Eugene toolie). The Container is approximately 1/3 ? 1/2 full, total volume is roughly 500 - 750 gallons (Dimensions in CE/CA), Masonry Matting (38 x 2 x (8'x1.5'). Miscellaneous structural beams.

- Two spools of cable (7 wire galvanized 3/4", 20 wire c conduit 1.5")

Bundled wire (Combination of Both 7 and 20).

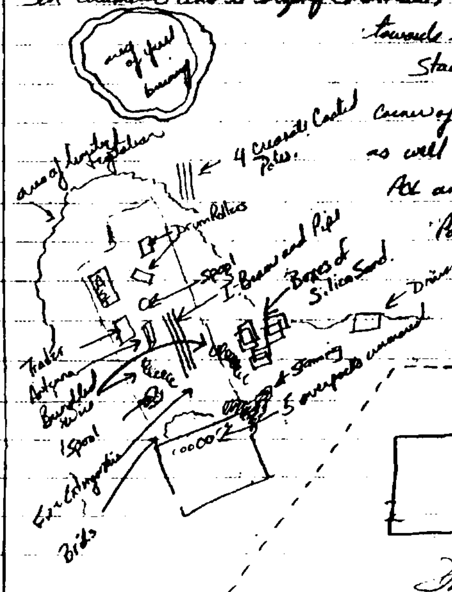
6 Boxes of silica sand (3'x3'x2'), 3 (three) sections of 4" pipe (1x12', 2x20'), 1 (One) Trailer, 1 (One) Section of antenna (Triangular)) 12 (twelve) fid lang One few Catingender

Douglas K. S. 8/8/96

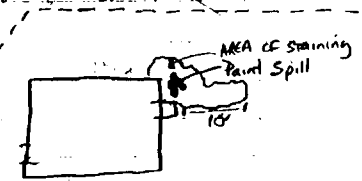
Northeast Cape Phase II August 8, 1996

Site 16 - Paint Dope Storage Building (Continued)

The area directly behind (to the North of the structure) is where all of the aforementioned Debris was buried. Further North the land has been physically worked by heavy equipment. Eugene Toolie told us that this area is where the majority of the recovered fuel from the 40,000 gallon spill was stockpiled and burned. The area in question has very little vegetation mainly because of earth moving rather than fuel disturb. This area is approximately 100' in diameter and is slightly mounded. Surface flow is typically towards the North.



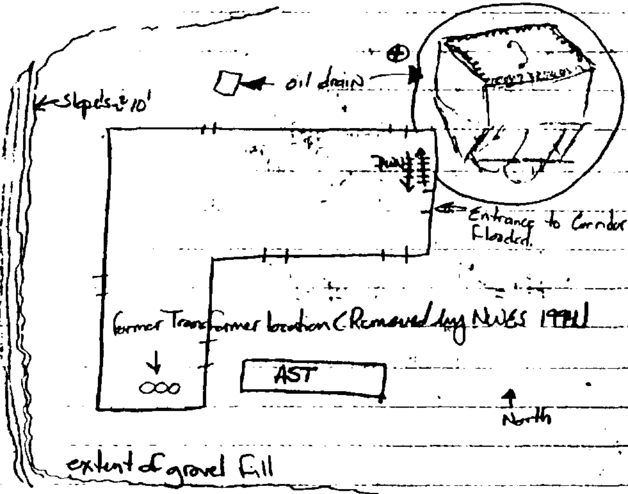
Stained area of Soil @ Northeast Corner of Building. Fuel odor noted as well as visible staining from AC and one remnant of a Paint spill remains. All Exterior Sources were removed by NWES in 1994.



Douglas K. S. 8/8/96

August 2, 1996. Northeast Cape Phase II

Site 14. Emergency Heat and Electric Bldg # 98.



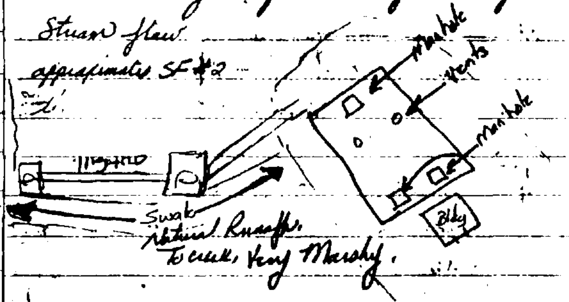
55 gallon drum full of Antifreeze.
No apparent Staining or Evidence of Release

Surface Water Flow is away from fill Pad and then in a Northwesterly Direction towards the outfall @ site 21 / Creek bed.

Daugh... 8/2/96

August 2, 1996 Northeast Cape Phase II

Site 21 - Wastewater treatment facility
No apparent Contamination in main area.
Area near terminus of outfall very marshy and water is very stagnant. Rusty looking Stream flow.
approximate SF #2



Daugh... 8/2/96

August 2, 1993 Northeast Cape Phase II

Item previously referenced as oil drum on page 13 was found upon near Northwest Corner of main Camp Pad. It appears to be a freestanding transformer and has the following face plate

G&W ELECTRIC SPECIALTY CO.
3500 W 127TH STREET
BLUE ISLAND, ILL. U.S.A.
TYPE: AL VOLTS: 15 KV AMP. 250
CAT. NO. AL 3372M SER. NO. C8097-63

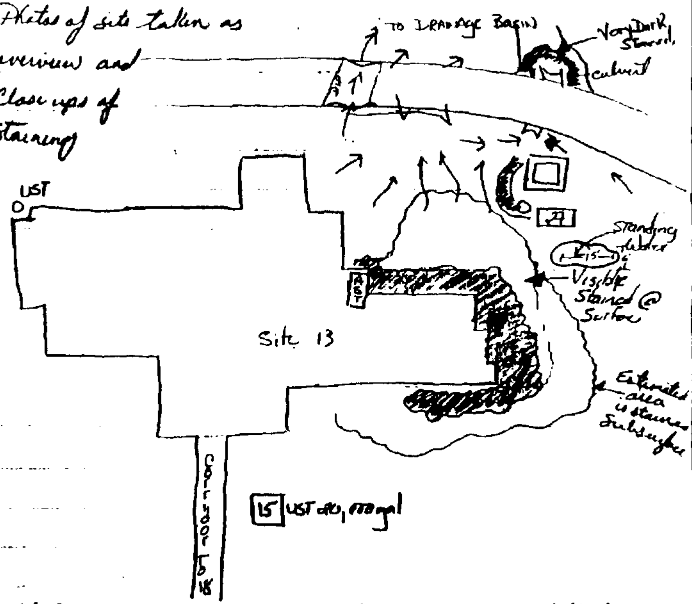
Three photos taken, appears to be half full with rain water, No sheen, No Signs of distressed Vegetation Area Surrounding Completely Vegetated.

[signature] 8/2/96

Northeast Cape Phase II August 2, 1996

Site 13 Heat and Electric Building
Area of Historic 40,000 gallon diesel fuel Spill
Encompasses Sites 13, 15, and 27.

Photos of site taken as overview and Close ups of Staining



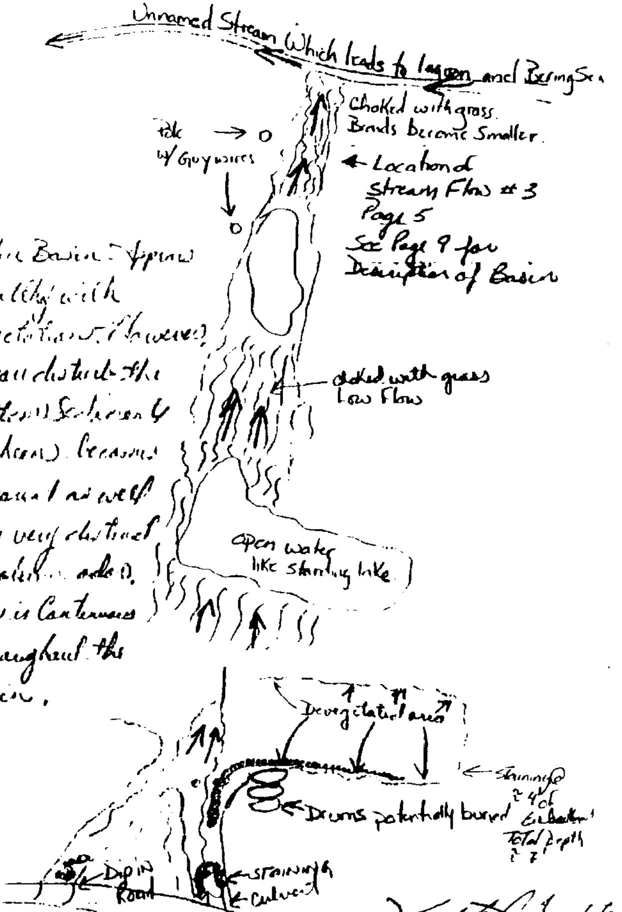
The Dark Stained area is represented above. There is little to no vegetation about the site, due in part by both the presence of fill, but also the spilled fuel. For logistical purposes Sites 13, 15, and 27 should be addressed together with respect to remedial options (soil) as the primary and overwhelming contaminant source is continuous throughout these sites.
The Drainage Basin is addressed in the coming pages.

[signature] 8/2/96.

August 2, 1996

Northeast Cape Phase II

Drainage Basin Area



Entire Basin appears healthy with vegetation. However if you disturb the bottom sediments a sheen becomes apparent as well as a very distinct petroleum odor. This is continuous throughout the Basin.

[illegible] 8/1/96

August 2, 1996

Phase II Northeast Cape

Begin to cut wire with slash.
Cut all wires associated with Antenna Array North of the [illegible] facility. All wires (on ground or near ground) were cut into approximately 4-5' pieces.

Mob back to Site [illegible] for 1900 Departure, Arrive Nome ≈ 1940.

[illegible] 8/[illegible]

August 3, 1996 Northeast Cape Phase II

0730 - Take Bonnie and Victor to Cape Smythe for A.M. Departure to Northeast Cape.

0900 - Return to Nancy Manor to retrieve Elise.

0830 - Go to Hardware Store and Grocery Store for Supplies.

0945 - Go to Alaska Airlines Goldstreak to check for shipments. None received.

1000 - Elise to Call Jenna Apatiki in Gambell to Coordinate Shipment of materials

1015 - Drop off Freezer, tents (2), Hexane (in 5 gallon bucket), Red Cooler with Battery charger, and Box With 2 Batteries (ATV). all at Northern Air Cargo for later Shipment home.

1100 - Arrive Cape Smythe Air for flight to Northeast Cape. Bonnie and Victor already there.

1240 - Plane Delayed, Depart for Northeast Cape on DC-3 with Elise.

Arrive Northeast Cape, unload and organize Materials.

1400 Go over use of Phone (Sattelite) with Bonnie, Victor, and Elise. - To release Lock, Press 1234 STO. - Find Sattelite. When Power on is displayed, dial number with 1+ area code. Our Number is 1-8[illegible]-332-0974

[signature] 8/3/96

August 3, 1996 Phase II Northeast Cape

1530 Bonnie and Doug to Catalog Vessels, Victor and Elise to do Benthic, Macro and Phytoplankton Sampling.

Site 2 -

One 1,000-gallon (East and Southeast Corner), Empty. Labeled 2-1 empty 7/15/94. Tank is still Empty.

Site 14 -- Tank (AST) 72" x 24', Tank is 1 phase (Benzene?) 1/3 full. AST 14-1. Photo taken. Vessel has no sludge.

Drum - 55 gallon - full of Antifreeze, Photo taken 14-2.

Site 18 - DS-2 and STB Noted as in 1994.

Site 16 Oblong 4'x6'x7.5'

16-1 (AST) approximately ½ full - 2 phases Waste oil and Water

16-2 overpack Drum 8.5"x15" (Contents Unknown for 16-2-16-6 assumed left by NAVS in 1991)

16-3 overpack Drum 8.5"x15'

16-4 Overpack Drum 8.5"x15"

16-5 Overpack Drum 10.5"x15"

16-6 Overpack Drum 10½"x15"

The AST Waste noted by Eugene Toolie to have been used for oiling of the roads.

[signature] 8/3/96

August 3, 1996
Site 16
Empty 1 gallon Cans of twenty-nine total (29)

INSULATING OIL
ELECTRICAL
9160-682-6461
Service Transformer Oil
(equal to GE 11BA3A0)
PHILLIPS PROD CORP
May 62 Batch 1
DSA 6-718 10S 6A1

All are empty. No signs of contents. Assume that that this is what is in the overpacks. However, no conclusion. Will have to contact NULES upon return to Anchorage to ascertain chronology.

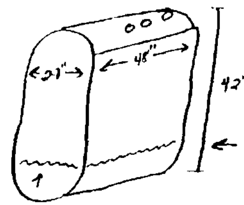
Site 13

AST 13-1 4'x8' Labeled "Empty" Diesel fuel Oil.
UST 13-2 Calculated 20,000 gallons from (Eugene Toole) Full
UST 13-3 Located in Northwest Corner. Labeled "Empty" by MW in 94

UST 13-2 is completely full of water - the water has [illegible] oil sheens and faint fuel odor. It is [illegible] 10' in depth with [illegible] on Bottom. No Sludge.

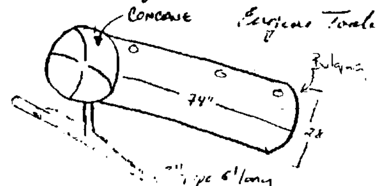
Doug [illegible] 8/3/96

August 3/96 Northeast Cape Alaska
Site 19-
19-1- AST 42" Tall, 27" across, 48" long



← approximate level of Antifreeze Eugene Toole confirmed this was an old antifreeze tank. @ 1715

19-2- AST 74" long, 28" diameter, Used for Running Dogs?
Empty



Return to Site 14 to Check and Pump water [illegible] Condor. Pump empty, Refuel and Restart. Approximately 1/3 volume left. 1630. 1635 End. Return to Vessel immediately.

Site 13-
AST 13-4 Located on North Edge of [illegible]. This tank is 5' in diameter and 10' long. The Tank is sitting on two Wooden Cradles. According to Eugene Toole he placed this here after the 15,000 gal diesel fuel spill to try and retrieve some of the fuel. [illegible] were recovered.

Doug [illegible] 8/3/96

August 3, 1996 Northeast Cape Phase II

1800 - Return to site 14 to check on Dewatering. Everything Still Running, approximately 2 feet of water left. Estimate finish @ 1900-2000. So far no items of interest noticed.

Site 32 - Water Wells and Water Supply Building - Approximately 150 1 gallon Cans of Asbestos Patent Cement.

Columbia Asbestos Co.
Fischer's Original
Patent Cement
Asbestos Surface and Asbestos Cement
Made of Asbestos and NON-Shrinking Fire-Proof Materials.
Portland, Or

Doug [illegible] 8/3/96

August 3, 1996 Northeast Cape Phase II

1830 - Return to Site 2 to return Eugene's trailer to transport pumps back to terminal.

1915 - Shut off Pump @ site 14. As Eugene Soolie told us, the area was a utility/Man Corridor between building — at site 18 and building 98 @ site 14. The Hallway is approximately 6' wide 12' tall and — feet long. There remains less than one foot of Water in the corridor. No [illegible] items of concern were found after dewatering. Four photos taken of Corridor. 3 from Site 14, and 1 from Site 18.

1930 - Begin to break down pumps for transport back to terminal.

1945 - Bonnie and Doug to return to site 2. Victor and Elise to follow shortly.

Prepare for Vessel Sampling to commence in a.m. Vessels 16-1, 13-2, 14-1, 19-1, and 4- to be sampled. Only 16-1 has more than one layer.

All water pumped from corridor was colorless and void of odor from start to finish.

8/3/96 Doug [illegible]

August 4, 1996 NEC Phase II

0830
Inspect Site 4 tanks
- Tank 4-1 is Empty
Tank 4-2 has approximately 1/2 full of water
Water appears to be clear and there is some
sludge in the bottom, However the sludge
appears to be only scale flaking off of the
tank. Eugene [illegible] [illegible] [illegible] [illegible]
tanks were used for water distribution to
the [illegible] hunting and fishing Camp

Prepare for Vessel Sampling
Site 4, - Tank AST 4-2, Water / Sludge TRPH / BTEX
Site 13, - Tank AST 13-2, Water / No Sludge TRPH / BTEX
Site 16, - Tank AST 16-1, Oil / Water / ~~TRPH~~ BTEX / PCBS sludge glycol TCLP w/ [illegible]
Site 14, - Tank AST 14-1, Water / No Sludge TRPH / BTEX / PCB's
Site 17, - Tank AST 19-1, Antifreeze / No Sludge / Sampled Previously
Site 19, Pit
TRPH / BTEX / PCB's
Sludge for TCLP Metals
fuel ID and glycol

Site 14/18 Consider if Sludge TCLP, Fuel ID and glycol

[signature] 8/4/96

August 4, 1996 Northeast Cape [redacted] II

Inventory Bottles @ [redacted]

Amber No Pres	H_2SO_4	HCL	VOA w/ HCL
12	12	12	54
12	12	12	
12	12	4	
12	10		
12	12		
11			

Soil Jars
25: 8oz 4 x 4oz 3 x 2oz [illegible]

Packaged in ~~4 x 4oz HCL~~
9 x 8oz 2 x Trip Blanks 7 x Temp Blank
3 x 4oz 2 x Voas ~~HCL~~ 5 x 40ml 2 x 2oz
1 x 1L TCLP RCRA Nalgene

[signature] 8/4/96

August 4, 1996 Northeast Cape Phase II

[illegible] Site 4

[illegible]

There was no sludge present in tank 4-2. There is a very thin layer of Rust on the inside of the tank. No sludge Sample was collected from tank 4-2.

18' Tank 4-2 is 42" [illegible] by 66" long. Tank 4-1 is 10' [illegible] by 25' long and bulges a little [illegible] this tank is Empty (By Sounding) and all [illegible] to the interior are [illegible]. No Samples Collected from tank 4-1. Both tanks [illegible] photographed and [illegible].

1100 Go to Site 14 to collect Vessel [illegible] at 14-2. Collect 8 1L amber glass liters ([illegible] EPA) and 3 40 ml vials for BTEX.

[illegible] Site [illegible] to collect Sample [illegible] [illegible]

1530 Return to Site 4 and

1600 Begin Sampling of Tank 16-1

[signature] 8/4/96

August 4, 1996 Northeast Cape Phase II

Conclude Sampling of Site 16 Tank 16-1

A total of 15 1L amber liters and 18 VOAs were collected

Samples were as follows.

96NETK16101 Primary with MS/MSD

96NETK16201 QC

96NETK16301 QA

1700 Leave Northeast Cape for Nome

[signature] 8/4/96

August 5, 1996

August 5, 1996 -

Gimbell Pallet Contents

24 x 4 oz, ~~12 x 16 [illegible]~~, 11 x HCL 12 [illegible]

4 ~~T[illegible]~~ ~~4 [illegible]~~, 10 4 oz, 2 HCL 16

August 6, 1996 Northeast Cape Phase II

0750 - go to [illegible] to complete
[illegible] packaging for [illegible] shipment.
8 coolers to MAS Anchorage, 2 coolers to NPDL,
MAS and Sablatnek, NPDL sent Fedex.
Will [illegible] this afternoon from
Northeast Cape.
0915 - Depart for Northeast Cape.
1000 - Arrive Northeast Cape
1030 - Doug and Elise to Site 19 to Sample
Drainage Pit.
1100 - Collect Water Samples from pit for
TRPH, PCB, DRO, 314 plus Amber and 2, 40ml VOAs
Collect Sediment Samples for [illegible]
and
The Pit itself is
and Contains mainly debris. The "Sediment"
Consisted mainly of insulation and paint chips

Doug [illegible] 8/6/96

August 6, 1996 Northeast Cape Phase II

1200 - Collect Sludge Samples from tank 16-1.
Collect QA/QC as well.
Sludge is very dense black and greasy to touch
Sludge is very gelatinous and appears to be
simply [illegible]. All
Sampling [illegible] the Teflon Dipper
were left in the [illegible]
grossly contaminated. Tank [illegible]
Lid which was closed and secured [illegible]
by the field team [illegible] of
sampling [illegible]

1300 - [illegible] site 27
for [illegible] 101, 102, 103,
104, 105 [illegible] 106, 107, 108,
and 109 [illegible]. Sample #s 55101 had a
[illegible] taken. Sample times are as follows.

101	1300	TRPH	106	1300	DRO/PCB's
101?	1305		107	1455?	
101?	1310		108	1255?	
102	1315		109	1310	
103	1320				
104	1325				
105	1330				

All Survey site locations are in VEH's notebook

Doug [illegible] 8/6/96

SKIPPED
[signature] 8/7/96

August 7, 1996 — Northeast Cape Phase II

0730 - Take Carl, Victor, and Bonnie to Cape Smythe for a.m. flight to Gambell (Carl) and Northeast Cape (Bonnie, Victor).

0810 - Contact Alaska airlines and change reservations for Harris, Leyman, and Quist to flight 152 Departing Nome @ 1240 and arriving Anchorage @ ~200.

0915 - Fax COC's to NAX and Mrs @ Sitnasuak, NPDE confirmed. NMAS phone number not responding. Will call to check number and re-fax then.

1045 - Get ready for shipment of cooler to NMAS and NAX. Also Shop for Eugene and Mr Gambell.

1430 - Depart for Airport for flight to Gambell. Gambell flight Delayed. Arrive Gambell @ 1830.

See Gambell Phase II Notebook

[signature] 8/7/96

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Notebook No. 391

Phase II COE
Aug 1 - Aug 8
1996
Elise Tuzman, Vicki Harris
Doug Quist, Bonnie McLean
Northeast Cape

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name Elise Tuzman
Montgomery Watson

Address

Phone

Project St. Lawrence Island
Phase II RI/FS

s

1-5	NEC - Aug. 1 (windy, rainy)	
6-8	NEC - Aug. 2 (windy, overcast)	
7-16	NEC - Aug. 3 (windy, rainy)	
17-22	NEC - Aug. 4 (dry, windy, sunny)	
23-30	NEC - Aug. 5 (dry, windy, sunny)	
31-	NEC - Aug. 6 (dry, slightly overcast)	
45	Photo log (ET1 + ET2)	8/1/96
48	Phone #'s	8/1/96

Thursday, Aug 1

Arrive @ NEC ~ 10:00 A.M
Clean Airport Bldg for Mobilization Area
Arrange lodging + ATV rental w/ Eugene Tobcie
Cape Smythe will pick us up Friday @ 7 P.M

1[15] cut 3 cables in front of airport Bldg, drug under shelter

2[00]: Bonnie + Elise began installing "Asbestos Warning" signs on the buildings
2° field office @ Pump House Bldg

* Photo of Rec Bldg Switches (Roll ET1/#26)
* close up of switches 1 + 2 (photo 25, 24) (#s in Bonnie's field book)
* photo #23 - Switch 5 (fire protection, alarm)

Very windy + rainy today

8/1/96

Bldg 108 switches (Westinghouse Electric Corp)
No. B7350?(0.in.C)
style or type: AB11-4ABL25
Assembled in: SEA
Stock order. SEYA-S2214?
Amps I25
Volts L20/208
(Roll ET1/#20)

"Danger Asbestos" Signs

Bldg 114 North door
113 North door
99 Southwall
99 North door
100 (lg) SE door
105 S door
102 BOQ east door
103 ACW west door
Corridor b/w ACW + Squad Hdqts North side
Squad Hdqts east door
109 - Auto Maintenance east door
109 - garage door
corridor 109 → 108 south side
100

"Danger Signs" Posted 8-1-96

Bldg 105 SE dock
Bldg 106 NE dock
Bldg 107 E dock
Bldg. 112 E side
Bldg. 112 W side
Bldg. 107 NW Dock Edge
Bldg 111 NE Dock dock
Bldg. 111 S door
Bldg 101 E N door
Bldg. 101 W N door
Bldg 98 NE [illegible]
Bldg 98 NW door
Bldg 100 E S door
Bldg 105 W door
Bldg 100 N W landing
intersect corridor
to 101 & 111 — S door
Bldg 101 E S door
101 W S door
101 W W door
98 inside E door
inside NE door
98 inside S middle door (photo)
98 SW door, inside
98 W door landing

Site 21 Well House (1 E door)
Corridor b/w 111 + 101 Midwest door
Southwest door
~~Bldg [illegible]~~
Bldg. 110 north east + north door
Bldg. 110 South facing garage door

Airport terminal (6 signs)
NW garage doors
N mid door
E door
S mid-door
S garage door
door to office area from garage

SMT
9/1

10:00 Friday, Aug. 2. Overcast, windy

Bonnie + Elise begin quantifying fill, cutting wires, documenting stained Well posting add'l Asbestos signs

1:45 Gather wires SW of Bldg 98 begin attaching to ATV w/ rope to store in buildings

Cut wires crossing road east of Water tank bldg + placed in Rec Bldg.

Explored power lines going from south of Water tank bldg toward White Alice - gathered wires + cord along route - attached to ATV - Stiff wire in which reindeer could not become entangled were kept in place

EMT 8/2/96

Gathered wires around power lines north of White Alice site (line leading from site to sea due east)
- brought wires to ~~Air bldg~~ EMT Pump house

Snipped wires surrounding Ops Bldg + road from Ops to Pump House (photo)

Gathered wires around ~~General~~ EMT Mess Hall Warehouse (107) + put on building platform 4' off the ground (photo)

Snipped wires around ~ 20 antenna poles + in between. Snipped ~ wery 4' on wires (South of Heat + Electric Bldg)

Drug large wires surrounding Bldg 112 into Paint + Dope Bldg (112)

EMT 8/2/96

Completed wire cutting for the day at $6^{\underline{00}}$

Traveled back to Airport Terminal to Wait for Cape Smythe pickup.

Arrived in Nome $7^{\underline{40}}$ P.M.

Photo log on page 45

Elvie Tugman
8/2/96

Saturday, August 3

Took $2^{\underline{nd}}$ DC3 to NEC
Arrived @ $1^{\underline{30}}$ P.M.

Prepare for Benthic, phyto + zoo-plankton Sampling

Wilcox dredge 6" × 6" × 6"

$4^{\underline{00}}$ check on basement pump refill w/ gas

Approach drainage basin to stake sw/sed locs + benthic locs.
Take Water quality tests for DO, pH, temp + EC

10

Locations of SW/SD, streamflow + Streamflow #6 } Benthic

138' NW of MW 27-1 to the thalwag of the drainage where streamflow 6 was taken

Streamflow #5

128.5' North Northeast of MW 27-1

5[10] SW/sed #1

203' North of MW 27-1

pH = 6.29
Conductivity = 75 umhos
Temp = 10°C
DO = 11

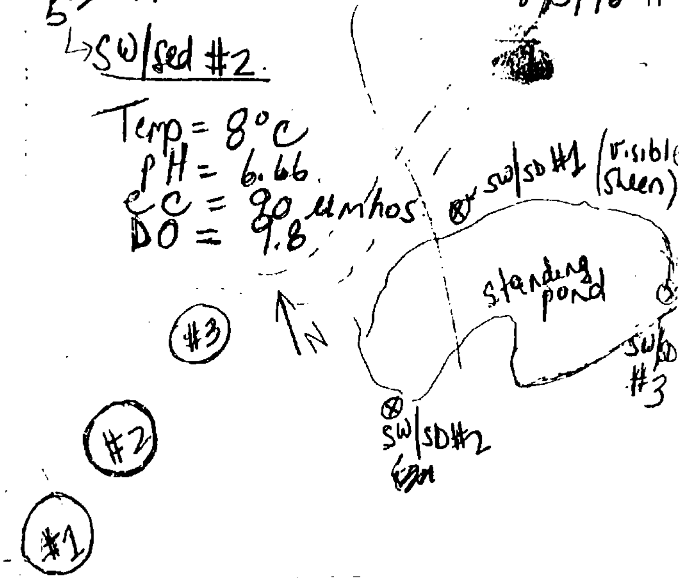
pH - Beckman
EC + temp - YSI
DO - HACH Pocket Colorimeter

EMT

5[25] P.M. 8/3/96 11

↳ SW/sed #2

Temp = 8°C
pH = 6.66
EC = 90 umhos
DO = 9.8



SW/SD #3
5 35 P.M.

pH = 7.13
Temp = 9.8°C
EC = 100 umhos
DO = 11

Redid DO on 8/4:
DO = 7.9

Appears to be no distressed vegetation, visible sheen in pockets

SW/SD #4

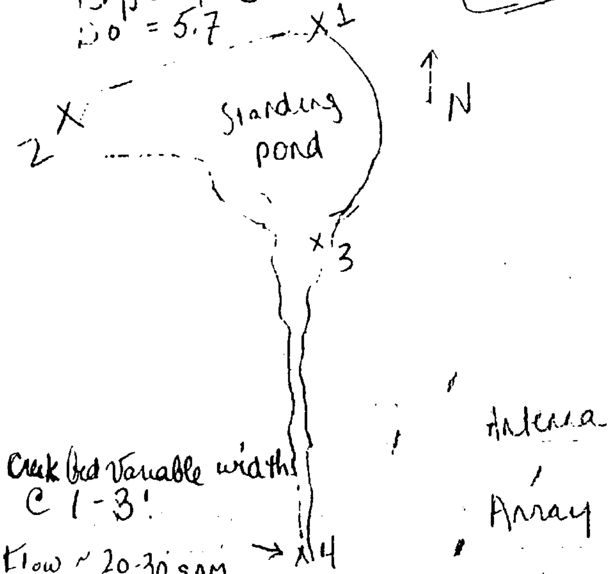
Time = 6^{10} (running water)

pH - 7.15

eC - 190 ← redid on 8/5 $\boxed{eC = 110}$

Temp: 4°C

DO = 5.7



Creek bed variable widths @ 1-3'

Flow ~ 20-30 gpm

Visible sheen in banks

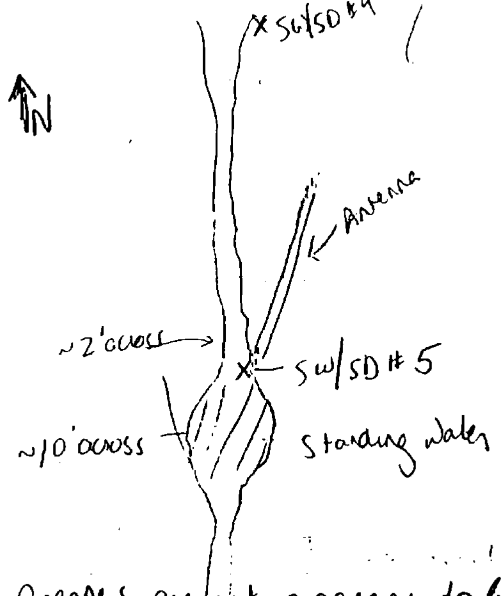
Appears to be no distressed vegetation.

Grasses + clay present.

Towards Airport Terminal

SW/SD #5

Time = 6^{40} PM.



grasses present; appears to be no distressed vegetation.

sheen in pockets along bank

flow ~ 5-10 gpm.

pH = 6.98

Temp = 10°C

eC = 75 umhos

DO = (Probe?) 11?) ← Redid on 8/...

SW/SD #6

Time 7:00 P.M

8/3/96

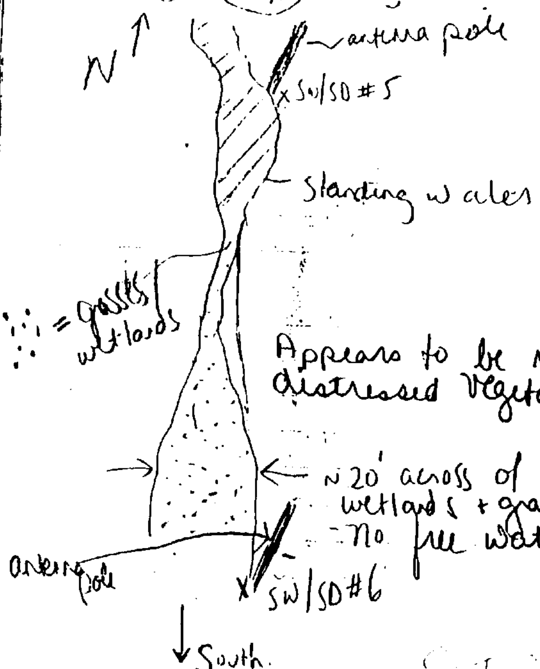
pH = 7.03

Temp = 9°C

Conductivity > meter limits (?) (will retry)

redid 8/5 EC = 80

DO (wrong) ← wrong ← redid 8/4/96 DO = 8.0



Appears to be no distressed Vegetation

EMT 8/3/96

SW/SD #7

Time 7:15 P.M

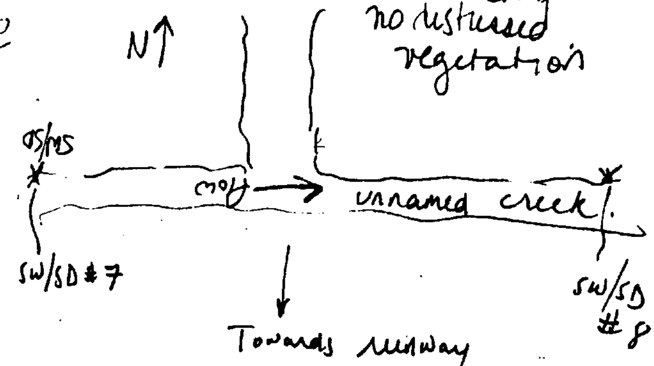
8/3/96

Flow ~ 10-20 gpm

width of creek 3-5' (variable).

appears clear - no sheen.

no distressed vegetation



Temp = 9°C

EC = 50

pH = 7.29

DO = ← completed on 8/4/96 (DO = 7.9)

Clear Water

EMT 8/3/96

8/3/96

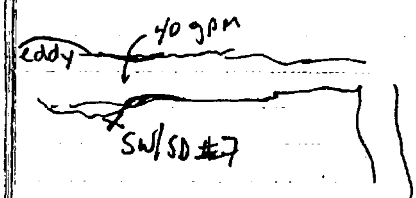
SW/SD #8

(Loc on pg 15)

Time : 7:30 P.M.

west of junction b/w drainage + unnamed creek, along creek

creek flow ~40 gpm



Temp = 9°C
EC = 50 µmhos
pH = 7.17

Duplicated DO on 8/4 ⇒ DO = 7.3

creek width ~8' at sample location
variable width along creek at ~2-8'

Clear water, no distressed vegetation, no visible sheen

GMT 8/3/96

12:00

8/4/96

Begin SW/SD Sampling [DRO + PCB]

SW/SD #1
Time 12:00

96NECDBSD101
SD201 - QC
SD301 - QA

96NECDBSW101
201 - QC
301 QA

Redo DO : Same # as 8/3 ; 11 (?)

SW/SD #2
Time 12:30
96NECDBSD102
SW102

SW/SD #3
Time 13:10

DO = 7.9

96NECDBSD103
SW103

GMT 8/4/96

8/4/96

SW/SD #4 DRO, PCB
Time 1320
96 NEC DB SD 104
96 NEC DBSW104

SW/SD #5
Time 1340
96 NEC DB SD 105
96 NEC D B SD 105

Redid DO from 8/3:
DO = 8.1

SW/SD #6
Time = 1405
96 NEC DB SW/SD 106

DO = 8
redo from 8/3

EMT 8/4/96

8/4/96

SW/SD # 7 [DRO, PCB]
Time 1420
96 NEC DB SD/SW 107
@ unnamed creek
redid DO from 8/3/96
DO = 7.9

SW/SD # 8 (DRO, PCB)
Time = 1430
96 NEC DB SD/SW 108
West of junction b/w Drainage Basin (DB) + unnamed creek

DO = 7.3

MT
8/4/96

8/4/96

Collected surface soil · sediment samples for PCB only at:

96NECDBSS101 1440
96NECDBSS102 1445
96NECDBSS103 1450
96NECDBSS203 - QC 1455
96NECDBSS303 - QA 1500

96NECDBSD109 1505
96NECDBSD110 1510

All located in drainage basin area in order to pinpoint source of PCB contamination.

1515 Victor + Elise swingtie the SW/SD locations in the drainage basin

96NECDBSW/SD 101→108

Elise

8/4/96

Swingtying SW/SD #8 → see a sheen on creek's surface when bringing up contaminated sediment

SW/SD#8 (sediment)
96NECDBSD108 was taken on side of creek bed. Will take a sample from creek bottom tomorrow.

1700 Cape Smythe brings us back to Nome with our samples.

Checking Gambell stuff @ Cape Smythe:

Gambell stuff
3 bailers
10 stakes
PID meter
DI water in bucket
bubble wrap

Not preserved: 12+1 = 13

HCL = 11 + 1 = 12

4oz = 24 + 10 = 34

Voas = 45 = 45

Trip Blanks - 4 = 4

2 coolers.

1 long box ?

Need tedlar bags
Calibration gas

ET 8/4/96

- 9:30

8/5/96

Arrived @ NEC w/ Cape Smythe.

Prepare for Benthic, Phyto + Zooplankton sampling.
Benthic samples will be taken in triplicate
Begin @ SW/SD #7 / Benthic sample 103

96 NEC DB ZO 103
96 NEC DB PL 103
96 NEC DB BT 103

Physical Characterization

1) predom. land use → nature
2) Watershed erosion → none
3) Streamwidth - Variable 2-4 ft @ sample location
4) stream depth = 1'- 27" run
5) local watershed pollution None @ sample location
6) High water mark ~~3'~~ 27"
7) Velocity - ~20gpm
8) Dam present ⇒ No
9) Channelized → yes
10) Canopy Cover open

8/5/96

11) Sediment odor → normal
12) Sediment oils → absent
13) Sediment deposits
14) Inorganic Substrate Components → Silt

15) Substrate type 100% silt

16) Organic Substrate Component ⇒ MUCK-MUD

Water Quality
- Temp = 9°C
- DO = 7.9
- pH = 7.29
- EC = 50 μmhos

Cold water
No odor
NO water surface oils
Clear turbidity
Sunny, slightly windy day

Photo ET 2 / # 1

Benthic sample mostly organics, no visible bugs

8/5/96

1700 Benthic Phyto + Zooplankton at junction b/w drainage system + unnamed creek

96 NECDBZO 102
PL 102
BT 102

Physical Character
1) Native life
2) No erosion
3) obvious source of pollution
4) Stream width
5) Stream depth) → riffle
6) high water mark
7) velocity ~10 gpm
8) No dam present
9) not channelized
10) no canopy cover
11) petroleum sediment odor
12) sheen present
13) sediment deposits - sludge
14) Organic silt
15) Substrate type
MUCK - MUD

20

Water Quality 8/5/96

Temp: 9°C

~~DO~~

pH = 7.04

EC = 100 umhos

Cold Water drainage basin

Petroleum water odor

Sheen

Benthic sample Mostly organics, no visible bugs.

ET 2/# 2

12^{20}

Calibrated YSI

Calibrated Beckman

12^{45}

Benthic Location #4, 104

(SWISD #8)

96 NEC DB ZO 104

PL 104

BT 104

Water Quality

Temp: 9°C

DO = 7.3

EC = 50 umhos

21

Physical Characterization 8/5/96

1) Native use

2) No erosion

3) obvious source of pollution

4) stream width = 3-5'

5) stream depth - Run ~3'

6) high water mark

7) velocity (20-30 gpm)

8) No dam present

9) channelized

10) No canopy cover

11) No petroleum odor

12) sediment oils profuse

13) sediment deposits ?

14) silty/sandy bottom

15) Muck Mud organic bottom

Cold water creek

No water odors

Sheen when sediments are disturbed

Clean turbidity

~~Photo: ET 2/#3~~ EMT

Sample Sandy, little organics.

1320 Redid eC for SW/SD #6 8/5/96
(originally result was out of
limits of YSI)
eC = 80 umhos

1330 Benthic sample 101
(SW/SD #5)
96NECDBZO101, PL141, BT101
Mostly wetland + ponds, no (low)
flowing water

1) Native use
2) No erosion

* Photo ET2/#3 of Benthic loc 101

3) Obvious source of pollution
4) Drainage width ~ 20-30'
5) Drainage depth
variable 6" - 1'

Low velocity | ~5 gpm |
No dam or channel
No canopy cover

CMT

8/5/96

Smell of creosote from
antenna pole
No sheen present

Silty bottom, petroleum smell

Muck Mud organic bottom

clear turbidity
Cold water
Sample mostly organic mat'l, petroleum odor
pH = 6.78
Temp = 10°C
eC = 75 umhos
DO = 8.1

* Photo ET2/#4
Bonnie collecting phyto +
zooplankton samples w/
Wisconsin net @
location 101 (SW/SD #5)

1355 Redid eC for
SW/SD #4 (PL ET2 #5)
eC = 110

8/5/96

1400 Bring Samples Back to Terminal
dilute cover w/ formaldehyde solution

1600 collect surface soil samples @ Site 10 [DRO, TRPH]

96 NEC 10 SS 101
SS 201 QC
SS 301 QA

10 SS 102 1630
10 SS 103 1640
10 SS 104 1645
10 SS 105 1650
10 SS 106 1655

Do swingties for locations

1830 Fly to Nome.

10 SS 107 1645
10 SS 108 1700

8/5/96

8/6/96

0900 Called Jenna at Sivuqaq
confirmed lodging + ATU rental, arranged equipment to be stored at the Gambell Lodge.

Booked Elise to leave from Gambell Wed morning, 8/7/96, called Doug to arrive Wed
evening IAN BISHOP
Victor will arrive in Gambell on Thursday afternoon, 8/8

1000 Arrived at NEC.

Prepare for pit, sludge + surface soil samples with DOUG.

1055 Sample water in pit @ Site A (into 1 pint glass jars)
Photo ET 2 / # 6-9/10
PCB, TPH, BTEX samples collected
Sample time 1100

Gmt

8/6/96

96NEC19 ~~ET~~TK102 - Sludge in pit
96NEC19 TK101 water in pit

1130 leave to sample sludge at Site 16, Tank 16-1

96NE16TK102
sample time 1200
Sampled for: glycol, fuel ID, TCLP metals

QC 96NE16TK202
QA 96NE16TK302

* Photo ET2/#11-15

1245 Soil Sampling at Site 27 (North of Bldg 110)

DRO/PCBs
96 NEC 27SS108 1245
DRO + PCB
96 NEC 27SS107 1255
96 NEC 27SS106 1300

96NEC 27SS109 1310
PCBs only

SMT

8/6/96

* Photos taken: ET2/#16+17

1315 Add PCB sample to Site 10 sample from 8/5/96

96NEC10SS107 1315

1340 Begin traveling along unnamed creek westward from SW/SD#8 to determine extent of petroleum contamination (cutting hazardous wells along the way) Photo ET2/#18

1345 2 small fish (6") found in unnamed creek ~~west~~ east of junction b/w drainage basin + unnamed creek

Photo ET2/#19
- other fish found ~~[illegible]~~
200' W of SW/SD#8 - sheen observed upon sediment disruption, pe odor

SMT

8/6/96

400' W of SW/SD#8 – Sheen observed upon sediment disruption Petroleum odor

600' W of SW/SD # 8 – Sheen from sediments Petro odor. Sample collected.

96NEC DBSD 111

for DRO+PCB Time 1515

Depth of water -> 1.4ft.

Velocity 2-5 gpm

photo: ET2/#20, 21

800' W of SW/SD#8
Sheen + odor [ET#2/#22].

1000' W of SW/SD#8
Sheen observed
No discernible odor

GMT

8/6/96

1530 880' west of SW/SD#8

wires observed – Small straw telephone type wires + 1 7 gauge wire cable extending from antenna 100' south across the creek toward the airport (NW antenna of this array)

Photo ET2/#23, #24 close-up

Unable to cut

1200' W of SW/SD#8
Sheen observed, mostly from disruption along edges odor observed. (Sheen harder to find)

1400' W of SW/SD# 8

No sheen observed b/c of gravelly bottom However, @ 1450' W, sandy bottom showed sheen. (harder to

8/6/96

Between 1400 + 1600'
Stream meanders

@1600' - Sheen found mostly along banks w/ stagnant water, ~~discern~~ odor

1700' creek turns north toward runway

@1900' (200' Northward)

~~observed~~
bottom surface covered w/ black Moss.

Sheen seen along banks (contamination harder to fix') petroleum odor.

CMT

8/6/96

@2100' (400' Northward)

Bottom covered w/ black moss
no sheen observed

@2300' (600' Northward)

from 2000' onward - the bottom becomes more cobbly, + progressively less sheen is observed.

Sheen observed @ 2300' in sandy pockets along bank
Very little sheen observed
No discernible odor

@2450

AST seen on east side of creek.
Photo ET2 | #25
500 gallon AST, empty
labeled: Elmendorf; B

8/6/96

@ 2500' along unnamed creek. Sample collected for DRO

96NECDBSD 112
for DRO + PCB
Photo ET#2 / #26 TIME: 1630
(Last picture in roll ET2)

Very gravelly bottom.

@ 2700'
More, significantly more algae growing on cobbles on creek bottom
No sheen observed.

@ 2750' ~~[illegible]~~
~~[illegible] - sheen observed~~
fish seen in creek.
6" sculpin (?)

@ 2800' - empty drum on east side of creek.

8/6/96

1745 DOUG seals shut the lid on tank 14-1 w/ wire

1750 Lid sealed shut on Tank 16-

1755 Lid sealed on Tank 13-2

1800 Measure pit @ Sck 19
Auto Maintenance Bldg
28" wide × 2.4' long × 5" deep

1900 Plane picks us up for NOME.

Prepare samples for Shipment

Plans to depart for GAMBELL at 8 A.M

EMT

12 L Ambers w/ HCL ✓
18 VOAs T 15 ✓
10 Ambers - no preservatives
27 4 oz bottles
12 Trip Blanks

photolog:

ET2/#22 800' W of SW/SD#8
Sheen observed

#23, #24 - were found 880' W of SW/SD#8 along unnamed creek.

#25 - AST found 2,450 west from SW/SD ~~west of~~ along unnamed creek on east side of creek.

#26 - Doug collecting sediment sample 2500' from SW/SD#8 along unnamed creek - where no sheen was observed.

Photo Log

Roll ET1

#27 Rec Bldg ACM Sign (South Wall)
#26 Rec Bldg Switches
#25 close up of (1) Switch bo
#24 " " " 2nd box
#23 close up of Switch 5 (fire protection alarm
#22 Blg 105 Rec Bldg South S ACM sign
#21 ACW Bldg - Sign
#20 Switches in Bldg 108
#19 Bldg 110 North door
#18 Paint + Dope Bldg 55 gallon drums
#17 General Warehouse 20-25# Tabo- discharg
#16 Bldg 98 NE corner Power / Generator Bldg
#15 Bldg 101 W - W door
#14 Bldg 98 S middle door
13 ~~#13~~ Bldg 99 W door
13 Bldg 401 N mid-door
11 wires yard w/in Bldg 99
10 wires collected around
4 poles SW of Bldg 90

#9 - Wire collected ~~south~~ north of White Alice site
#8 - snipped wires surrounding OPS Bldg (98) - north side.
#7 gathered wires on MessHall Warehouse platform (107)
#6 ~~Antenna poles~~ EW power lines whose hazardous wires were clipped North of Heat + Electric Bldg

ET2
#1 Benthic, phyto + zooplankton sampling @ LOC 103 (SW/SD - 1)
#2 Benthic sampling @ LOC 102 Junction b/w DB + unnamed creek
#3 Benthic sample 101 (SW/SD Location #5)
#4 Bonnie collected phyto, zooplankton samples at Location 101 (SW/SD #5)
#5 SW/SD #4 (drainage basin)

#6 pit @ Site 19 pit
#7 pit @ Site 19 pit
#8 BTEX sampling @ Site 19 pit
#9 TRPH, PCB sampling @ Site 19
#10 PCB sampling @ Site 19
#11 Tank sludge sampling @ 16-
#12 " " " "
#13 " " " "
#14 " " " "
#15 " " " "
#16 Surface Soil Samples 96NEC 27 SS 106 - 108 (106 in foreground)
#17 Surface Soil Sample 96NEC 27 SS 109 (PCBs only)
#18 wire cutting north of facility along road to runway
#19 Small fish seen in Unnamed Creek east of junction b/w drainage basin + creek.
#20 Sediment sample 6'') of SW/SD#
#21 " " " "

Phone #s

Cape Smythe 907-443-2414
800-478-5433

Nunaq Apts 443-3063 fax

a product of
J. L. Darling Corporation
2212 Port of Tacoma Road
Tacoma, WA 98421 USA
(206) 383-1714

DURA Rite
WATERPROOF

HORIZONTAL LINE

NOTEBOOK NO. 691

CRPIP 2198.0440
St. Lawrence Meetings
March 24 - 27, 1996

Elise Tugman / N Harris
Basement Samples

Tuesday March 25

1:00 Lv for Savoonga

10:00 Arrive in Savoonga

Lodging at Nelson Alowa's

Call George Noongwook + Jerry Wagiitkin to remind them of mtg

2:00 visited by Carl Pelowook
worked in boiler room at DEC
considers himself high risk
wanted to know if he had work this summer
HAZMAT trained

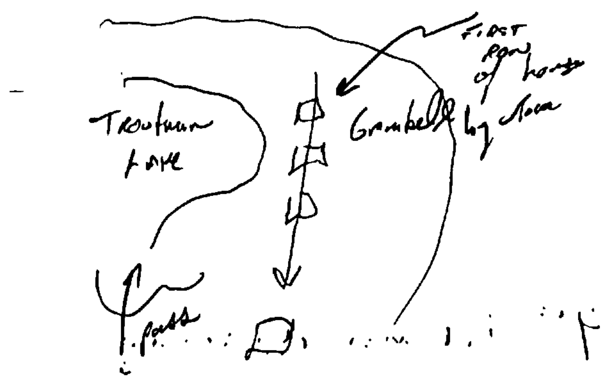
4:00 mtg @ city bldg - see trip notes

9:00 Eskimo dancing

WED 6-26-96

12:30 pm Wipe samples of TRANSFORMERS on top of Sevuokuk Mt. Tuzman, Harris, Rowe

12:35 FINISH SAMPLE
TRAN 1 - primary, QC, QA
2 - primary
3 - primary
+ blank
wiped inside of transformers
12" ∅ x 2.5' long, RUSTED
marked with yellow pen



12:4_ Inspection of INFILTRATION GALLERY. GALLERY consists of 2 6' x 6' SHED. Numerous pipes - (6" PVC) in area - design unknown. 6' ∅ vertical culvert about 50' away. Buried ~10' - Appears to be a well.

Pipe (6" HDPE leads from galley to town)

Wipe samples 6/26/96

Transformer #1

96GAM001 WI 1230

96GAM011 WI QC 1235

96GAM021 WI QA → NPDL 1240

Transf #2

96GAM002 WI 1245

Transf #3

96GAM003 WI 1250

BLANK

96GAM100 WI 1255

4^{00} Prepared for Community Mtg at the Q-Bldg

* See trip notes

Thursday, June 27

Charter from Bering leaving Gambell at 8 A.M. for Northeast Cape.

DEPART GAM 8:15 A

1st Basement Water Sample

Building water sample

4' x 4' crawl space w/ WOOD STAIRS

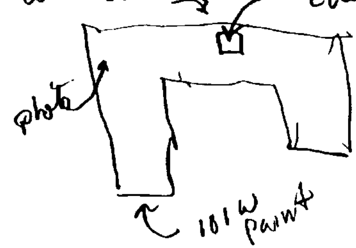
Water at depth of 12' from ground

Water 4' deep in cellar

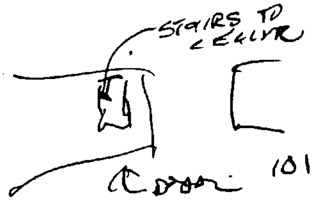
No sheen - water appears clean

additional 3' to

WINDOW window cellar



: pk Bldg 98



TAKE off 11:30 FROM NEC

ARR OME 12:30
JOHN SWOINSKI

Sample #'s

Bldg 100 DORM. + MS/MSD
Basement sampling
96 NEC 001 SW 1000
96 NEC 011 SW ~~1005~~ 1010 QC
DP DL ⇒ 96 NEC 021 SW 1015 QA
96 NEC 900SW → Trip Blanks 1040

Operations Bldg
96 NEC 002 SW 1030

Army Corps of Engineers

Northeast Cape, Alaska

Equipment Calibration Records

MONTGOMERY WATSON

EQUIPMENT CALIBRATION STANDARD FORM

Project: USACOE - NEC   Project Number: 298 0460
Personnel: B McLean D Quest   Date: 8-2-96
Weather: Clear cldy Rain ✓ Snow ____ Temperature 40°F Humidity ____

INSTRUMENTATION: Microtip
pH ____ PID 3000 IS EC ____ Explosimeter ____ OTHER ____

CALIBRATION:

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm) ~~(um/cm)~~	Meter Reading ~~@ 25~~	Comments
8/3	1045	103		103	Isobutylene & Zero

CALIBRATION CHECK: n/A

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm)	Meter Reading	Comments

MAINTENANCE AND/OR REPAIR: None noted   Report all problems to FOX BOSS

Date	Problem	Return to Mfg. for Repair	In-House Repair	Type of Maintenance or Repair *	Effective	Comments

* *Does not include charging batteries.*
Use one form for EACH piece of equipment
Comments should include whether or not it was a warranty repair, date equipment was repaired or was received from the manufacturer, and any other information you feel would be useful.

JMM James M. Montgomery

Note: If you run out of space in the maintenance and repair section please write on the back.

PROJECT NO. 18111

EQUIPMENT CALIBRATION STANDARD FORM

Project: LCS Area NEC Project Number: 2198-026C
Personnel: Elisa Truman V Harris Date: 8-3-96
Weather: Clear ____ Rain ✓ Snow ____ Temperature ____ Humidity ____

INSTRUMENTATION:
pH Beckman PID Microtip 3000 IS EC YSI 3000 Explosimeter ____ OTHER DO Hach

CALIBRATION:

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm) (um/cm)	Meter Reading @ 25 C	Comments
8/3	1130	air	103 ppm	103	Isobutylene
		Ø		Ø	Zero
8/3	1040	pH STD	pH 4 & 7	7 & 4	Self-calibrates
8/3	1100	EC	1413 umho	1407	
8/3	1110	DO	100% 8 ppm		self-calibrating

CALIBRATION CHECK: N/A

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm)	Meter Reading	Comments

MAINTENANCE AND/OR REPAIR: Report all problems to FOX BOSS

Date	Problem	Return to Mfg. for Repair	In-House Repair	Type of * Maintenance or Repair	Effective	Comments
none noted						

* *Does not include charging batteries.*
Use one form for EACH piece of equipment
Comments should include whether or not it was a warranty repair, date equipment was repaired or was received from the manufacturer, and any other information you feel would be useful.

JMM James M. Montgomery

Note: If you run out of space in the maintenance and repair section please write on the back.

PROJECT NO. 18111

EQUIPMENT CALIBRATION STANDARD FORM

Project: USACOE OEC　　Project Number: Z198 0460
Personnel: BMcLean DQuist　　Date: 8-4-91
Weather: Clear ✓　Rain ____　Snow ____　Temperature ____　Humidity ____

INSTRUMENTATION:
pH ____　PID ____　EC ____　Explosimeter ____　OTHER Radiological PUB1

CALIBRATION:

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm) (um/cm)	Meter Reading	@ 25 C Comments
8/4					Calibrated in factory
					paper work provided

CALIBRATION CHECK:

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm)	Meter Reading	Comments

MAINTENANCE AND/OR REPAIR:　　Report all problems to FOX BOSS

Date	Problem	Return to Mfg. for Repair	In-House Repair	Type of * Maintenance or Repair	Effective	Comments

* *Does not include charging batteries.*
Use one form for EACH piece of equipment
Comments should include whether or not it was a warranty repair, date equipment was repaired or was received from the manufacturer, and any other information you feel would be useful.

JMM James M. Montgomery

Note: If you run out of space in the maintenance and repair section please write on the back.

PROJECT NO. 18111

EQUIPMENT CALIBRATION STANDARD FORM

Project: USACOE - NEC Project Number:
Personnel: Date: 8-5-96
Weather: Clear Rain Snow Temperature Humidity

INSTRUMENTATION:
pH Beckman PID EC YSI 3000 Explosimeter OTHER

CALIBRATION:

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm) (um/cm)	Meter Reading @ 25 C	Comments
8/5	1040	pH STD	4 & 7	4.0 & 7.0	Full calibration
8/5	1045	14.3	um/cm	14.5	
8/5	1450	Isobutylene	103	103	2nd Zero =0

CALIBRATION CHECK: NA

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm)	Meter Reading	Comments

MAINTENANCE AND/OR REPAIR: none needed Report all problems to FOX BOSS

Date	Problem	Return to Mfg. for Repair	In-House Repair	Type of * Maintenance or Repair	Effective	Comments

* *Does not include charging batteries.*
Use one form for EACH piece of equipment
Comments should include whether or not it was a warranty repair, date equipment was repaired or was received from the manufacturer, and any other information you feel would be useful.

JMM James M. Montgomery

Note: If you run out of space in the maintenance and repair section please write on the back.

PROJECT NO. 18111

EQUIPMENT CALIBRATION STANDARD FORM

Project: USACE-Nee Project Number: 2198.0260
Personnel: Brodrean Date: 8-6-96
Weather: Clear ✓ Rain ____ Snow ____ Temperature ____ Humidity ____

INSTRUMENTATION:
pH ____ PID ____ EC ____ Explosimeter ____ OTHER Radiologic Victoreen #452

CALIBRATION:

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm) (um/cm)	Meter Reading @ 25 C	Comments
					Paper work on file
					Calibrated in factory

CALIBRATION CHECK:

Date	Time	Calibration Standard	Calibration Standard Concentration (ppm)	Meter Reading	Comments

MAINTENANCE AND/OR REPAIR: Report all problems to FOX BOSS

Date	Problem	Return to Mfg. for Repair	In-House Repair	Type of * Maintenance or Repair	Effective	Comments

* *Does not include charging batteries.*
Use one form for EACH piece of equipment
Comments should include whether or not it was a warranty repair, date equipment was repaired or was received from the manufacturer, and any other information you feel would be useful.

JMM James M. Montgomery

Note: If you run out of space in the maintenance and repair section please write on the back.

PROJECT NO. 18111

HAZCO S/N 3028
E/C: V450

Victoreen, Inc.

VICTOREEN

Survey Meter Calibration Report / Certificate of Calibration

Customer HAZCO SERVICES INC.

Cust PO # 101556 Victoreen # 41546

Model 450
Serial # 1554

CALIBRATION NOTES

Radiation levels are based on standards whose calibrations are traceable to the N.I.S.T..

The suggested re-calibration date is only a suggestion. The actual frequency of re-calibration may vary depending on Federal, state or local requirements.

During calibration the survey meter was positioned with the detector perpendicular to the beam axis.

The source used for calibration was Cs-137 .

All readings were corrected for Air Density. To determine the Air Density Correction Factor use the formula:

((273.2 + T) / 295.2) X (760 / P)

Where T = temperature in degrees Celsius
and P = barometric pressure in mm/Hg.

All readings below 10 mR/h were corrected for Background Radiation.

The formula for % Error is:

((Reading - Rate) / Rate) X 100

IMPORTANT

Any correction to the instrument readings (e.g. Air Density or Energy Dependence) are up to the user to apply. Care must be used in applying those factors.

The test response data is on page two (2) of this report.

6000 Cochran Road
Cleveland, Ohio 44139-3395
(216) 248-9300
FAX (216) 248-9301
TWX 810-421-8287

Victoreen, Inc.

VICTOREEN

Model 450 Serial #1554

CALIBRATION DATA

RATE

	Range (mR/h)	Rate (mR/h)	Reading (mR/h)	% Error	Comments
Background	0 - 5	N/A	0.021	N/A	
	0 - 5	3.68	3.61	-1.90	Cal Point
	0 - 5	1.16	1.13	-2.59	
	0 - 50	41.0	40.1	-2.20	Cal Point
	0 - 50	11.7	11.9	1.71	
	0 - 500	408	404	-0.98	Cal Point
	0 - 500	147	142	-3.40	
	(R/h)	(R/h)	(R/h)		
	0 - 5	4.03	3.97	-1.49	Cal Point
	0 - 50	40.7	40.2	-1.23	Cal Point

INTEGRATE

Range (mR)	Exposure (mR)	Reading (mR)		
0 - 50	13.6 mR	13.6	0.00	Cal Point

Calibrated by Robert Williams 24-Jun-96

Operational checkout by 20-Jun-96

Suggested re-cal date 24-Jun-97

Traceable to the N.I.S.T.
Test No DG9852/95
Dated Jan. 25, 1995
PTW Chamber Model N23331
Serial No. 174

Temperature 22.5 °C

Humidity 50 %

6000 Cochran Road
Cleveland, Ohio 44139-3395
(216) 248-9300
FAX (216) 248-9301
TWX 810-421-8287

Army Corps of Engineers

Northeast Cape, Alaska

Field Forms

MONTGOMERY WATSON

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site 10

Sample ID 96NEC10SS101 → 106	**Date** 8 / 5 / 96 (month / day / year)	**Time** 1615 → 1655

Sample Type

Surface Soil [X] Depth (ft) 6" – 1 foot	**Surface Water** [ ] Temperature (°C) ____ Conductivity (umhos/cm) ____ pH ____ TDS (mg/l) ____ BOD (mg/l) ____	**Wipe** [ ]
		Lead Paint Chip [ ]
Sediment [ ]		**TCLP Core Samples** [ ]
		Asbestos [ ]

Field Information

Field Team Elise Bonnie Victor Doug

Sampler Elise Tuzman

PID (ppm)

ELISA screening <less than >greater than spectrophotometer

DRO 100 1000	GRO 50 200	PCB 5 50

Weather Snow Rain Sleet Hail Clear (circled) Foggy Overcast Partly Cloudy

Ambient Temperature (°C) 5 °C

Photo Yes No
Roll # Frame #

Shipping Information

Chain of Custody Number

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

Victor =)

North

Comments
Sampled for DRO, TRPH

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site 10

Sample ID 96NE [illegible]	Date 8 / 5 / 96 (month / day / year)	Time 1645

Sample Type

Surface Soil [X]	Surface Water [ ]	Wipe [ ]
Depth (ft) 6" - 1 foot	Temperature (°C)____	Lead Paint Chip [ ]
Sediment [ ]	Conductivity (umhos/cm)____	TCLP Core Samples [ ]
	pH ____	Asbestos [ ]
	TDS (mg/l)____	
	BOD (mg/l)____	

Field Information

Field Team: [illegible]	Weather: Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler: Elise Turner	
PID (ppm)	Ambient Temperature (°C) 5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	Photo Yes No; Roll # Frame #

Shipping Information

Chain of Custody Number	Swing Tie Data
Shipped Via: Goldstreak UPS FedEx DHL	
Date Shipped	North
Airbill Number	

Comments: Sampled for DRO, TPH

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Site ID

Sample ID 96 NE 10 SS 107	Date 8 / 6 / 96 (month / day / year)	Time 1315

Sample Type

Surface Soil [X]	Surface Water [ ]	Wipe [ ]
Depth (ft) 6" - 1 foot	Temperature (°C) ______	Lead Paint Chip [ ]
	Conductivity (umhos/cm) ______	
Sediment [ ]	pH ______	TCLP Core Samples [ ]
	TDS (mg/l) ______	
	BOD (mg/l) ______	Asbestos [ ]

Field Information

Field Team Elise Bonnie Victor D...	**Weather** Snow Rain Sleet Hail **Clear** Foggy Overcast Partly Cloudy
Sampler Elise Thompson	
PID (ppm)	**Ambient Temperature (°C)** 8°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No — Roll # Frame #

Shipping Information

Chain of Custody Number	**Swing Tie Data**
Shipped Via Goldstreak UPS FedEx DHL	North
Date Shipped	
Airbill Number	

Comments Sampled for PCB

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96 NE IC SS 128	**Date** 7 / 5 / 96 (month / day / year)	**Time** 1700	

Sample Type

Surface Soil [X] Depth (ft) 6" - 1 foot	**Surface Water** [ ] Temperature (°C)____ Conductivity (umhos/cm)____ pH ____ TDS (mg/l)____ BOD (mg/l)____	**Wipe** [ ]
Sediment [ ]		**Lead Paint Chip** [ ]
		TCLP Core Samples [ ]
		Asbestos [ ]

Field Information

Field Team Elise Bonnie V. ...	**Weather** Snow Rain Sleet Hail Clear (circled) Foggy Overcast Partly Cloudy
Sampler Elise Tr...man	
PID (ppm)	**Ambient Temperature (°C)** 5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No Roll # Frame #

Shipping Information

Chain of Custody Number	**Swing Tie Data**
Shipped Via Goldstreak UPS FedEx DHL	
Date Shipped	North
Airbill Number	

Comments

Sampled for LRO Test

Revision Date 4/29/96

5-Aug-96 NEC

600 gal water tank on from
clean tanks (400K) every 2-3
years because of RUST. Water
flush-out drain hole
NE side.

Tank 2 wind pipe broken.
700 gallons never used
7' was not used except
fixed.

Wind blew small tank (gasoline)

- ALL RAINDEER travel into wind
- so do POLAR BEAR
- POLAR BEAR ONLY TURN
AND LOOK IN 1 direction)

NOT USED

5-AUG-96 NEC

SWING TIES AT SITE 10

LOCATION	10-1 DIST (feet)	T-1 DISTANCE (FEET)	
10 SS 107	36.2	143.3	PCB (6-Aug), DRO, TRPH
108	34.3	127	DRO, TRPH
102	67.7	159.8	
103	80	181	
104	98.2	203.6	
101	79'	142	

BARREL reference → T-1 137.8
T-1 → GRID REF 1 133'

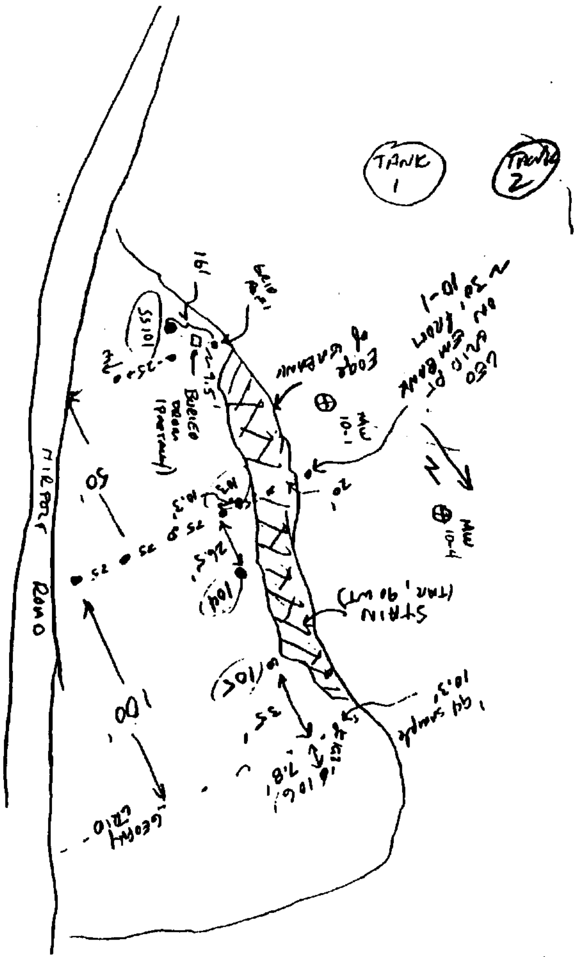
LOCATION	10-1 DIST (ft)	10-4 DIST (ft)
104	98.2	124.7
105	118'	131.3
106	148'	144.8

Depth to water 10-1
54 1/8" BTOC PVC PVC STICKUP 1.8'
PAD BROKEN 10-3 2
DTW 3.85 BTOC PVC PVC STICKUP 2.3'

NOT USED

5-AUG-96 NEC

SKETCH OF SAMpling - Site 10



Further swing ties 5-A '6 NEC

Site 10

DRO, TRPH

101 → BANK	39.3	
101 → 102	42.6	
101 → 103	68.5	"BANK" = area where relatively flat pad slopes down to D.B.
101 → 104	99'	
101 → 105	132.5	
101 → 106	178.5	
102 → BANK	17.8	
103 → BANK	34.7	
104 → BANK	42.5	
105 → BANK	34.5	
106 → BANK	18.6	

LS-8535 1994 Lounsbury → 106 35.7'

NOT USED

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96 NE 27 SS 101 - 105	**Date** 8 / 6 / 96 (month / day / year)	**Time** 1300 - 1330

Sample Type

Surface Soil X Depth (ft) 6" - 1 foot	**Surface Water** Temperature (°C) ____ Conductivity (umhos/cm) ____ pH ____ TDS (mg/l) ____ BOD (mg/l) ____	**Wipe** ☐
		Lead Paint Chip ☐
Sediment ☐		**TCLP Core Samples** ☐
		Asbestos ☐

Field Information

Field Team E. ..., Bonnie, Don, Vic...	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler Doug Quint	
PID (ppm))	**Ambient Temperature (°C)** 8°C
ELISA screening <less than >greater than spectrophotometer	**Photo** Yes No Roll # Frame #

ELISA	DRO 100 1000	GRO 50 200	PCB 5 50
screening	|	|	|
spectrophotometer	____	____	____

Shipping Information

Chain of Custody Number

Shipped Via
Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

Victor ⇒

North

Comments

Sampled for DRO

QA/QC taken at 101

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96 NEC 27SS106-108 | **Date** 8 / 6 / 96 (month / day / year) | **Time** 1300 1255 1245

Sample Type

Surface Soil [X]	Surface Water [ ]	Wipe [ ]
Depth (ft) 6"-1'	Temperature (°C)____	Lead Paint Chip [ ]
Sediment [ ]	Conductivity (umhos/cm)____	TCLP Core Samples [ ]
	pH ____	Asbestos [ ]
	TDS (mg/l)____	
	BOD (mg/l)____	

Field Information

Field Team Chris Baron, Doug, Victor

Sampler Elena Tugman

PID (ppm)

ELISA screening <less than >greater than spectrophotometer

DRO 100 1000	GRO 50 200	PCB 5 50

Weather Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy

Ambient Temperature (°C) 8 °C

Photo Yes No

(Victor in foreground) Roll # ET2 Frame # 16

Shipping Information

Chain of Custody Number

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

Victor =)

North

Comments

Sample for DRO, PCBs at Site 27, North of Heat + Electric Bldg (Bldg 110)

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NEC27SS109	Date 8 / 6 / 96 (month / day / year)	Time 1310

Sample Type

Surface Soil [X] Depth (ft) 6"-1'	Surface Water [ ] Temperature (°C) ___ Conductivity (umhos/cm) ___ pH ___ TDS (mg/l) ___ BOD (mg/l) ___	Wipe [ ]
Sediment [ ]		Lead Paint Chip [ ]
		TCLP Core Samples [ ]
		Asbestos [ ]

Field Information

Field Team: Glen, Bonnie, Dove, Victor	Weather: Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler: ~~Dave~~ Doug Quist ~~Glen Victor~~	
PID (ppm) 0	Ambient Temperature (°C) 8°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	Photo Yes No — Roll # ET2 Frame # 17

Shipping Information

Chain of Custody Number

Shipped Via: Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

Victor →

North

Comments

Sampled for PCBs
North of entrance to Heat + Electric Bldg (Bldg 110)
Soil has petroleum look + odor

Revision Date 4/29/96

although some dried dead vegetation is noted (natural phenomena?) Large (1" ø) insulated (5 strands) running through an lorace field here

SWING TIES - SITE 27

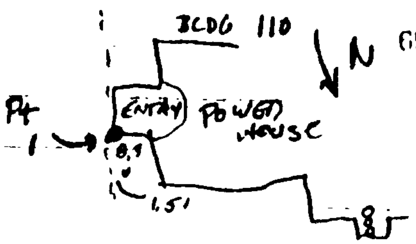
MW 27-1 to:

LOC	FT
105	61' (across road)
104	64.5
102	88.0
101	81.6
103	47.5
109	74.8
106	42.8
107	77.6
108	103.9

MW 13-1 to

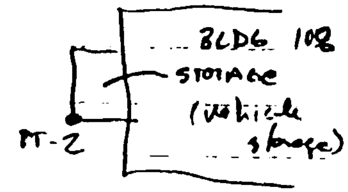
108	29.5
107	46.3
106	77.5
109	66.4
101	133.1

103	131.1
104	160.3'
102	162.5'
105	177.3'



Pt 1 to:

109	8.3'
106	61.4'
107	64.2'
108	77.8'



Pt 2 to:

101	12'
103	45'
105	100.1'
104	52.9
102	33.1

NOTE ROAD (current) IS 65' to 85' ALONG THIS TRAVERSE

NOTE 102 IS IN LINE w/ face of GARAGE BAY 19.7 from edge 115' from 19-1 [illegible]

5 lb can of grease noted at 20,000 gallon UST

Rationale for sampling
- entire area noted on p 70
p 70 is STAINED to some degree
- obviously contaminated

(cont p 71)

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NECDB SS101 -> 103	**Date** 8 / 4 / 96 (month / day / year)	**Time** 1440 - 1500	

Sample Type

Surface Soil [X]	Surface Water [ ]	Wipe [ ]
Depth (ft) 6" - 1 foot	Temperature (°C) ______	Lead Paint Chip [ ]
Sediment [ ]	Conductivity (umhos/cm) ______	TCLP Core Samples [ ]
	pH ______	Asbestos [ ]
	TDS (mg/l) ______	
	BOD (mg/l) ______	

Field Information

Field Team Elise Bonne, Doug, Victor	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler Elise Tuzman	
PID (ppm)	**Ambient Temperature (°C)** ~5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No; Roll # Frame #

Shipping Information

Chain of Custody Number	
Shipped Via Goldstreak UPS FedEx DHL	
Date Shipped	
Airbill Number	

Swing Tie Data

Victor's

North

Comments

Sampled for PCBs to delineate PCB source in (floor drain) drainage basin

Revision Date 4/29/96

4-AUG-NEC

swing first:

SO toward TANK @ Power house

MANHOLE ~~NO~~ to SS SO 101 = 4' (south)

MANHOLE → SF 6, ~~SW~~ SO 109 DB = 43' NO (down drainage)

MH → DBSS 102 98' ACROSS RIDGE

MH → SF 5 79' ACCROSS RIDGE

MH → SD 110 (DB) 94' ACCROSS RIDGE

MH → SS 103 (DB) 134' " "

MH → SW/SD 101 (DB) = 142'

27-1 → SF 5 = 131'

27-1 → SD 110 = 132.5'

27-1 → SS 103 = 131'

27-1 → SW/SD 101 = 202.5

NOTE: SS 103 IS IN-LINE between MW-27-1 AND SW/SD 101 (DB)

14:15 Eugene stops by. He forgot to tell me that AF had 1 or two locations where they stored live AMMO in "caves". plonel pit? MK well? The AMMO is still there - DIAMOND shaped

4-Aug-NEC

Note: the 5 PCB samples (2 seds, 3 SS) are for the purpose of finding potential source of PCBs. DRO not taken, because there is no doubt that they will come up very high. HC contamination is obvious based on visual/sheen/odor

SWING TIES con't

DB SW/SD 1 → 2 = 133'

GROUND TRUTH AREA N.O. Divide N.O TANK DRAINAGE noted EARLIER during 1-AUG SF w/ QUIST. This appears to be organic sheen, NOT HC - NO ODOR - Resolves question of how they got there (p 46)

14:45 Eugene could not find loc of buried ammo (he never saw it personally during AF occupation, it was reported to him by "KIDS". He did find lots of 12-gauge SG shells near MK well - probably skeet SHOOT AREA

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Sample ID	96NEC SW/SD 101,201,301
Date (month / day / year)	8 / 4 / 96
Time	1200

Sample Type

Surface Soil	Surface Water ☒	Wipe ☐
Depth (ft)	Temperature (°C) 10°C	Lead Paint Chip ☐
	Conductivity (umhos/cm) 75	
Sediment / Sludge ☒ green, silt organics	pH 6.29	TCLP Core Samples ☐
	DO ~~TDS (mg/l)~~ 11	
	BOD (mg/l)	Asbestos ☐

Field Information

Field Team: Elise, Bonnie, Doug, Victor	Weather: Snow Rain Sleet Hail Clear (circled) Foggy Overcast Partly Cloudy
Sampler: Elise Tuzman	
PID (ppm)	Ambient Temperature (°C) ~5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	Photo Yes No; Roll # Frame #

Shipping Information

Chain of Custody Number

Shipped Via: Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

Victor ⇒

North

Comments

QA/QC taken here for SW + SD
Samples collected for DRO + PCB

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NEC DB SD/SW 102	Date 8 / 4 / 96 (month / day / year)	Time 1230

Sample Type

Surface Soil ☐	Surface Water ☒	Wipe ☐
Depth (ft)	Temperature (°C) 8	Lead Paint Chip ☐
Sediment ☒ sheen, silt organics.	Conductivity (umhos/cm) 90	TCLP Core Samples ☐
	pH 6.66	Asbestos ☐
	DO ~~TDS~~ (mg/l) 9.8	
	~~BOD~~ (mg/l)	

Field Information

Field Team: Elise Bonnie, Doug, Victor	Weather: Snow Rain Sleet Hail **Clear** Foggy Overcast Partly Cloudy
Sampler: Elise Tuzman	Ambient Temperature (°C) ~ 5°C
PID (ppm) 0	Photo: Yes No
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	Roll # Frame #

Shipping Information

Chain of Custody Number	Swing Tie Data: Victor →
Shipped Via: Goldstreak UPS FedEx DHL	North
Date Shipped	
Airbill Number	

Comments

Samples collected for DRO + PCB

Sheen seen on surface water

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NECDBSW/SD103	**Date** 8 / 4 / 96 (month / day / year)		**Time** 1310

Sample Type

Surface Soil ☐ Depth (ft)	**Surface Water** ☒ Temperature (°C) 9.8 Conductivity (umhos/cm) 100 pH 7.13 DO ~~TDS~~ (mg/l) 7.9 BOD (mg/l)	**Wipe** ☐
Sediment ☒ Sheen. Silt, organics		**Lead Paint Chip** ☐ **TCLP Core Samples** ☐ **Asbestos** ☐

Field Information

Field Team Elise Bonner Doug Victor	**Weather** Snow Rain Sleet Hail Clear (circled) Foggy Overcast Partly Cloudy
Sampler Elise Tiegman	
PID (ppm) 0	**Ambient Temperature (°C)** ~5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No Roll # Frame #

Shipping Information

Chain of Custody Number	**Swing Tie Data** Victor ⇒ North
Shipped Via Goldstreak UPS FedEx DHL	
Date Shipped	
Airbill Number	

Comments

visible sheen in pockets

Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NEC DBSW/SD 104	**Date** 8/4/96 (month / day / year)	**Time** 1320	

Sample Type

Surface Soil ☐ Depth (ft)	**Surface Water** ☒ Temperature (°C) 4 Conductivity (umhos/cm) 110 pH 7.15 DO ~~TDS~~ (mg/l) 5.7 ~~BOD~~ (mg/l)	**Wipe** ☐
Sediment ☑ silts, clays, green 'sludge' deposits, organics		**Lead Paint Chip** ☐ **TCLP Core Samples** ☐ **Asbestos** ☐

Field Information

Field Team Elise Bonnie Doug Victor	**Weather** Snow Rain Sleet Hail Clear (circled) Foggy Overcast Partly Cloudy
Sampler Elise Tuzman	
PID (ppm) 0	**Ambient Temperature (°C)** ~5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No Roll # Frame #

Shipping Information

Chain of Custody Number
Shipped Via Goldstreak UPS FedEx DHL
Date Shipped
Airbill Number

Swing Tie Data

Victor →

North

Comments

visible sheen in banks

DRO + PCB sampled

Rev Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NECDBSW/SD 105	**Date** 8 / 4 / 96 (month / day / year)	**Time** 1340	

Sample Type

Surface Soil [X] Depth (ft)	**Surface Water** [X]	**Wipe** [ ]
	Temperature (°C) 10°C	**Lead Paint Chip** [ ]
	Conductivity (umhos/cm) 75	
Sediment [X] sheen, silt organics	pH 6.98	**TCLP Core Samples** [ ]
	DO ~~TDS~~ (mg/l) 8.1	
	BOD (mg/l)	**Asbestos** [ ]

Field Information

Field Team Elise Bonnie Doug Victor	**Weather** Snow Rain Sleet Hail Clear (circled) Foggy Overcast Partly Cloudy
Sampler Elise Tuzman	
PID (ppm) 0	**Ambient Temperature (°C)** ~5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No; Roll # Frame #

Shipping Information

Chain of Custody Number

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

Victor ⇒

North

Comments

sheen in pockets + along banks

DRO + PCB Sampled

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NECDBSW/SD106	**Date** 8/14/96 (month / day / year)	**Time** 1405	

Sample Type

Surface Soil ☐	Surface Water ☒	Wipe ☐
Depth (ft)	Temperature (°C) 9 °C	Lead Paint Chip ☐
	Conductivity (umhos/cm) 80	TCLP Core Samples ☐
Sediment ☒ silt, organics	pH 7.03	
	DO ~~TDS~~ (mg/l) 8.0	Asbestos ☐
	BOD (mg/l)	

Field Information

Field Team [illegible] Doug Victor	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler Lise Tugman	
PID (ppm)	**Ambient Temperature (°C)**
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000, GRO 50 200, PCB 5 50	**Photo** Yes No; Roll # Frame #

Shipping Information

Chain of Custody Number	**Swing Tie Data** Victor ⇒
Shipped Via Goldstreak UPS FedEx DHL	North
Date Shipped	
Airbill Number	

Comments DRO + PCB Sampled wetlands + grasses

Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Sample ID 96NECDBSWSD107	Date 8 / 4 / 96 (month / day / year)	Time 1420

Sample Type

Surface Soil ☐	Surface Water ☒	Wipe ☐
Depth (ft)	Temperature (°C) 9°C	Lead Paint Chip ☐
	Conductivity (umhos/cm) 50	
Sediment ☒	pH 7.29	TCLP Core Samples ☐
silt, organic	DO ~~TDS~~ (mg/l) 7.9	
	~~BOD~~ (mg/l)	Asbestos ☐

Field Information

Field Team: Elise Boivie, Doug Victor	Weather: Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler: Elise Tuzman	
PID (ppm)	Ambient Temperature (°C) ~5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	Photo Yes No; Roll # Frame #

Shipping Information

Chain of Custody Number

Shipped Via: Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

Victor ⇒

North

Comments

Along unnamed creek
east of junction b/w drainage basin
- creek
DRO + PCB Sampled
No sheen observed

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Sample ID 96NECDBSW/SD108	**Date** 8/4/96 (month day year)	**Time** 1430	

Sample Type

Surface Soil [ ] Depth (ft)	**Surface Water** [X]	**Wipe** [ ]
	Temperature (°C) 9°C	**Lead Paint Chip** [ ]
	Conductivity (umhos/cm) 50	
Sediment [X] Sand, little organics	pH 7.17	**TCLP Core Samples** [ ]
	DO ~~TDS~~ (mg/l) 7.3	**Asbestos** [ ]
	BOD (mg/l)	

Field Information

Field Team -- Bonnie Doug, Victor	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler Elise Tuxman	
PID (ppm) 0	**Ambient Temperature (°C)** ~5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000, GRO 50 200, PCB 5 50	**Photo** Yes No Roll # Frame #

Shipping Information

Chain of Custody Number

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

Victor ⇒

North

Comments
sheen observed upon sediment disruption
DRO + PCB sampled
@ unnamed creek - west of drainage basin + creek junction

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Sample ID 96 NEC DBSD 109, 110	**Date** 8 / 4 / 96 (month / day / year)	**Time** 1505; 1510

Sample Type

Surface Soil ☐ Depth (ft)	**Surface Water** ☐ Temperature (°C) ____ Conductivity (umhos/cm) ____ pH ____ TDS (mg/l) ____ BOD (mg/l) ____	**Wipe** ☐
Sediment ☒		**Lead Paint Chip** ☐
		TCLP Core Samples ☐
		Asbestos ☐

Field Information

Field Team Elise Bonne, Doug Victor	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler Elise Tuzman	
PID (ppm) 0	**Ambient Temperature (°C)** 5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No Roll # Frame #

Shipping Information

Chain of Custody Number
Shipped Via Goldstreak UPS FedEx DHL
Date Shipped
Airbill Number

Swing Tie Data

Victor =)

North

Comments

Sampled for PCBs for source determination at drainage basin.

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NECDBSD111	**Date** 8/6/96 (month / day / year)	**Time** 1515

Sample Type

Surface Soil ☐	Surface Water ☐	Wipe ☐
Depth (ft)	Temperature (°C) ____	Lead Paint Chip ☐
	Conductivity (umhos/cm) ____	
Sediment ☒ 600' west of SW/SD #8 along unnamed creek	pH ____	TCLP Core Samples ☐
	TDS (mg/l) ____	
	BOD (mg/l) ____	Asbestos ☐

Field Information

Field Team Elise Bonnie Doug Victor	**Weather** Snow Rain Sleet Hail Clear (circled) Foggy Overcast Partly Cloudy
Sampler Elise Tuzman	
PID (ppm) 0	**Ambient Temperature (°C)** 8°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes (circled) No — Roll # ET2 Frame # 20, 21

Shipping Information

Chain of Custody Number

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

North

Comments

Sampled for DRO + PCB
Sheen observed upon sediment disturbance

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96NECDBSD112	**Date** 8 / 6 / 96 (month / day / year)
Time 1630	

Sample Type

Surface Soil ☐ Depth (ft)	**Surface Water** ☐ Temperature (°C) ____ Conductivity (umhos/cm) ____ pH ____ TDS (mg/l) ____ BOD (mg/l) ____	**Wipe** ☐
Sediment ☒ 2500' west of SW1SD#8 along unnamed creek		**Lead Paint Chip** ☐
		TCLP Core Samples ☐
		Asbestos ☐

Field Information

Field Team Elise Bernie, Doug, Victor	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler ~~Eli~~ DOUG QUIST	
PID (ppm)	**Ambient Temperature (°C)** 8°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No — Roll # ET2 Frame # 26

Shipping Information

Chain of Custody Number	**Swing Tie Data** North
Shipped Via Goldstreak UPS FedEx DHL	
Date Shipped	
Airbill Number	

Comments

Sampled for DRO + PCB
No sheen observed

Revision Date 4/29/96

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96 NE LB SL 113 | **Date** 8 / 7 / 96 (month / day / year) | **Time** 1700

Sample Type

- **Surface Soil** ☐ — Depth (ft)
- **Sediment** ☒
- **Surface Water** ☐
  - Temperature (°C) ______
  - Conductivity (umhos/cm) ______
  - pH ______
  - TDS (mg/l) ______
  - BOD (mg/l) ______
- **Wipe** ☐
- **Lead Paint Chip** ☐
- **TCLP Core Samples** ☐
- **Asbestos** ☐

Field Information

Field Team Elise, Bonnie, Dave, Victor

Sampler Bonnie McLean

PID (ppm)

ELISA screening <less than >greater than spectrophotometer

DRO	GRO	PCB
100 1000	50 200	5 50

Weather Snow, Rain, Sleet, Hail, Clear, Foggy, Overcast, Partly Cloudy

Ambient Temperature (°C) 4 °C

Photo Yes No

Roll # Frame #

Shipping Information

Chain of Custody Number

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

North

Comments Sampled for LKS PCL

Revision Date 4/29/96

NEC - 3-Aug-96

9:12 warm up (run-up)
9:19 - Rotate.
10:18 - pass over NEC
10:22 touch down
10:58 - DC-3 lv NEC

13:00 → 14:00 Bonnie, Vic mob
Equip to Bldg 98
Set trash pump on
5491R well. Water clear -
odorless. Start pump
@ 14:01 - prevent erosion -
discharge to lower pad

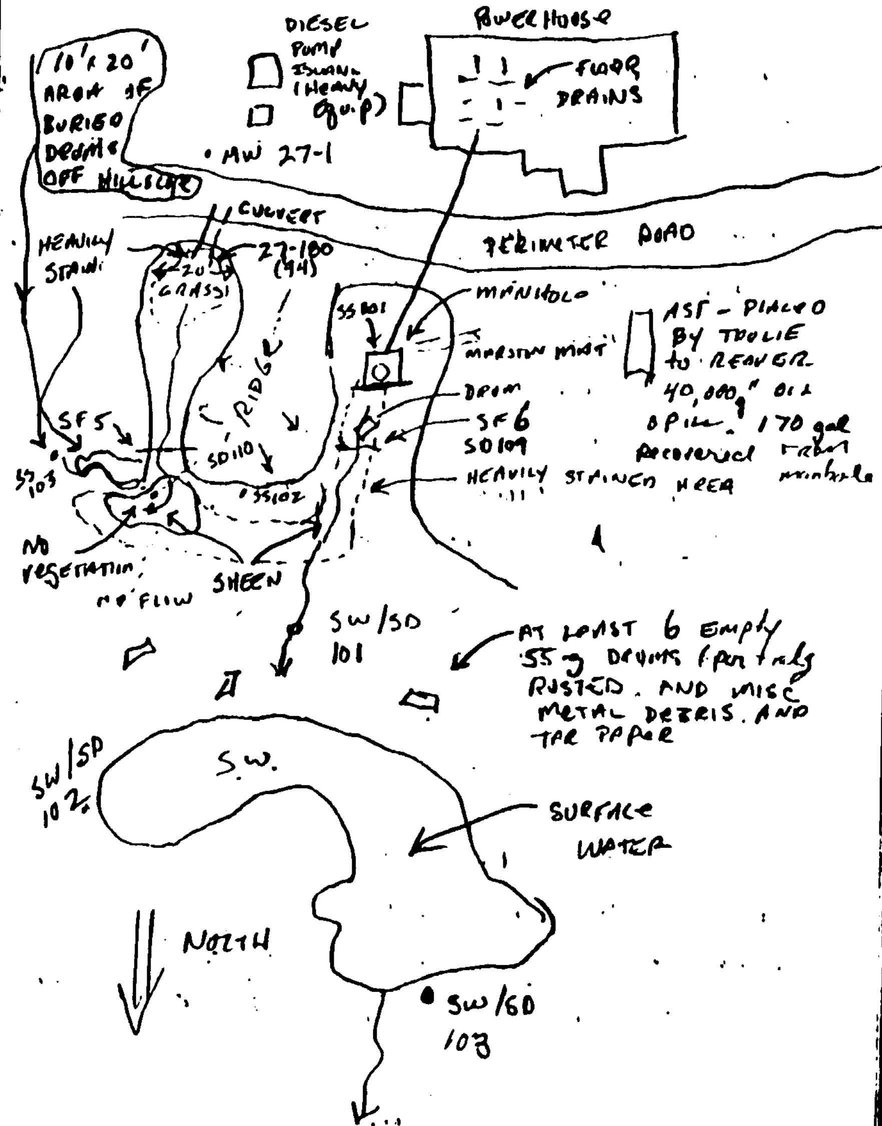
15:30 Doug & Elise work ~ 14:15
work on generator, phone
stow gear

16:15 check trash pump @
bldg 98. Dropped 21"
and out of gas. 1 tank
= ~1.5 hrs. Check at 5:30

NOT USED

NEC 3-AUG 96

16:30
Elise & Vic stake locs for
SW/SD in drainage basin



NOTE DRUMS SCATTERED
IN DB (at least 10)

4-AUG-NEC

13

swing ties:

SO toward tank @ Powerhouse

MANHOLE ~~NO~~ to SS SO 101 = 4' (south)

MANHOLE → SF 6, ~~SW~~ SO 109 DB = 43' NO (down drainage)

MH → DBSS 102 98' ACROSS RIDGE

MH → SF 5 79' ACCROSS RIDGE

MH → SD 110 (DB) 94' ACCROSS RIDGE

MH → SS 103 (DB) 134' " "

MH → SW/SD 101 (DB) = 142'

27-1 → SF 5 = 131'

27-1 → SD 110 = 132.5'

27-1 → SS 103 = 131'

27-1 → SW/SD 101 = 202.5

NOTE: SS 103 IS IN-LINE between MW-27-1 AND SW/SD 101 (DB)

14:15 Eugene stops by. He forgot to tell me that AF had 1 or two locations where they stored live AMMO in "caves". gravel pit? MK well? The AMMO is still there - DIAMOND shaped

4-Aug-NEC

Note: the 5 PCB samples (2 seds, 3 ss) are for the purpose of finding potential source of PCBs. DRO not taken, because there is no doubt that they will come up very high. H.C. contamination is obvious based on visual/sheen/odor

SWING TIES con't

DB SW/SD 1 → 2 = 133'

GROUND TRUTH FROM N.O. DIVIDE N.O TANK DRAINAGE noted EARLIER during 1-AUG SF w/ QUIST. This appears to be organic sheen, NOT HC - NO ODOR - Resolves question of how they got there (p 46)

14:45 Eugene could not find loc of buried ammo (he never saw it personally during AF occupation, it was reported to him by "KIDS". He did find lots of 12-gauge SG shells near MK well - probably skeet SHOOT AREA

4-AUG-96 NEC

SWING TIES CONT' (DB).
SW/SD 101 → 103 : 221'
AT THIS LOC SW ENDS AND
~~con~~ channel constricts to about
30' of grass w/ SHALLOW SW

BEGIN TRAVERSE down DB
LOCATION OF SF7 observation
IS SW/SD 103 + ~~130'~~ at this loc
3 drums and ~~sheet~~ metal (aluminum)
NOTED

SW/SD DB/103 + 200' = 20' NARROW GRASSY
channel w/ ~2' STREAM bed flow
(surface ≥ 10gpm?)

SW/SD 104 IS 200' + 44' from
SW/SD 103 channel (2-3')
WINDS THROUGH LOW grassy
AREA - NO ~~stan~~ veg affect

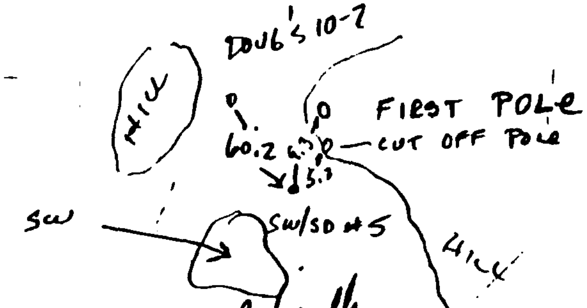
200' from SW/SD 104 - BROAD
GRASSY channel ~50' wide
DOUG'S SW/SD 10-2 '94 stake
IS 80' FURTHER

4-AUG-96 NEC

START AT SW/SD 103 (221' from 101)
SF 7 = SW 103 + 130
(200 SPOT)
SW 104 = SW 103 + 244
(200 SPOT)
DOUG'S 10-2 = SW 104 + 200 + 80

FIRST POLE IS SW 104 + 200 + 80 + 38

SW 5 IS SW 104 + 200 + 80 + 47



SW 5 is laterally
ADS TO CUT off & pole #1

MARK SD 5 + 200. Moose (Vole?) Noted
MARK ANOTHER 200
SD 6 IS SD5 + 200 + 200 + 74
second pole is SD5 + 200 + 200 + 79
Note this is loc of SF3

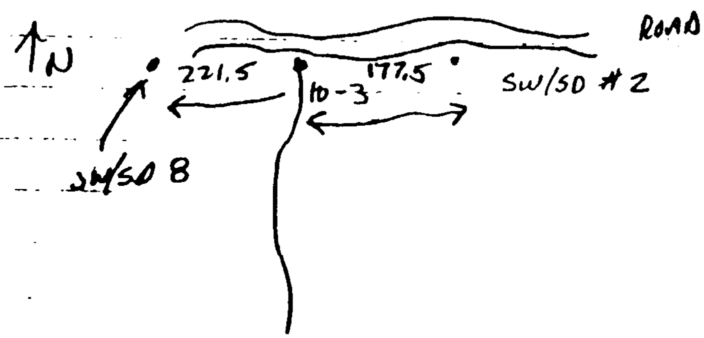
81 9C

4-Aug-96 NEC

Mock location ~~SF~~ SD 5+600
PHOTO

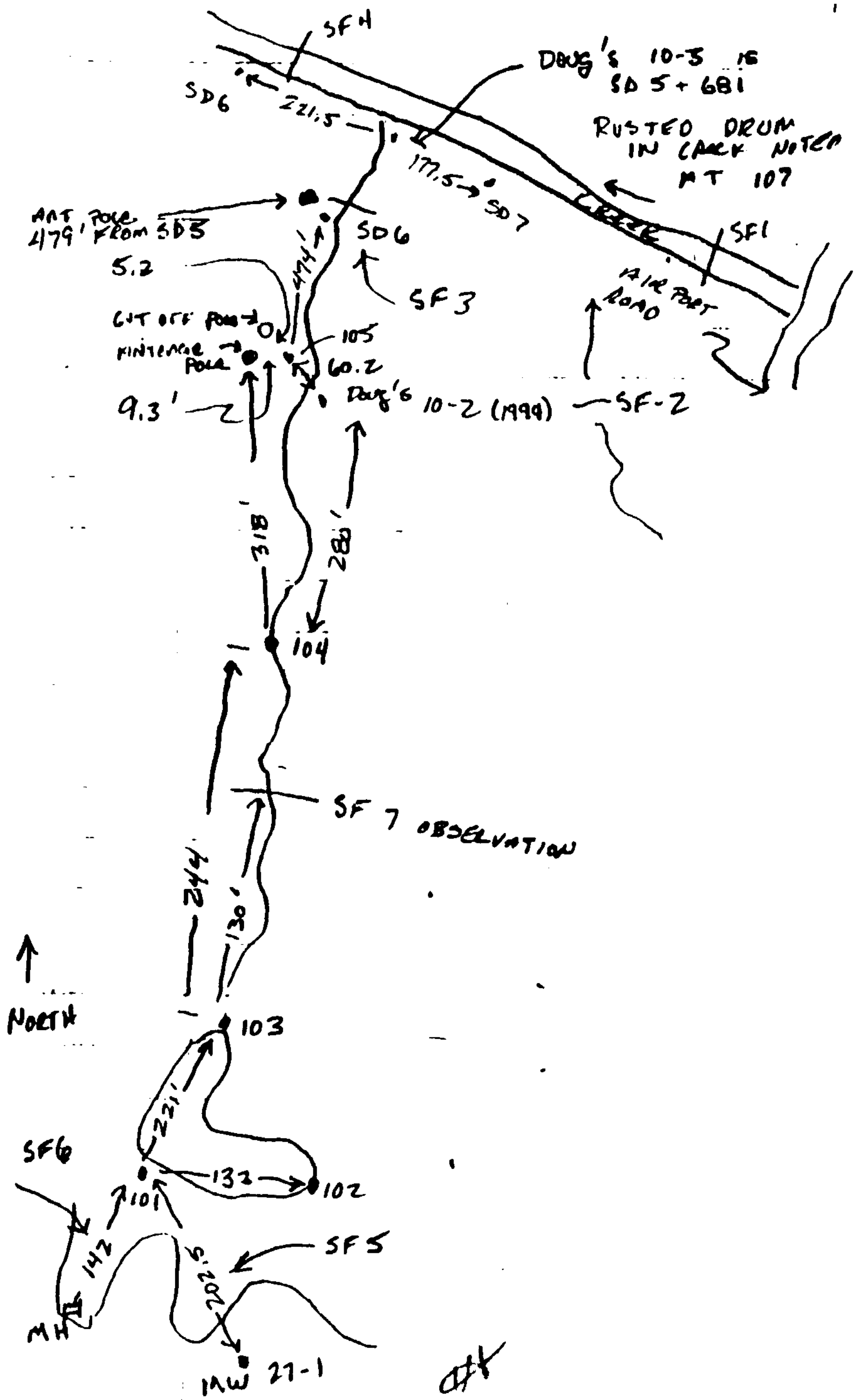
Doug's SW/SD 10-3 (94) is
DB SD 5 + 600 + 81
℄ Main creek is SD5+600+96
Photo

Loc of SF 4 250' EAST



16.15 Mob to airport
Note that SD 8 mag
~~be~~ resampled (did not get H.C)
Mob gear for partial demob
4 pax + 1300 lbs gear
piper cheyenne N218CS
pilot: Kevin
Rotate 17:18
Land OME 17:59.

4-AUG-96 NEC



dH

Drum/Tank Survey

Project [illegible]
Site [illegible]
Location [illegible]
Date 8/3/96
Drum/Tank # 2-1
Sample # NONE
Time 1530

Size: (gals) 1,000
Dimensions: (ft)
Openings: #
Size
Piping: Size

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:		
Size		
Top		
Markings:		
Keyword		
Color		

Conditions: [illegible]

Content: State
Amount
Color
Odor
PID Reading ✓

Phase
Sheen ✓
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive			≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown
1 radioactive
2 acid/oxidizer
3 caustic/reducer/cyanide
4 flammable organic
5 nonflammable organic
6 peroxide
7 air or water reactive
8 inert ✓

CHEMICAL ANALYSIS:

NONE

TANK [illegible]

MONTGOMERY WATSON

Drum/Tank Survey

Project Nutrient [illegible]
Site 4
Location [illegible]

Date 8/3/96
Drum/Tank # 4-1
Sample # None
Time

Size: (gals) 10,000
Dimensions: (ft) 10' D x 25'
Openings: #
Size
Piping: Size

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	[illegible]	
Size		
Top		
Markings:	[illegible]	
Keyword	Ø	
Color		

Conditions: AST INTEGRITY GOOD

Content: State
Amount
Color
Odor
PID Reading ✓

Phase
Sheen ✓
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		Ø	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	✓

CHEMICAL ANALYSIS:

Empty

MONTGOMERY WATSON

Drum/Tank Survey

Project Northeast Corner Phase I
Site 4
Location
Size: (gals) 250
Dimensions: (ft) 42" X 66
Openings: # No lid
Size 18"
Piping: Size

Type: metal ✓
plastic
other

Date 8/3/96
Drum/Tank # 4-2
Sample # 96NE04TK101
Time

	Prim.	Sec.
Color:	Blue	Silver
Size		
Top		
Markings:	Ø	Ø
Keyword	Ø	Ø
Color		

Conditions:

Content: State
Amount
Color
Odor
PID Reading

Phase Ø
Sheen Ø
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		✓	≥ 1mR over background
Acidic		✓	pH ≤ 3
Caustic		✓	pH ≥ 12
Air Reactive		✓	Reaction of ≥ 10-F temp. change
Water Reactive		✓	Reaction of ≥ 10-F temp. change
Water Soluble	✓		Dissolves in water
Water Bath OVA		✓	Reading= ≥ 10 ppm = Yes
Combustible		✓	Catches fire when torched in water bath
Halide		✓	Green flame when heated w/copper
Inorganic	✓		Water Bath OVA and Combustible = No
Organic		✓	Inorganic = No
Alcohol/Aldehyde		✓	Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide		✓	Draeger tube over water bath ≥ 2 ppm
Flammable		✓	Combustible = Yes and SETA flashpoint ≤140-F
Oxidizer		✓	Starch iodine paper shows positive reaction
Inert or Other	✓		Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	✓

CHEMICAL ANALYSIS:

BETX, TRPH

MONTGOMERY WATSON

Drum/Tank Survey

Project ______________________ Date 8/3/96
Site 13 Drum/Tank # 13-1
Location ______________________ Sample # None
Time ______________________

Size: (gals) 500
Dimensions: (ft) 4'x8
Openings: # ______
Size ______
Piping: Size 4"

Type: metal ✓
plastic ______
other ______

	Prim.	Sec.
Color:	rust	
Size		
Top		
Markings:		
Keyword		
Color		

Conditions: intact

Content: State Empty ∅ Phase ∅
Amount ______ Sheen ______
Color ______
Odor ______
PID Reading ✓ Extox Reading ______

SCREENING DATA:

	YES	NO	
Radioactive		∅	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	∅
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	✓

CHEMICAL ANALYSIS:

MONTGOMERY WATSON

Drum/Tank Survey

Project [illegible] | Date [illegible]
Site 13 | Drum/Tank # 13-2 UST
Location [illegible] | Sample # [illegible]
[illegible] | Time 1630 8/4/96 Sampled

Size: (gals) 20,000 ([illegible])
Dimensions: (ft) [illegible]
Openings: # 1
Size 24"
Piping: Size 4"

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	Rust	
Size		
Top		
Markings:		
Keyword		
Color		

Conditions: [illegible]

Content: State Ø
Amount 20,000 [illegible]
Color [illegible]
Odor Ø
PID Reading [illegible]

Phase 1
Sheen Ø
Extox Reading Ø

SCREENING DATA:

	YES	NO	
Radioactive		✓	≥ 1mR over background
Acidic		✓	pH ≤ 3
Caustic		✓	pH ≥ 12
Air Reactive		✓	Reaction of ≥ 10∘F temp. change
Water Reactive		✓	Reaction of ≥ 10∘F temp. change
Water Soluble		✓	Dissolves in water
Water Bath OVA		✓	Reading= ≥ 10 ppm = Yes
Combustible		✓	Catches fire when torched in water bath
Halide		✓	Green flame when heated w/copper
Inorganic	✓		Water Bath OVA and Combustible = No
Organic		✓	Inorganic = No
Alcohol/Aldehyde		✓	Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide		✓	Draeger tube over water bath ≥ 2 ppm
Flammable		✓	Combustible = Yes and SETA flashpoint ≤140∘F
Oxidizer		✓	Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	8

CHEMICAL ANALYSIS:

[illegible]

[illegible]

MONTGOMERY WATSON

Drum/Tank Survey

Project Northfield [illegible]
Site B
Location Northfield [illegible]

Date 8/3/96
Drum/Tank # B-3 UST
Sample # NONE
Time

Size: (gals) 500 gal
Dimensions: (ft) unknown
Openings: # 2 [illegible]
Size 2"
Piping: Size

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	[illegible]	
Size		
Top		
Markings:		
Keyword		
Color	✓	

Conditions: [illegible]

Content: State [illegible] empty
Amount
Color
Odor
PID Reading ✓
Phase Ø
Sheen ✓
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		Ø	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	Ø
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	✓

CHEMICAL ANALYSIS:

Empty

MONTGOMERY WATSON

Drum/Tank Survey

Project: Northeast Cape Phase I
Site: 13
Location: North of the Hunter Road

Date: 8/3/96
Drum/Tank #: 13-4
Sample #: None
Time:

Size: (gals) 1 T
Dimensions: (ft) 5' X 10'
Openings: #
Size
Piping: Size

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	Red	
Size		
Top		
Markings:	Ø	
Keyword	Ø	
Color		

Conditions: Intact

Content: State Ø Empty
Amount
Color
Odor
PID Reading

Phase Ø
Sheen

Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		Ø	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other			Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	Ø
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	

CHEMICAL ANALYSIS:

Empty

MONTGOMERY WATSON

Drum/Tank Survey

Project Northeast Cape Phase II
Site 14
Location [illegible] Building
Size: (gals) 15,000
Dimensions: (ft) 70" x 24'
Openings: # 1 [illegible]
Size [illegible]
Piping: Size 4" Vent [illegible]
2
Type: metal ✓
plastic
other

Date 8/3/96
Drum/Tank # 14-1
Sample # 96NE14TK101 [illegible]
Time 1530 1400

	Prim.	Sec.
Color:	[illegible]	
Size		
Top	✓	
Markings:	[illegible]	
Keyword	[illegible]	
Color		

Conditions: Top open - Tank in [illegible] cond

Content: State [illegible]
Amount [illegible]
Color [illegible] metals
Odor
PID Reading
Phase /
Sheen No
Extox Reading N/A

SCREENING DATA:

	YES	NO	
Radioactive		✓	≥ 1mR over background
Acidic		✓	pH ≤ 3
Caustic		✓	pH ≥ 12
Air Reactive		✓	Reaction of ≥ 10·F temp. change
Water Reactive		✓	Reaction of ≥ 10·F temp. change
Water Soluble		✓	Dissolves in water
Water Bath OVA		✓	Reading= ≥ 10 ppm = Yes
Combustible		✓	Catches fire when torched in water bath
Halide		✓	Green flame when heated w/copper
Inorganic	✓		Water Bath OVA and Combustible = No
Organic		✓	Inorganic = No
Alcohol/Aldehyde		✓	Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide		✓	Draeger tube over water bath ≥ 2 ppm
Flammable		✓	Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer		✓	Starch iodine paper shows positive reaction
Inert or Other	✓		Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	X

CHEMICAL ANALYSIS:

[illegible]

[illegible]

MONTGOMERY WATSON

Drum/Tank Survey

Project Northern ... Phase I
Site 16
Location Northern Edge of Site 16

Date 8/3/96
Drum/Tank # 16-1 AST
Sample # [illegible] NE16TK 01, 201 311 [illegible]
Time 8/4/96 [illegible]

Size: (gals) [illegible]
Dimensions: (ft) 4'x [illegible]
Openings: # 1
Size 24"
Piping: Size 3" [illegible]

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	[illegible]	
Size		
Top		
Markings:	O	
Keyword		
Color		

Conditions: INTACT

Content: State [illegible]
Amount [illegible]
Color [illegible]
Odor [illegible]
PID Reading [illegible]

Phase [illegible]
Sheen [illegible]
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		✓	≥ 1mR over background
Acidic		✓	pH ≤ 3
Caustic		✓	pH ≥ 12
Air Reactive		✓	Reaction of ≥ 10·F temp. change
Water Reactive		✓	Reaction of ≥ 10·F temp. change
Water Soluble		✓	Dissolves in water
Water Bath OVA		✓	Reading= ≥ 10 ppm = Yes
Combustible		✓	Catches fire when torched in water bath
Halide		✓	Green flame when heated w/copper
Inorganic		✓	Water Bath OVA and Combustible = No
Organic	✓		Inorganic = No
Alcohol/Aldehyde		✓	Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide		✓	Draeger tube over water bath ≥ 2 ppm
Flammable		✓	Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer		✓	Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	8

CHEMICAL ANALYSIS:

[illegible]

[illegible]

[illegible]

MONTGOMERY WATSON

Drum/Tank Survey

Project Northeast Exp. Phase II
Site 16
Location INSIDE ...
Date 2/3/96
Drum/Tank # 16-2
Sample # NONE
Time

Size: (gals) 5
Dimensions: (ft)
Openings: # 1 Drum ...
Size 15"
Piping: Size ∅

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:		
Size		
Top		
Markings:	∅	
Keyword	∅	
Color		

Conditions:

Content: State UNKNOWN
Amount
Color
Odor
PID Reading ✓
Phase UNKNOWN
Sheen ✓
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		N/A	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	0
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	

CHEMICAL ANALYSIS:

MONTGOMERY WATSON

Drum/Tank Survey

Project [illegible]
Site 16
Location [illegible]

Date [illegible]
Drum/Tank # 16-3 [illegible]
Sample # [illegible]
Time

Size: (gals) 5
Dimensions: (ft) [illegible]
Openings: # [illegible]
Size
Piping: Size [illegible]
Type: metal ✓
plastic
other
Conditions: [illegible]

	Prim.	Sec.
Color:	[illegible]	[illegible]
Size		
Top		
Markings:		
Keyword		
Color		

Content: State Unknown
Amount
Color
Odor
PID Reading ✓
Phase unknown
Sheen ✓
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		N/A	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	0
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	

CHEMICAL ANALYSIS:

MONTGOMERY WATSON

Drum/Tank Survey

Project: Northeast Cape [illegible]
Site: 16
Location: NSI - [illegible]

Date: 8/3/96
Drum/Tank #: 16-4 Drum, [illegible]
Sample #: NONE
Time:

Size: (gals) 5
Dimensions: (ft) 8.5" x 15"
Openings: # 1 lid
Size 5"
Piping: Size ∅

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	Black/Drum	White/Lid
Size		
Top		
Markings:	NONE	
Keyword	NONE	
Color		

Conditions: Sealed

Content: State Unknown
Amount
Color
Odor
PID Reading

Phase Unknown
Sheen
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		N/A	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10.F temp. change
Water Reactive			Reaction of ≥ 10.F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140.F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	0
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	

CHEMICAL ANALYSIS:

None

MONTGOMERY WATSON

Drum/Tank Survey

Project Northern - Joint Phase I
Site 16
Location Inside tank ...

Date 2/3/96
Drum/Tank # 16-5 drum Onepack
Sample # 3
Time

Size: (gals) 10
Dimensions: (ft) 16 1/2 x 15"
Openings: # 1 Drum Lid
Size 15"
Piping: Size

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	Black/Drum	White/Lid
Size		
Top		
Markings:	∅	
Keyword	∅	
Color		

Conditions: Sound

Content: State unknown
Amount
Color
Odor
PID Reading

Phase unknown
Sheen

Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		N/A	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other			Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	0
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	

CHEMICAL ANALYSIS:

MONTGOMERY WATSON

Drum/Tank Survey

Project [illegible] Phase I
Site [illegible]
Location [illegible]
Date [illegible]
Drum/Tank # 16-6 [illegible]
Sample # None
Time

Size: (gals) 10
Dimensions: (ft) [illegible]
Openings: # [illegible]
Size
Piping: Size

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	[illegible]	[illegible]
Size		
Top		
Markings:	Ø	
Keyword	Ø	
Color		

Conditions: [illegible]

Content: State Unknown
Amount
Color
Odor
PID Reading
Phase unknown
Sheen
Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		N/a	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10·F temp. change
Water Reactive			Reaction of ≥ 10·F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140·F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		Y	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	0
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	

CHEMICAL ANALYSIS:

None.

MONTGOMERY WATSON

Drum/Tank Survey

Project	Northeast Caps Phase I	Date	8/3/96
Site	19	Drum/Tank #	19-1 AST
Location	[illegible]	Sample #	NONE
		Time	

Size: (gals) 250

Dimensions: (ft) 48" x 27" x 42

Openings: # 3

Size 2"

Piping: Size 4

Type: metal ✓

plastic

other

	Prim.	Sec.
Color:	red	red
Size		
Top		
Markings:	Ø	
Keyword	Ø	
Color	Ø	

Conditions: AST [illegible]

Content: State liquid

Amount <20 gal

Color [illegible]

Odor

PID Reading 0

Phase

Sheen [illegible]

Extox Reading 0

SCREENING DATA:

	YES	NO	
Radioactive		✓	≥ 1mR over background
Acidic		✓	pH ≤ 3
Caustic		✓	pH ≥ 12
Air Reactive		✓	Reaction of ≥ 10◦F temp. change
Water Reactive		✓	Reaction of ≥ 10◦F temp. change
Water Soluble	✓		Dissolves in water
Water Bath OVA		✓	Reading= ≥ 10 ppm = Yes
Combustible		✓	Catches fire when torched in water bath
Halide		✓	Green flame when heated w/copper
Inorganic	✓		Water Bath OVA and Combustible = No
Organic		✓	Inorganic = No
Alcohol/Aldehyde		✓	Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide		✓	Draeger tube over water bath ≥ 2 ppm
Flammable		✓	Combustible = Yes and SETA flashpoint ≤140◦F
Oxidizer		✓	Starch iodine paper shows positive reaction
Inert or Other	✓		Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	8

CHEMICAL ANALYSIS:

None - [illegible]

[illegible]

[illegible]

MONTGOMERY WATSON

Drum/Tank Survey

Project Northeast Ap... Phase I — Date 8/3/96
Site 19 — Drum/Tank # 19-2
Location Inside ... Building — Sample # None
Time

Size: (gals) ≅ 250
Dimensions: (ft) 74" x 28"
Openings: # 3
Size 3"
Piping: Size 3" x 5'

Type: metal ✓
plastic
other

	Prim.	Sec.
Color:	Yellow	Rust
Size		
Top		
Markings:	↓	
Keyword	↓	
Color		

Conditions: Intact

Content: State Φ Empty
Amount
Color
Odor
PID Reading

Phase
Sheen

Extox Reading

SCREENING DATA:

	YES	NO	
Radioactive		Φ	≥ 1mR over background
Acidic			pH ≤ 3
Caustic			pH ≥ 12
Air Reactive			Reaction of ≥ 10∘F temp. change
Water Reactive			Reaction of ≥ 10∘F temp. change
Water Soluble			Dissolves in water
Water Bath OVA			Reading= ≥ 10 ppm = Yes
Combustible			Catches fire when torched in water bath
Halide			Green flame when heated w/copper
Inorganic			Water Bath OVA and Combustible = No
Organic			Inorganic = No
Alcohol/Aldehyde			Water Bath OVA, Water Soluble and Combustible = Yes
Cyanide			Draeger tube over water bath ≥ 2 ppm
Flammable			Combustible = Yes and SETA flashpoint ≤140∘F
Oxidizer			Starch iodine paper shows positive reaction
Inert or Other		✓	Everything "No" except Inorganic or Organic

SCREENING RESULTS (AREA):

0 Unknown	Φ
1 radioactive	
2 acid/oxidizer	
3 caustic/reducer/cyanide	
4 flammable organic	
5 nonflammable organic	
6 peroxide	
7 air or water reactive	
8 inert	↓

CHEMICAL ANALYSIS:

Empty

MONTGOMERY WATSON

FIELD SURVEY

Location Northeast Cape

Site 4

Present and Future Land Uses:

Three (3) of the buildings located within the boundaries of site 4 are used by the local seasonal resident Eugene Toolie and his Brother.

Condition and Type of Biota:

Sedges, Grasses, some mosses. Very similar to rest of site.

Vegetation Survey (% of cover, vegetation condition and type):

Nearly 100%, with exception of gravel fill associated with the Cargo Beach Road and the Beach area. Vegetation is healthy and thriving.

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Organic with some wet marshy areas, grasses leading to beach.

Soil have a fetch

Drainages or Standing Water (ponds, streams, standing water, size, distance):

Drainage is North towards the Beach with standing water scattered about the site in depressed areas.

Predominant Wind Direction:

S/SW in Summer

N in Winter

Estimate Streamflow (where applicable):

ø

Biological Samples (where applicable):

ø

Chemical Samples (where applicable):

ø

FIELD SURVEY

Location Northeast Cape

Site 10

esent and Future Land Uses:

None / None Anticipated

Condition and Type of Biota:

Limited due to gravel Pad area extending from the Cargo Beach access Road. Those that do exist include sedges, grasses, and some moss all are healthy

Vegetation Survey (% of cover, vegetation condition and type):

$<40\%$ Coverage due to gravel Pad. Sedges, grasses, ~~moss~~, possible lichen.

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Soil adherence is Low to medium fetch in the gravel pad whereas it is quite high in the organic non-disturbed area.

rainages or Standing Water (ponds, streams, standing water, size, distance):

Drainage is North/Northwest towards the Drainage Basin (Assoc. w/ 10/11/87).

Predominant Wind Direction:

S/SW in Summer

N in Winter

Estimate Streamflow (where applicable):

Ø

Biological Samples (where applicable):

Ø

hemical Samples (where applicable):

Ø

FIELD SURVEY

Location Northeast Cape

Site 11

Present and Future Land Uses:

None / None Anticipated

Condition and Type of Biota:

Sedges, grasses, moss and Lichens, all healthy.

Vegetation Survey (% of cover, vegetation condition and type):

>70% Lack of Coverage due to either the presence of the gravel Pad or The Major Diesel fuel Spill. Vegetation that is present appears healthy and fairly Dense.

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

In those areas not affected by the gravel Pad soil adherance is high.

Drainages or Standing Water (ponds, streams, standing water, size, distance):

There is a large Pond which leads to the drainage Basin (See Victor Harris Notebook) for dimensions

Predominant Wind Direction:

S/SW in Summer
N in Winter

Estimate Streamflow (where applicable):

Streamflow is negligible approaching acquiesence.

Biological Samples (where applicable):

Ø

Chemical Samples (where applicable):

FIELD SURVEY

Location Northeast Cape

Site 15

esent and Future Land Uses:

None / None Anticipated

Condition and Type of Biota:

Sparse Grasses.

Vegetation Survey (% of cover, vegetation condition and type):

<5% - Gravel Pad with Scattered stands of grass.

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Medium - Fetch (Gravel Pad).

rainages or Standing Water (ponds, streams, standing water, size, distance):

Drainage is immediately North towards Site 27 and then through the culvert to the Drainage Basin Area.

Predominant Wind Direction:

S/SW in Summer
N in Winter

Estimate Streamflow (where applicable):

N/A

Biological Samples (where applicable):

N/A

Chemical Samples (where applicable):

N/A

FIELD SURVEY

Location Northeast Cape

Site 16

resent and Future Land Uses:

None / None forever.

Condition and Type of Biota:

Sparse Grasses (Gravel Pad)

Vegetation Survey (% of cover, vegetation condition and type):

< 10% Vegetation is sparse due to physically disturbed earth and gravel Pad. Vegetation that is present appears normal and healthy

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Soil adherence is low to Medium with the majority of the site being covered with gravel.

rainages or Standing Water (ponds, streams, standing water, size, distance):

No clear Drainage Pathway as the site is fairly well graded (Manmade).

Predominant Wind Direction:

S/SW in Summer
N in Winter

Estimate Streamflow (where applicable):

N/A

Biological Samples (where applicable):

N/A

hemical Samples (where applicable):

N/A

FIELD SURVEY

Location Northeast Cape

Site 19

:esent and Future Land Uses:

None / None foreseen

Condition and Type of Biota:

Limited to none - Gravel Pad

Vegetation Survey (% of cover, vegetation condition and type):

<5% grasses, Gravel Pad

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Soil adherence is Low to Medium due to gravel Pad.

ɹrainages or Standing Water (ponds, streams, standing water, size, distance):

ø, Drainage is to the North toward Site 27 and the large Drainage Basin.

Predominant Wind Direction:

S/SW in Summer

N in Winter

Estimate Streamflow (where applicable):

ø

Biological Samples (where applicable):

ø

Ͻhemical Samples (where applicable):

ø

FIELD SURVEY

Location Northeast Cape

Site 27

esent and Future Land Uses:

None / None foreseen

Condition and Type of Biota:

Sparse due to gravel Pad.

Vegetation Survey (% of cover, vegetation condition and type):

<5% due to gravel Pad. Mainly grasses (Sparse.)

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Medium to low due to gravel Pad construction

rainages or Standing Water (ponds, streams, standing water, size, distance):

Drainage is immediately to the North, both over the road and through the Culvert.

Predominant Wind Direction:

S/SW in Summer

N in Winter

Estimate Streamflow (where applicable):

∅

Biological Samples (where applicable):

∅

hemical Samples (where applicable):

∅

FIELD SURVEY

Location NEC

Site 13

Present and Future Land Uses:

None / None anticipated

Condition and Type of Biota:

Vegetation Survey (% of cover, vegetation condition and type):

Virtually No Vegetation, Area Constructed on gravel fill Pad.

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Same as entire Site on Pad, Med to small grain gravels with sand.

Drainages or Standing Water (ponds, stream, standing water, size, distance):

Drainage is Northward toward Drainage Basin #1.

Predominant Wind Direction:

Same - SouthSouthwest in Summer Northerly in Winter

Estimate Streamflow (where applicable):

Stream flow from Site 13 is Northerly towards the Ocean
Stream flow is estimated @ No more than 3-5 gallons per minute
i.e. Stream Flow Measurements = 5 and 6

Biological Samples (where applicable):

Ø

Chemical Samples (where applicable):

Ø

NEC/12

Photographs and Video:

Photo's taken Overview of Site

Field Conceptual Model:

Any Contaminants would migrate downslope and downgradient, past 27, under the Road or through the culvert, and emerge in the Drainage Basin Area.

Benthic Sampling (where applicable):

ϕ

Zoo and Phytoplankton sampling (where applicable):

ϕ

Potential Source of Chemical Release:

Known 70,000 gallon fuel Spill @ site 15.

Potential Transport Medium:

Percolating Rainwater, Surface Water runoff,

Potential Exposure Pathways:

Ingestion, inhalation, dermal Contact

Potential Receptors:

all wildlife species such as fox, leaming, ground squirrel, etc as well as migrating species and exploring human populus (minor)

Background Contaminant Sample:

FIELD SURVEY

Location DEW

Site 14 Bldg 9

Present and Future Land Uses:

None/None foreseen

Condition and Type of Biota:

Nature and healthy, Cross fox, Lemmings, ground squirrels.

Vegetation Survey (% of cover, vegetation condition and type):

Vegetation ranges from sparse in areas of impacted fill to completely-covered in non disturbed areas. Grasses, Sedges, Moss, Labrador Tea, etc. Tundra.

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Gravel fill 4" → < 1/2", ≈ 3/4" typical

Drainages or Standing Water (ponds, stream, standing water, size, distance):

There is no standing water in the immediate vicinity of this site

Predominant Wind Direction:

as with all sites from the South/Southeast in Summer Changing to Northerly in winter

Estimate Streamflow (where applicable):

∅

Biological Samples (where applicable):

∅

Chemical Samples (where applicable):

∅

NEC / 14

Photographs and Video:

Video taken around building, Video Camera then went dead.

Field Conceptual Model:

Surface Water Drainage is North Northeast towards site 41 (Wastewater treatment facility)

Benthic Sampling (where applicable):

ϕ

Zoo and Phytoplankton sampling (where applicable):

ϕ

Potential Source of Chemical Release:

[Oil drains on North Side of facility Drained in '74. By NWES,] Drum full of Statyfury on South Side 14,000 gallon AST located on South Side. Marked and Hazcated on 7-14-96 by MW.

Potential Transport Medium:

Percolating Rainwater to surrounding Vegetation

Potential Exposure Pathways:

Potential Receptors:

Surrounding

Background Contaminant Sample:

FIELD SURVEY

Location NEC

Site 18

Present and Future Land Uses:

Abandoned / none anticipated

Condition and Type of Biota:

native / health
Cross Fox, ground squirrels
native birds

Vegetation Survey (% of cover, vegetation condition and type):

sparse to 100% cover in undisturbed area

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

Drainages or Standing Water (ponds, stream, standing water, size, distance):

No standing water
Drainage Bwt. 101E & W (N. end)
to center, N and then W

Predominant Wind Direction:

Summer S - SW
Winter N - NE

Estimate Streamflow (where applicable):

N/A

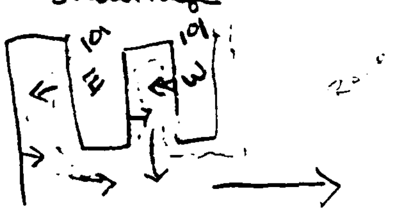
Biological Samples (where applicable):

N/A

Chemical Samples (where applicable):

See 1994 RI

Drainage



NEC (10)

Photographs and Video:

Field Conceptual Model:

Benthic Sampling (where applicable):

N/A

Zoo and Phytoplankton sampling (where applicable):

N/A

Potential Source of Chemical Release:

Potential Transport Medium:

Potential Exposure Pathways:

Potential Receptors:

Background Contaminant Sample:

FIELD SURVEY

Location NEC

Site 21

Present and Future Land Uses:

None / None foreseen

Condition and Type of Biota:

Same

Vegetation Survey (% of cover, vegetation condition and type):

Aside from areas of physically disturbed earth, i.e. earth-moving, etc.) Vegetation is healthy. There is little to no fill @ this site

Soil Adherence Factor (type and condition, grain size, moisture, sorting, color, fetch):

From gravelly fill near building to very organic marshy areas & grasses

Drainages or Standing Water (ponds, stream, standing water, size, distance):

Drainage is North/Northwest with [illegible] Stream @ the ends of the outfall approximately 1,000 feet West of main structure

Predominant Wind Direction:

Same

Estimate Streamflow (where applicable):

<10 gpm - Stream Near Terminus of Outfall

Biological Samples (where applicable):

∅

Chemical Samples (where applicable):

∅

NEC/21

Photographs and Video:

Photo's taken of site including Outfall.
Video - Dead.

Field Conceptual Model:

Benthic Sampling (where applicable):

∅

Zoo and Phytoplankton sampling (where applicable):

∅

Potential Source of Chemical Release:

Creek/Stream to the west

Potential Transport Medium:

Surface and groundwater flow.

Potential Exposure Pathways:

ingestion

Potential Receptors:

— Fauna, Vegetation does not appear to be affected, Very Healthy grass/tundra mat.

Background Contaminant Sample:

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Sample ID 96NEDB101PL,EN,ED	**Date** 8 / 5 / 96 (month / day / year)		**Time** 1330

Sample Type

Surface Soil ☐	**Surface Water** ☐	**Wipe** ☐
Depth (ft)	Temperature (°C) ______	**Lead Paint Chip** ☐
Sediment ☐	Conductivity (umhos/cm) ______	**TCLP Core Samples** ☐
	pH ______	**Asbestos** ☐
	TDS (mg/l) ______	
	BOD (mg/l) ______	

Field Information

Field Team Elise, Bonnie, [illegible], Victor	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler Bonnie McEwen	**Ambient Temperature (°C)** 5C
PID (ppm)	**Photo** Yes No Roll # Frame #
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	

Shipping Information

Chain of Custody Number	
Shipped Via Goldstreak UPS FedEx DHL	
Date Shipped	
Airbill Number	

Swing Tie Data

North

Comments Mist [illegible] same [illegible] as [illegible] 05 and 94SW/SL102, [illegible] flat, braided creeks, [illegible] water in WS smelling [illegible] [illegible] bottom material [illegible] [illegible]

Revision Date 4/29/96

96 NECDBZ0101 (Location
PL101 (SW/SD #5)
BT101.

MONTGOMERY WATSON
PHYSICAL CHARACTERIZATION/ WATER QUALITY
FIELD DATA SHEET

Mostly wetlands + ponds, low flowing water (y an

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/ INSTREAM FEATURES

1). PREDOMINANT SURROUNDING LAND USE:

Forest Field/Pasture Agriculture Residential Commercial Other Native

2). LOCAL WATERSHED EROSION: None Moderate Heavy

3). LOCAL WATERSHED NPS POLLUTION: No Evidence Some Potential Obvious Source

4). ~~STREAM~~ Drainage WIDTH ___ m ~20-30'

5). STREAM DEPTH: Riffle ~6"-1' Run___ m Pool___ m

6). HIGH WATER MARK___ m 7). VELOCITY ~5gpm ~~CSS~~ 8). DAM PRESENT: Yes___ No X

9). CHANNELIZED: Yes___ No X

10). CANOPY COVER Open Partly Open Partly Shaded Shaded

Smell of creosote from antenna pole

SEDIMENT/ SUBSTRATE :

11). SEDIMENT ODOR : Normal Sewage Petroleum Chemical Anaerobic None Other___

12). SEDIMENT OILS : Absent Slight Moderate Profuse

13). SEDIMENT DEPOSITS: Sludge Sawdust Paper Fiber Sand Relict Shells Other___

Are the undersides of shallow embedded stones black? Yes___ No___

14). INORGANIC SUBSTRATE COMPONENTS Silty Sediments.

SUBSTRATE TYPE	DIAMETER	PERCENT COMPOSITION in SAMPLING AREA
BEDROCK		
BOULDER	> 256-mm (10 in.)	
COBBLE	64-256 mm (2.5- 10 in.)	
GRAVEL	2- 64 mm (0.1-2.5 in.)	
SAND	0.06- 2.00 mm (gritty)	
SILT	.004- .06 mm	
CLAY	<.004- mm (slick)	

PHYSICAL CHARACTERIZATION PAGE 2

15). ORGANIC SUBSTRATE COMPONENTS

SUBSTRATE TYPE	CHARACTERISTIC	PERCENT COMPOSITION in SAMPLING AREA
DETRITOUS	STICKS, WOOD, COARSE PLANT MATERIAL	
MUCK-MUD	BLACK, VERY FINE ORGANIC MATERIAL (FPOM)	
MARL	GREY, SHELL-FRAGMENTS	

muck - mud organic bottom.

WATER QUALITY

TEMPERATURE 10 C DISSOLVED OXYGEN 8.1 ppm pH 6.98 CONDUCTIVITY 75 umhos

INSTRUMENT (s) USED YSI, Beckman, HACH

STREAM TYPE: COLDWATER WARMWATER

WATER ODORS: Normal Sewage Petroleum Chemical None Other

WATER SURFACE OILS: Slick Sheen Globs Flecks None

TURBIDITY: Clear Slighty Turbid Turbid Opaque Water Color

WEATHER CONDITIONS

PHOTOGRAPH NUMBER: ET2 #3, #4

OBSERVATIONS:

Sample - mostly organic mat'l, petroleum odor

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)

Northeast Cape, St. Lawrence Island

Sample ID 96 NE DF 102 PL.I N, 3C **Date** 8 / 5 / 96 (month / day / year) **Time** 1200

Sample Type

Surface Soil ☐
Depth (ft)

Sediment ☐

Surface Water ☐
Temperature (°C)__________
Conductivity (umhos/cm)__________
pH __________
TDS (mg/l)__________
BOD (mg/l)__________

Wipe ☐

Lead Paint Chip ☐

TCLP Core Samples ☐

Asbestos ☐

Field Information

Field Team
Eric Bonnie Don [illegible]

Sampler
Bonnie McLean

PID (ppm)

ELISA
screening
<less than
>greater than
spectrophotometer

DRO	GRO	PCB
100 1000	50 200	5 50

Weather
Snow Rain Sleet Hail Clear
Foggy Overcast Partly Cloudy

Ambient Temperature (°C) 5° C

Photo Yes No
Roll # Frame #

Shipping Information

Chain of Custody Number

Shipped Via
Goldstreak UPS FedEx DHL

Date Shipped

Airbill Number

Swing Tie Data

North

Comments At [illegible] of [illegible] small drainage 117' W of EPP 103, only a [illegible] up to .5' Brown silt organic matter w, grass on edges. Petro sheen seen when bottom broken

Revision 4/29/96

96 NEC DB Z0102
PL 102
BT 102
(location → jct b/w drainage ba[se] + unnamed creek)

MONTGOMERY WATSON
PHYSICAL CHARACTERIZATION/ WATER QUALITY
FIELD DATA SHEET

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/ INSTREAM FEATURES

1). PREDOMINANT SURROUNDING LAND USE:

Forest Field/Pasture Agriculture Residential Commercial Other Native

2). LOCAL WATERSHED EROSION: None Moderate Heavy

3). LOCAL WATERSHED NPS POLLUTION: No Evidence Some Potential Obvious Source

4). STREAM WIDTH_____ m

5). STREAM DEPTH: Riffle 6" m Run_______ m Pool_______ m

6). HIGH WATER MARK _____ m 7). VELOCITY ~10gpm ~~CFS~~ 8). DAM PRESENT: Yes____ No X

9). CHANNELIZED: Yes_____ No X

10). CANOPY COVER: Open Partly Open Partly Shaded Shaded

SEDIMENT/ SUBSTRATE :

11). SEDIMENT ODOR : Normal Sewage Petroleum Chemical Anaerobic None Other_______

12). SEDIMENT OILS : Absent Slight Moderate Profuse

13). SEDIMENT DEPOSITS: Sludge Sawdust Paper Fiber Sand Relict Shells Other_______

Are the undersides of shallow embedded stones black? Yes____ No______

14). INORGANIC SUBSTRATE COMPONENTS Organic Silt

SUBSTRATE TYPE	DIAMETER	PERCENT COMPOSITION in SAMPLING AREA
BEDROCK		
BOULDER	> 256-mm (10 in.)	
COBBLE	64-256 mm (2.5- 10 in.)	
GRAVEL	2- 64 mm (0.1-2.5 in.)	
SAND	0.06- 2.00 mm (gritty)	
SILT	.004- .06 mm	
CLAY	<.004- mm (slick)	

96 NEC DBZ0102
PL102
BT102

PHYSICAL CHARACTERIZATION PAGE 2

15). ORGANIC SUBSTRATE COMPONENTS

SUBSTRATE TYPE	CHARACTERISTIC	PERCENT COMPOSITION in SAMPLING AREA
DETRITOUS	STICKS, WOOD, COARSE PLANT MATERIAL	
MUCK-MUD	BLACK, VERY FINE ORGANIC MATERIAL (FPOM)	
MARL	GREY, SHELL FRAGMENTS	

WATER QUALITY

TEMPERATURE 9° C DISSOLVED OXYGEN ____ ppm pH 7.04 CONDUCTIVITY 100 umhos

INSTRUMENT (s) USED Beckman + YSI

STREAM TYPE: COLDWATER WARMWATER

WATER ODORS: Normal Sewage Petroleum Chemical None Other____

WATER SURFACE OILS: Slick Sheen Globs Flecks None

TURBIDITY: Clear Slighty Turbid Turbid Opaque Water Color____

Sunny, Slightly windy
WEATHER CONDITIONS

PHOTOGRAPH NUMBER: ET2/#2

OBSERVATIONS:

Benthic sample mostly organics, no visible bugs

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Sample ID 96 NE [illegible] 03 PL.BN.20	**Date** 8 / 5 / 96 (month / day / year)	**Time** 1030	

Sample Type

Surface Soil ☐ Depth (ft)	**Surface Water** ☐ Temperature (°C) ______ Conductivity (umhos/cm) ______ pH ______ TDS (mg/l) ______ BOD (mg/l) ______	**Wipe** ☐
		Lead Paint Chip ☐
Sediment ☐		**TCLP Core Samples** ☐
		Asbestos ☐

Field Information

Field Team [illegible]	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler [illegible] McLean	
PID (ppm)	**Ambient Temperature (°C)** 5°C
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No Roll # Frame #

Shipping Information

Chain of Custody Number
Shipped Via Goldstreak UPS FedEx DHL
Date Shipped
Airbill Number

Swing Tie Data

North

Comments Same as 96 [illegible]. Completed plankton w/ [illegible] net + 20 l water, 3m w/ [illegible] net, [illegible], in triplicate, w/ Wilaco [illegible] ([illegible] x [illegible] x 2") Strain in net until all [illegible] Mostly organic material

Revision Date 4/29/96

96 NEC DBZ0103 (@ Location SW/SD #7)
96 NEC DBPL103
96 NEC DBBT103

MONTGOMERY WATSON
PHYSICAL CHARACTERIZATION/ WATER QUALITY
FIELD DATA SHEET

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/ INSTREAM FEATURES

1). PREDOMINANT SURROUNDING LAND USE:

Forest   Field/Pasture   Agriculture   Residential   Commercial   Other Native

2). LOCAL WATERSHED EROSION: None   Moderate   Heavy

3). LOCAL WATERSHED NPS POLLUTION: No Evidence   Some Potential   Obvious Source

4). STREAM WIDTH ____ m < 2-4 ft.

5). STREAM DEPTH: Riffle ____ m   Run 1 foot ~~m~~   Pool ____ m

6). HIGH WATER MARK 27" m   7). VELOCITY ~20gpm ~~cps~~   8). DAM PRESENT: Yes ____ No X

9). CHANNELIZED: Yes X   No ____

10). CANOPY COVER   Open   Partly Open   Partly Shaded   Shaded

SEDIMENT/ SUBSTRATE :

11). SEDIMENT ODOR :   Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other ____

12). SEDIMENT OILS :   Absent   Slight   Moderate   Profuse

13). SEDIMENT DEPOSITS: Sludge   Sawdust   Paper Fiber   Sand   Relict Shells   Other ____

Are the undersides of shallow embedded stones black? Yes ____ No ____

14). INORGANIC SUBSTRATE COMPONENTS   100% silt

SUBSTRATE TYPE	DIAMETER	PERCENT COMPOSITION in SAMPLING AREA
BEDROCK		
BOULDER	> 256-mm (10 in.)	
COBBLE	64-256 mm (2.5- 10 in.)	
GRAVEL	2- 64 mm (0.1-2.5 in.)	
SAND	0.06- 2.00 mm (gritty)	
SILT	.004- .06 mm	
CLAY	<.004- mm (slick)	

96 NECDBZO 103
PL103
BT103

PHYSICAL CHARACTERIZATION PAGE 2

15). ORGANIC SUBSTRATE COMPONENTS

SUBSTRATE TYPE	CHARACTERISTIC	PERCENT COMPOSITION in SAMPLING AREA
DETRITOUS	STICKS, WOOD, COARSE PLANT MATERIAL	
MUCK-MUD	BLACK, VERY FINE ORGANIC MATERIAL (FPOM)	Mostly muck-mud
MARL	GREY, SHELL-FRAGMENTS	

WATER QUALITY

TEMPERATURE 9° C DISSOLVED OXYGEN 7.9 ppm pH 7.29 CONDUCTIVITY 50 umhos

INSTRUMENT (s) USED Beckman, YSI, + HACH colorimeter

STREAM TYPE: COLDWATER WARMWATER

WATER ODORS: Normal Sewage Petroleum Chemical None Other

WATER SURFACE OILS: Slick Sheen Globs Flecks None

TURBIDITY: Clear Slighty Turbid Turbid Opaque Water Color

sunny, slightly windy day

WEATHER CONDITIONS

PHOTOGRAPH NUMBER: ET2/#1

OBSERVATIONS:

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Sample ID 96 NE DB 104 PL, BN, EO	**Date** 8 / 5 / 96 (month / day / year)	**Time** 1300

Sample Type

Surface Soil ☐ Depth (ft)	**Surface Water** ☐ Temperature (°C) ______ Conductivity (umhos/cm) ______ pH ______ TDS (mg/l) ______ BOD (mg/l) ______	**Wipe** ☐
		Lead Paint Chip ☐
Sediment ☐		**TCLP Core Samples** ☐
		Asbestos ☐

Field Information

Field Team [illegible]	**Weather** Snow Rain Sleet Hail Clear Foggy Overcast Partly Cloudy
Sampler [illegible]	
PID (ppm)	**Ambient Temperature (°C)** 5°C
ELISA screening <less than >greater than spectrophotometer DRO 100 1000 ___ GRO 50 200 ___ PCB 5 50 ___	**Photo** Yes No Roll # Frame #

Shipping Information

Chain of Custody Number
Shipped Via Goldstreak UPS FedEx DHL
Date Shipped
Airbill Number

Swing Tie Data

North

Comments Mist down gradient No sheen on water. Wi[illegible] [illegible] water [illegible] broken [illegible] sheen appears, [illegible] to collect. 3 BN samples, no sediment on bottom, Silty, gravelly bottom.

Revis[illegible] Date 4/29/96

96 NEC DBZ0104 (Location: SW/SD #8)
PL104
BT104

MONTGOMERY WATSON
PHYSICAL CHARACTERIZATION/ WATER QUALITY
FIELD DATA SHEET

PHYSICAL CHARACTERIZATION

RIPARIAN ZONE/ INSTREAM FEATURES

1). PREDOMINANT SURROUNDING LAND USE:

Forest Field/Pasture Agriculture Residential Commercial Other Native

2). LOCAL WATERSHED EROSION: None Moderate Heavy

3). LOCAL WATERSHED NPS POLLUTION: No Evidence Some Potential Obvious Source

4). STREAM WIDTH 3-5' ~~m~~

5). STREAM DEPTH: Riffle______ m Run ~3' ~~m~~ Pool______ m

6). HIGH WATER MARK______ m 7). VELOCITY 20-30 ~~CFS~~ gpm 8). DAM PRESENT: Yes____ No X

9). CHANNELIZED: Yes X No______

10). CANOPY COVER : Open Partly Open Partly Shaded Shaded

SEDIMENT/ SUBSTRATE :

11). SEDIMENT ODOR: Normal Sewage Petroleum Chemical Anaerobic None Other______

12). SEDIMENT OILS : Absent Slight Moderate Profuse

13). SEDIMENT DEPOSITS: Sludge Sawdust Paper Fiber Sand Relict Shells Other______

Are the undersides of shallow embedded stones black? Yes____ No______

14). INORGANIC SUBSTRATE COMPONENTS Silty, Sandy bottom

SUBSTRATE TYPE	DIAMETER	PERCENT COMPOSITION in SAMPLING AREA
BEDROCK		
BOULDER	> 256-mm (10 in.)	
COBBLE	64-256 mm (2.5- 10 in.)	
GRAVEL	2- 64 mm (0.1-2.5 in.)	
SAND	0.06- 2.00 mm (gritty)	
SILT	.004- .06 mm	
CLAY	<.004- mm (slick)	

PHYSICAL CHARACTERIZATION PAGE 2

15). ORGANIC SUBSTRATE COMPONENTS

SUBSTRATE TYPE	CHARACTERISTIC	PERCENT COMPOSITION in SAMPLING AREA
DETRITOUS	STICKS, WOOD, COARSE PLANT MATERIAL	
MUCK-MUD	BLACK, VERY FINE ORGANIC MATERIAL (FPOM)	
MARL	GREY, SHELL-FRAGMENTS	

muck - mud organic bottom

WATER QUALITY

TEMPERATURE 9°C DISSOLVED OXYGEN 7.3 ppm pH 7.17 CONDUCTIVITY 50 umhos

INSTRUMENT (s) USED

STREAM TYPE: COLDWATER WARMWATER

WATER ODORS: Normal Sewage Petroleum Chemical None Other

WATER SURFACE OILS: Slick Sheen Globs Flecks None when seds are disturbed

TURBIDITY: Clear Slighty Turbid Turbid Opaque Water Color

Sunny, slightly windy.

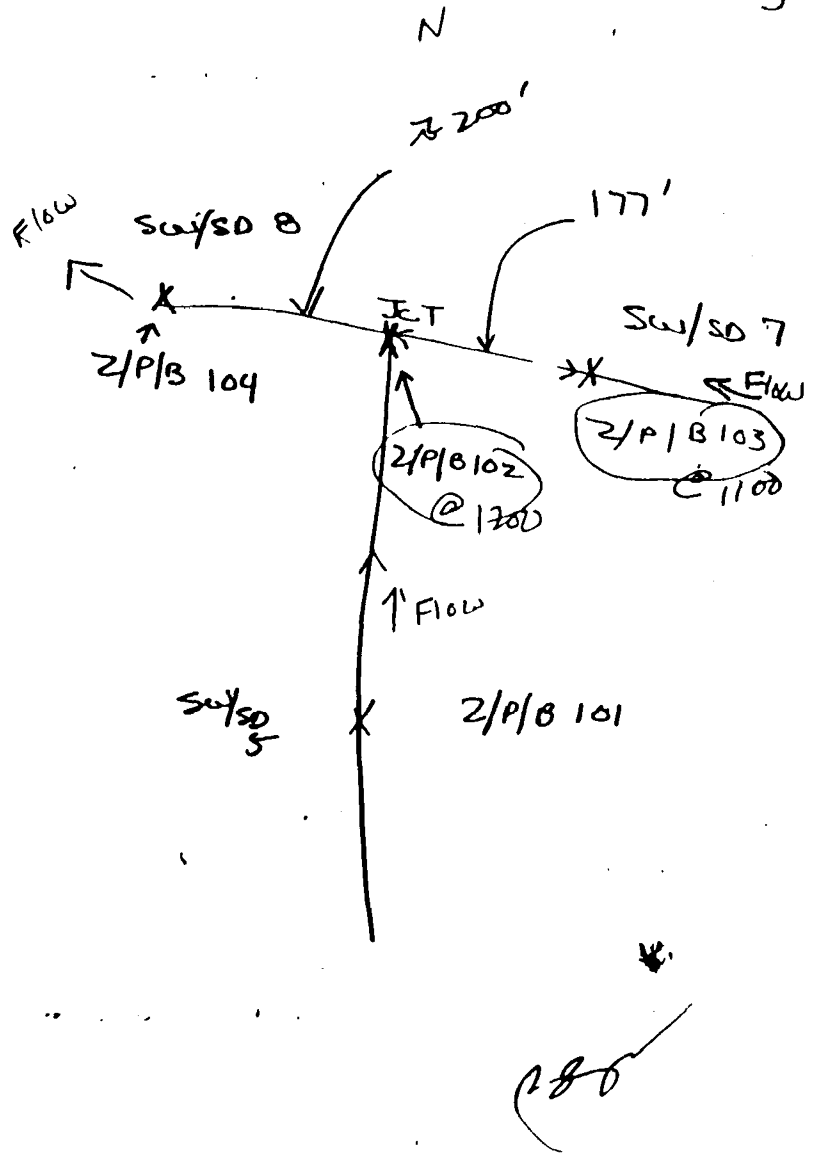
WEATHER CONDITIONS

PHOTOGRAPH NUMBER:

OBSERVATIONS:

Sample was sandy, little organics.
Took only two benthic samples, A + B. -
(little grabable sediment)

8-5-96 NEC (Mon)



8-5-96 NEC — Mon
Z/P/B 104
1145 at ZPB 102 station
This is at Juntion of streams
Collected Plankton, Zoo, Benthic
1200, small drainage
.177' west of ZPB 103
only a few inches deep to .5'
brown silt organic material
grass on edges.
petrol sheen seen when bottom broken

1240 at ZPB 104 —
Most downgradiant
NO sheen on Water, when you
break up bottom material
sheen appears — unable to collect
3 BN samples no sediment on bottom.
-silty/gravelly bottom -
Sample time 1300 P.B.Z complete
only PLA & B.
1320 at ZPB 101 —
Most Southerly. Same area
as 96 SW/SD5 and 94 SW/SD B-2
very little flow, braided creek
standing water on the W side
smelling of petro odor when bottom
BSV

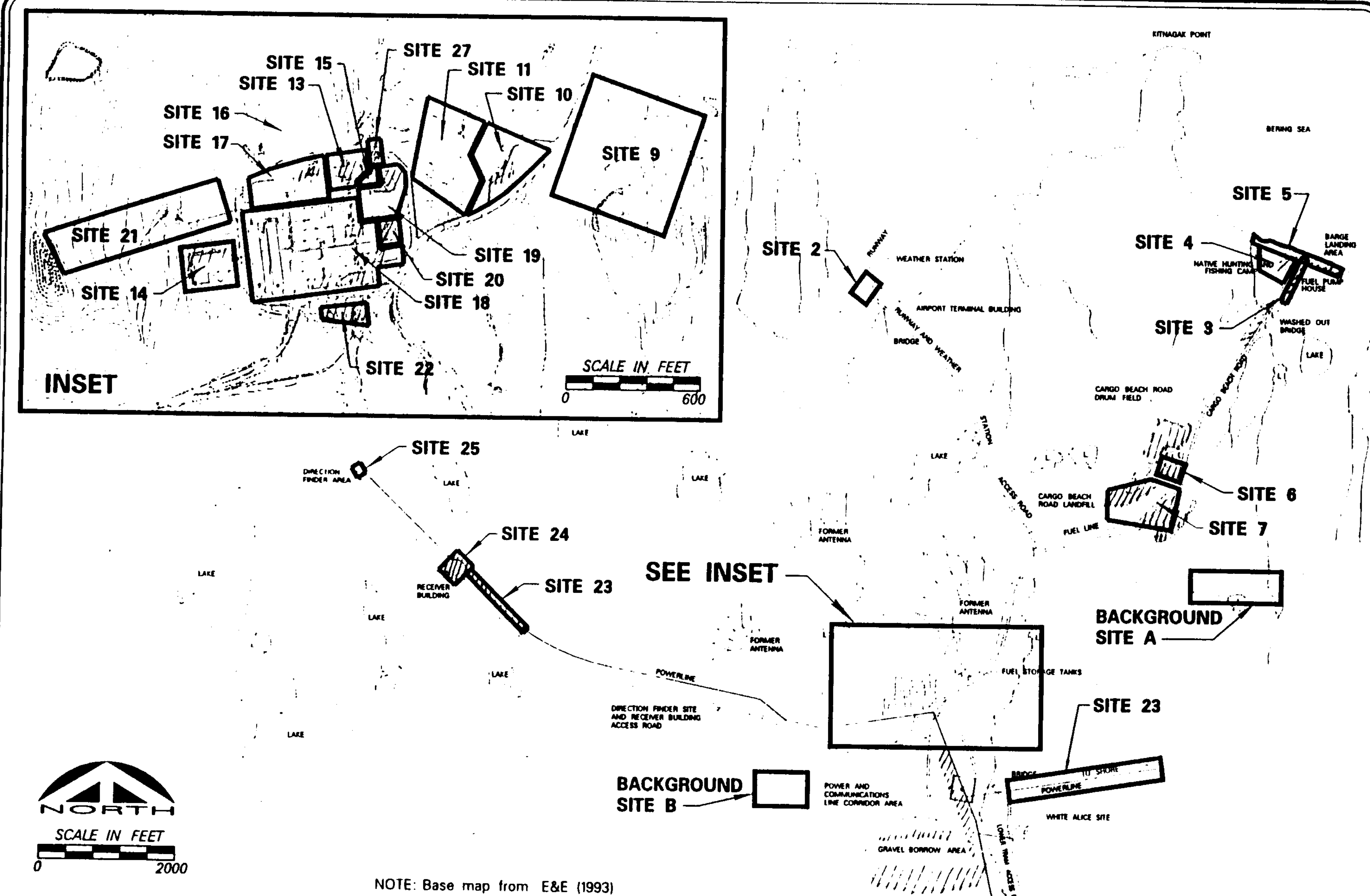
Army Corps of Engineers

Northeast Cape, Alaska

Radiological Survey Maps

MONTGOMERY WATSON

JOB No. 2198.042u TIME: 22-JUL-1996 11:15 FILE: g:\corps\necape\bddr\fnl\ph2wkpln\fg1_3.dgn



NOTE: Base map from E&E (1993)

MONTGOMERY WATSON
Anchorage, Alaska

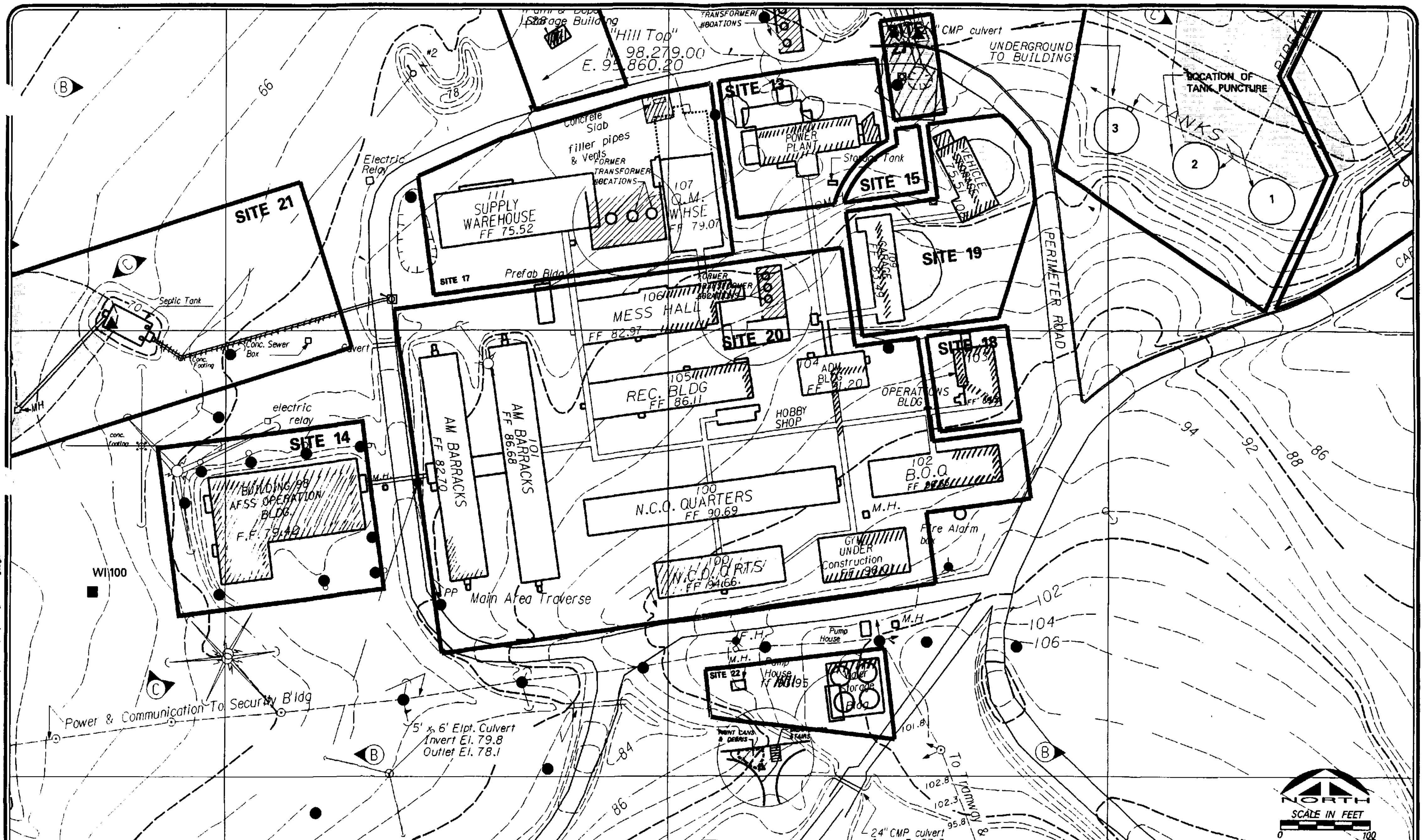
RADIOLOGICAL SURVEY

//// SURVEY AREA

FIGURE 1-3

ALASKA DISTRICT - CORPS OF ENGINEERS
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITE MAP



//// Survey Area

MONTGOMERY WATSON
Anchorage, Alaska

RADIOLOGICAL SURVEY

FIGURE 1
U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE MAP

Army Corps of Engineers

Northeast Cape, Alaska

"Danger" Signs Posted

MONTGOMERY WATSON

"DANGER" SIGNS POSTED FORM

NORTHEAST CAPE, ST. LAWRENCE ISLAND

Pg 1

SITE	BUILDING #	LOCATION (ie. N. S, DOOR)
22	Pumphouse, 114	N. door
22	Water Supply, 113	N. door
21	Well House	E door
20	AGW, 103	N door
20	Corridor -	N side
18	Squad HDQ - 104	W. side
18	Rec Bldg. - 99	S wall
18	Dorm Bldg - 100	N door
18	Dorm Bldg - 100	SE door
18	Dorm Bldg. 100	SW door
18	BOQ 102	E. door
18	Squad HDQ - 104	E. door
18	Rec. 105	NE Dock
18	Mess 106	SE dock
18	Dorm 100S	S door
18	Dorm 100S	W door
18	Dorm 100N	W door - landing
18	interconnect corridor	101 & 111
17	Gen WHse 111	N Dock, W side
13	Heat & Elec 110W	W. door outside enclosure
13	Heat & Elec 110W	W. door
13	H 119W	Backdoor, W.
13	Heat & Elect 110	E door, inside
18	Dorm E	S door
18	Dorm W	S door
18	Dorm W	W door
18	111 & 101 corridor	- W. door
18	"	SW door
14	Emg Power 98	NE door (inside)
14	Emg Power 98	E door
14	Emg Power 98	S mid door (inside)
14	Emg Power 98	SW door
14	Emg Power 98	W door
17	Warehouse 107	W Dock
17	Warehouse 107	NW dock, end

Revision Date 7/26/96

"DANGER" SIGNS POSTED FORM

NORTHEAST CAPE, ST. LAWRENCE ISLAND

Pg 2

SITE	BUILDING #	LOCATION (ie. N, S, DOOR)
17	Gen. WHse 111	N dock
17	Gen WHS	S. door
19	Auto Maint 109	East door
19	Auto Maint 109	East garage door
19	Auto Maint 109	S. door
19	Auto Stor 108	E. garage door
19	Auto Stor 108	W. door
3	Pump House	N side
2	Terminal Bldg.	NW garage door
2	Terminal	N. mid door
2	Terminal	E. door
2	Terminal	E. mid door
2	Terminal	S garage door
2	Terminal	Door to office from garage
20	ACW 103	N. door
19	Auto Maint 109	W door

Revision Date 7/26/96

Army Corps of Engineers

Northeast Cape, Alaska

Chain of Custody

#	Laboratory
1	MAS
2	NPDL
3	MAS
4	NPNL
5	MW Lab

MONTGOMERY WATSON

#820642

Return Cooler # ____ to:
MONTGOMERY WATSON
4100 Spenard ~~4000 Credit Union Drive, Suite 600~~
Anchorage, Alaska 99503
(907) ~~561-5829~~ 248 8883

MONTGOMERY WATSON
Anchorage, Alaska

CHAIN OF CUSTODY FORM

PROJ. NO.: Phase II

LABORATORY NAME: ATI

SAMPLERS: (Signature) Elise Tugman

LAB#	DATE	TIME	GRAB	STATION NUMBER/LOCATION	TOTAL NO. OF CONTAINERS	PCB-Wipe	TRPH	PCB	BTEX		REMARKS
01	6/26	1230	G	96GAM001WI	1	X					
02	6/26	1235	G	96GAM011 WI	1	X					
03	6/26	1245	G	96GAM002WI	1	X					
04	6/26	1250	G	96GAM003WI	1	X					
05	6/26	1255	G	96GAM100WI	1	X					
06	6/27	1000	G	96NEC001SW	19		X	~~X~~ NO	X		MS/MSD [redacted]
07	6/27	1010	G	96NEC011SW	7		X	NO	X		
08	6/27	1030	G	96NEC002SW	7		X	X	X		
09	6/27	1040	G	96NEC900SW	2				X		

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date/Time	Received by:
Elise Tugman	6/27/96 1400	[signature]	[signature]	6/28/96 1300	

Received for Laboratory by: Marie Miller Date: 6/28/96 Time: 1306

Cooler #1 - 0°C, Cooler #2 - 15°C Cooler #3 - 10°C

#820684

MONTGOMERY WATSON

C of C # 1

Page 1 of ~~3~~ 4

USACE
Northeast Cape, St. Lawrence Island
Phase II

CHAIN OF CUSTODY FORM

RETURN COOLERS TO:
MONTGOMERY WATSON
4100 Spenard Road
Anchorage, Alaska 99517
(907)248-8883

AUG 08 '96 08:29AM ATI ANCHORAGE P.2

PROJ. NO. 2198.0420

TO: MAS

SAMPLERS: (Signature)

S: Soil
W: Water
Sl: Sludge

LAB#	DATE 1996	TIME	S/W	SAMPLE ID NUMBER	TOTAL NO. OF CONTAINERS	BETX (SW 8020A) W: 3-40 ml vials w/HCl	DRO (SW 8100 Mod) S: 1-4 oz jar W: 2-1 L amber w/HCl	TRPH (EPA 418.1) S: 1-4 oz jar W: 2-1 L amber w/H2SO4	PCB (SW 8080A) S: 1-4 oz jar W: 2-1 L amber	TCLP - Metals (1311-6010/7000) S: 1-8 oz jar W: 1-1 L plastic	Fuel Identification (8015M) Sl: 1-8 oz jar W: 2-1 L amber	Glycol (8015M) Sl: 1-4 oz jar W: 2-1 L amber	REMARKS
01	8/4	1600	W	96NE16TK101	18	✓		✓	✓				ms/msD
02	8/4	1605	W	96NE16TK201	6	✓		✓	✓				
03	8/4	1630	W	96NE13TK101	5	✓		✓					
04	8/4	1300	W	96NE14TK101	6	✓		✓	✓				
05	8/4	1200	W	96NE04TK101	5	✓		✓					
06	8/4	1200	W	96NENASW101	4		✓		✓				
7	8/4	1200	W	96NENASW201	4		✓		✓				
8	8/4	1230	W	96NENASW102	4		✓		✓				
9	8/4	1310	W	96NENASW103	4		✓		✓				
0	8/4	1320	W	96NENASW104	4		✓		✓				
1	8/4	1340	W	96NENASW105	4		✓		✓				
12	8/4	1405	W	96NENASW106	4		✓		✓				

Relinquished by:	Date/Time:	Shipped via:	Notified:	Date/Time:	Received by:
[signature]	8/5/96	Gold Star AK Airlines			[signature]

Received for Laboratory by: 8/6/96 0830 1430? 4369 81295 Date 8/6/96 Time: 1:54

Revision Date: 4/18/96

#820684

MONTGOMERY WATSON

C of C # 1

Page 2 of ~~page~~ 4

USACE
Northeast Cape, St. Lawrence Island
Phase II

RETURN COOLERS TO:
MONTGOMERY WATSON
4100 Spenard Road
Anchorage, Alaska 99517
(907)248-8883

CHAIN OF CUSTODY FORM

PROJ. NO. 2198.0420

TO: MAS

SAMPLERS: (Signature)

S: Soil
W: Water
Sl: Sludge

LAB#	DATE	TIME	S/W	SAMPLE ID NUMBER	TOTAL NO. OF CONTAINERS	BETX (SW 8020A) W: 3-40 ml vials w/HCl	DRO (SW 8100 Mod) S: 1-4 oz jar W: 2-1 L amber w/HCl	TRPH (EPA 418.1) S: 1-4 oz jar W: 2-1 L amber w/H2SO4	PCB (SW 8080A) S: 1-4 oz jar W: 2-1 L amber	TCLP - Metals (1311-6010/7000) S: 1-8 oz jar W: 1-1 L plastic	Fuel Identification (8015M) S: 1-8 oz jar W: 2-1 L amber	Glycol (8015M) S: 1-4 oz jar W: 2-1 L amber	REMARKS
13	1996 8/4	1426	W	96NENASW107	4		✓		✓				
14	8/4	1436	W	96NENASW108	4		✓		✓				
15	8/4	1200	S	96NENASD101	2		✓		✓				
16	8/4	1200	S	96NENASD201	2		✓		✓				
17	8/4	1230	S	96NENASD102	2		✓		✓				
18	8/4	1310	S	96NENASD103	2		✓		✓				
19	8/4	1320	S	96NENASD104	2		✓		✓				
20	8/4	1340	S	96NENASD105	2		✓		✓				
21	8/4	1405	S	96NENASD106	2		✓		✓				
22	8/4	1420	S	96NENASD107	2		✓		✓				
23	8/4	1430	S	96NENASD108	2		✓		✓				

Relinquished by:	Date/Time:	Shipped via:	Notified:	Date/Time:	Received by:
[signature]	~~8/5/96~~ DD	AK Airlines Goldstreak			[signature]

Received for Laboratory by: ~~1730~~ DD 8/6/96 0830 4369 8395 Date 8/6/96 Time: 1540

Revision Date: 4/16/96

AUG 08 '96 08:30AM ATI ANCHORAGE P.3

#820684

MONTGOMERY WATSON

USACE
Northeast Cape, St. Lawrence Island
Phase II

RETURN COOLERS TO:
MONTGOMERY WATSON
4100 Spenard Road
Anchorage, Alaska 99517
(907)248-8883

C of C # 1
Page 3 of ~~3~~ 4

CHAIN OF CUSTODY FORM

PROJ. NO. 2198.0420 | TO: MAS

SAMPLERS: (Signature) [signature]

S: Soil
W: Water
Sl: Sludge

LAB #	DATE 1996	TIME	S/W	SAMPLE ID NUMBER	TOTAL NO. OF CONTAINERS	BTEX (SW 8020A) W: 3-40 ml vials w/HCl	DRO (SW 8100 Mod) S: 1-4 oz jar W: 2-1 L amber w/HCl	TRPH (EPA 418.1) S: 1-4 oz jar W: 2-1 L amber w/H2SO4	PCB (SW 8080A) S: 1-4 oz jar W: 2-1 L amber	TCLP - Metals (1311/6010/7000) S: 1-4 oz jar W: 1-1 L plastic	Fuel Identification (8015M) S: 1-8 oz jar W: 2-1 L amber	Glycol (8015M) S: 1-8 oz jar W: 2-1 L amber Sl: 1-4 oz jar	REMARKS
24	8/4	1440	S	96NEDBSS101	1				✓				
25	8/4	1445	S	96NEDBSS102	1				✓				
26	8/4	1450	S	96NEDBSS103	1				✓				
27	8/4	1455	S	96NEDBSS203	1				✓				
	~~8/4~~	~~1500~~	~~S~~										DP e
28	8/4	1505	S	96NEDBSD109	1				✓				
29	8/4	1510	S	96NEDBSD110	1				✓				
30	8/4	1400	S	96NE14TK102	3					✓	✓	✓	
31	8/4	1620	S	96NE16TK102	1								Floating Product
32	8/4	2100	W	96NE16TB101	3	✓							

Relinquished by:	Date/Time:	Shipped via:	Notified:	Date/Time:	Received by:
[signature]	8/5/96 DP	AK Airlines Goldstreak			Marie Miller

Received for Laboratory by: ~~1730~~ DP 8/6/96 4369875 | Date 8/6/96 | Time: 154

0830

Revision Date: 4/18/96

#820684

MONTGOMERY WATSON

Anchorage, Alaska

4 of 4

Return Cooler # ____ to:
MONTGOMERY WATSON
4000 Credit Union Drive, Suite 600
Anchorage, Alaska 99503
(907) 561-5829

CHAIN OF CUSTODY FORM

PROJ. NO.: 298.0420

LABORATORY NAME: MAS

SAMPLERS: (Signature)

LAB 1996	DATE	TIME	GRAB	STATION NUMBER/LOCATION	TOTAL NO. OF CONTAINERS	DRO (SW 8100 mod)	TRPH (EPA 418.1)				REMARKS
33	8/5	1615	S	96NE10SS101	2	✓	✓				
34	8/5	1620	S	96NE10SS201	2	✓	✓				
35	8/5	1630	S	96NE10SS102	2	✓	✓				
36	8/5	1640	S	96NE10SS103	2	✓	✓				
37	8/5	1645	S	96NE10SS104	2	✓	✓				
38	8/5	1650	S	96NE10SS105	2	✓	✓				
39	8/5	1655	S	96NE10SS106	2	✓	✓				
40	8/5	1645	S	96NE10SS107	2	✓	✓				
41	8/5	1700	S	96NE10SS108	2	✓	✓				

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date/Time	Received by:
[signature]	8/6/96 0830				Marie Miller

Received for Laboratory by: Marie Miller Date: 8/6/96 Time: 1540

AUG 08 '96 08:31AM ATI ANCHORAGE P.5

Alaska Airlines GOLDSTREAK PACKAGE EXPRESS

Copy 1

Airline	Origin	AIR WAYBILL Number
027-	ANC	4369 3126

From Shipper: MONTGOMERY WATSON 907 248-8883

Address: 4100 SPENARD ROAD

Phone:

City: ANCHORAGE State: AK Zip Code: 99517

Shipper's Signature PRINTED NAME Date Time a.m. p.m.

X

The Federal Aviation Administration requires Alaska Airlines to inform you of the following "Shipper's Security Notification":

☐ "Cargo items tendered for air transportation are subject to aviation security controls by air carriers and when appropriate, other government regulations. Copies of all relevant shipping documents showing the cargo's consignee, consignor, description, and other relevant data will be retained on file until the cargo completes its air transportation."

☐ "I certify that this shipment does not contain any unauthorized explosive or destructive devices. I am aware that this shipment is subject to appropriate aviation security controls and other relevant government regulations. I am aware that this endorsement, original signature, along with other shipping documents will be retained on file until the shipment is delivered."

Contents: SAMPLES

Insured Value:

Declared Value of Customs:

Remarks: 2198.0420/0430

Total Pieces: 8

Total Weight: 464

Form of Payment

☐ Cash ☐ Check ☐ GBL — Attach GBL

☒ AS / QX Account Number ~~27440065151~~

☐ Credit Card Number

Validata Approval V-0265 (Required for all except cash and GBL)

Executed By: Date/Time 01/16/96 8:49 a.m. p.m.

Carrier	Flight	Destination	E.T.A.
AS	152	ANC	2:00p

MULTIPLE PIECES FOR AS FLIGHTS ON

Please ✓ If Live Animal ☐

PCS.	WT. RANGE	RATE	CHARG
	GSX LETTER		
	1-15		
	16-50		
	51-70		
	71-100		

Subtotal Charges

Other Charges

1st Carrier

2nd Carrier

3rd Carrier

Tax (Offline only)

AS COURIER CHARGES

Pickup (NON AS COURIER)

Delivery (NON AS COURIER)

Special Service

Insurance

TOTAL 480.00

To Consignee: (Complete Consignee information required on package)

MULTICHEM ANALYTICAL SERVICES

Address: 2000 W. INT'L A/P RD, STE C-7

Phone: 907-248-8273

City: ANCHORAGE State: AK Zip Code: 99502

CHECK ONE ONLY

☒ AIRPORT TO AIRPORT SERVICE

DOOR TO DOOR

AGENT AGENT AGENT

SERVICES

Consignee's Printed Name – Signature (Received in Good Order Except as Noted) Time a.m. p.m. Date

Origin Courier Signature Date Time a.m. p.m.

X

Destination Courier Signature Date Time a.m. p.m.

Airline	Origin	AIR WAYBILL Number
027-		

This is a non-negotiable AIR WAYBILL subject to the terms and conditions set forth on the reverse of shipper's copy

Thank you for shipping with Alaska Airlines

P.O. Box 68900

Seattle, WA 98168

Shipper's Receipt

AUG 06 '96 08:29AM ATI ANCHORAGE P.1

8/8/96

MultiChem Analytical Services
(Formerly Analytical Technologies, Inc.-Anchorage)

2000 W. Int'l Airport Rd., Ste. C7, Anchorage AK 99502
◆ (907) 248-8273 ◆ Fax (907) 248-8274

SAMPLE RECEIPT ACKNOWLEDGEMENT FAX

Please deliver to the Project Manager below:

Total faxed pages: 5

TO (Company): Montgomery Watson

(Client P.M.): Victor Harris

CogCl

On 8/6 we received the following samples. Attached is a signed copy of your Chain-of-Custody for your records. Please inspect it for errors. If you find an error, please call your Project Manager at MultiChem Analytical Sciences (MAS) or Sample Control within 24 hrs.
The MAS accession number for your project is: 820684.
Please use this number when inquiring about this project. It will help us serve you in a timely manner.

Other comments/actions needed: ______

Thank you for using MAS, where Quality and Service come first !

#820687

MONTGOMERY WATSON

C of C # 3

Page 1 of 2

USACE
Northeast Cape, St. Lawrence Island
Phase II

CHAIN OF CUSTODY FORM

RETURN COOLERS TO:
MONTGOMERY WATSON
4100 Spenard Road
Anchorage, Alaska 99517
(907)248-8883

PROJ. NO. 2198.0420

TO: MAS

SAMPLERS: (Signature)

S: Soil
W: Water
Sl: Sludge

ab ID	DATE	TIME	S/W	SAMPLE ID NUMBER	TOTAL NO. OF CONTAINERS	BETX (SW 8020A) W: 3-40 ml vials w/HCl	DRO (SW 8100 Mod) S: 1-4 oz jar W: 2-1 L amber w/HCl	TRPH (EPA 418.1) S: 1-4 oz jar W: 2-1 L amber w/H2SO4	PCB (SW 8080A) W: 2-1 L amber	TCLP - Metals (1311-6010/7000) S: 1-4 oz jar W: 1-1 L plastic	Fuel Identification (8015M) S: 1-8 oz jar W: 2-1 L amber	Glycol (8015M) S: 1-8 oz jar W: 2-1 L amber	REMARKS
01	1996 8/6	1300	S	96NE27SS101	1		✓						
02	8/6	1305	S	96NE27SS201	1		✓						
03	8/6	1315	S	96NE27SS102	1		✓						
04	8/6	1320	S	96NE27SS103	1		✓						
05	8/6	1325	S	96NE27SS104	1		✓						
06	8/6	1330	S	96NE27SS105	1		✓						
07	8/6	1300	S	96NE27SS106	1			✓	✓				
08	8/6	1255	S	96NE27SS107	1			✓	✓				
09	8/6	1245	S	96NE27SS108	1			✓	✓				
10	8/6	1310	S	96NE27SS109	1				✓				
11	8/6	1200	S	96NE16TK102	3					✓	✓	✓	
12	8/6	1205	S	96NE16TK-202	3					✓	✓	✓	

Relinquished by:	Date/Time:	Shipped via:	Notified:	Date/Time:	Received by:
	8/7/96	Goldstreak			

Received for Laboratory by:	Date	Time:
Lisa Brainard	8/8/96	0

Revision Date:4/16/96

#820687

MONTGOMERY WATSON

C of C # 3

Page 2 of 2

USACE
Northeast Cape, St. Lawrence Island
Phase II

CHAIN OF CUSTODY FORM

RETURN COOLERS TO:
MONTGOMERY WATSON
4100 Spenard Road
Anchorage, Alaska 99517
(907)248-8883

PROJ. NO. 2198.0420

TO: MAS

SAMPLERS: (Signature)

S: Soil
W: Water
Sl: Sludge

	DATE	TIME	S/W	SAMPLE ID NUMBER	TOTAL NO. OF CONTAINERS	BETX (SW 8020A) W: 3-40 ml vials w/HCl	DRO (SW 8100 Mod) S: 1-4 oz jar W: 2-1 L amber w/HCl	TRPH (EPA 418.1) S: 1-4 oz jar W: 2-1 L amber w/H2SO4	PCB (SW 8080A) W: 2-1 L amber S: 1-4 oz jar	TCLP - Metals (1311-6010/7000) W: 1-1 L plastic Sl: 1-8 oz jar	Fuel Identification (8015M) W: 2-1 L amber Sl: 1-8 oz jar	Glycol (8015M) W: 2-1 L amber Sl: 1-4 oz jar	REMARKS
13	1996 8/6	1515	S	96NEDBSD111	1		✓		✓				Note: only 1 sample Container
14	8/6	1630	S	96NEDBSD112	1		✓		✓				Note: only 1 Sample Container
15	8/6	1115	S	96NE19TK102	3					✓	✓	✓	
16	8/6	1100	~~S~~W	96NE19TK101	6	✓		✓*	✓				* Please add H_2SO_4
17	8/6	0900	W	96NE19TB101	3	✓							
18	8/6	1315	S	96NE10SS107	1				✓				

LAST SAMPLE

Relinquished by:	Date/Time: 8/7/96	Shipped via: Alaska Goldstreak	Notified:	Date/Time:	Received by:

Received for Laboratory by: Anna Brainard | Date 8/8/96 | Time: 0915

Revision Date: 4/16/96

Alaska Airlines

GOLDSTREAK
PACKAGE EXPRESS

Airline 027- | Origin ANC | AIR WAYBILL Number 4369 8384

CofC #3

From Shipper: MONTGOMERY WATSON	907-248-8883
Address: 4100 SPENARD ROAD	Phone:
City: ANCHORAGE State: AK	Zip Code: 99517
Shipper's Signature X PRINTED NAME	Date 7 Aug Time 1350 a.m. p.m.

Total Pieces 1 | Total Weight 98

MULTIPLE PIECES FOR AS FLIGHTS O

Please ✓ If Live Animal ☐

Form of Payment

☐ Cash ☐ Check ☐ GBL — Attach GBL

☒ AS / QX Account Number ~~27440065151~~

☐ Credit Card Number

Validata Approval (Required for all except cash and GBL)

Executed By: Date/Time SKP 1350 7 Aug a.m. p.m.

PCS.	WT. RANGE	RATE	CHARG
	GSX LETTER		
	1-15		
1	16-50	40.00	80
	51-70		
	71-100		

Subtotal Charges

The Federal Aviation Administration requires Alaska Airlines to inform you of the following, "Shipper's Security Notification":

☐ "Cargo items tendered for air transportation are subject to aviation security controls by air carriers and when appropriate, other government regulations. Copies of all relevant shipping documents showing the cargo's consignee, consignor, description, and other relevant data will be retained on file until the cargo completes its air transportation."

☐ "I certify that this shipment does not contain any unauthorized explosive or destructive devices. I am aware that this shipment is subject to appropriate aviation security controls and other relevant government regulations. I am aware that this endorsement original signature, along with other shipping documents will be retained on file until the shipment is delivered."

Contents SAMPLES

Insured Value Ref

Declared Value of Customs Ref

Remarks 2198.0420/0430

Carrier	Flight	Destination	E.T.A.
AS	153	ANC	1800

Other Charges

1st Carrier	80.00
2nd Carrier	
3rd Carrier	
Tax (Offline only)	
Pickup (NON AS COURIER)	
Delivery (NON AS COURIER)	
Special Service	
Insurance	
TOTAL	80.00

To Consignee: (Complete Consignee information required on package) MULTICHEM ANALYTICAL SERVICES	
Address: 2000 W. INT'L A/P RD, STE C-7	Phone: 907-248-8273
City: ANCHORAGE State: AK	Zip Code: 99502
Consignee's Printed Name – Signature (Received in Good Order Except as Noted)	Time a.m. p.m. Date

CHECK ONE ONLY

☒ AIRPORT TO AIRPORT SERVICE

☐ PICK-UP ONLY ☐ DELIVERY ONLY ☐ DOOR TO DOOR

AS AGENT AS AGENT AS AGENT

AS 800 SERVICES (800) 634-7113

Origin Courier Signature	Date	Time a.m. p.m.	Destination Courier Signature	Date	Time a.m. p.m.
X					

Airline	Origin	AIR WAYBILL Number
027-		4369 8384

This is a non-negotiable AIR WAYBILL subject to the terms and conditions set forth on the reverse of shipper's copy

Thank you for shipping with Alaska Airlines

P.O. Box 68900
Seattle, WA 98168

Shipper's Receipt

MultiChem Analytical Services
(Formerly Analytical Technologies, Inc.-Anchorage)
2000 W. Int'l Airport Rd., Ste. C7, Anchorage AK 99502
◆ (907) 248-8273 ◆ Fax (907) 248-8274

SAMPLE RECEIPT ACKNOWLEDGEMENT FAX

Please deliver to the Project Manager below: Total faxed pages: 4

TO (Company): Montgomery Watson

(Client P.M.): Victor Harris

On 8 / 8 we received the following samples. Attached is a signed copy of your Chain-of-Custody for your records. Please inspect it for errors. If you find an error, please call your Project Manager at MultiChem Analytical Sciences (MAS) or Sample Control within 24 hrs.
The MAS accession number for your project is: 8206087.
Please use this number when inquiring about this project. It will help us serve you in a timely manner.

Other comments/actions needed: ______________________

Thank you for using MAS, where Quality and Service come first !

D

#820689

MONTGOMERY WATSON

C of C # 5

Page 1 of 1

USACE

Northeast Cape, St. Lawrence Island

Phase II

CHAIN OF CUSTODY FORM

RETURN COOLERS TO:
MONTGOMERY WATSON
4100 Spenard Road
Anchorage, Alaska 99517
(907)248-8883

P.3

PROJ. NO.	TO:
2198.0420	MAS

SAMPLERS: (Signature)

S: Soil
W: Water
Sl: Sludge

lab #	DATE	TIME	S/W	SAMPLE ID NUMBER	TOTAL NO. OF CONTAINERS	BETX (SW 8020A) W: 3-40 ml vials w/HCl	DRO (SW 8100 Mod) S: 1-4 oz jar W: 2-1 L amber w/HCl	TRPH (EPA 418.1) S: 1-4 oz jar W: 2-1 L amber w/H2SO4	PCB (SW 8080A) ~~S: 1-4 oz jar~~ 1-8 oz W: 2-1 L amber	TCLP - Metals (1311-6010/7000) W: 1-1 L plastic Sl: 1-8 oz jar	Fuel identification (8015M) W: 2-1 L amber Sl: 1-8 oz jar	Glycol (8015M) W: 2-1 L amber Sl: 1-4 oz jar	REMARKS
01	1996 8/7	1700	S	96 NE DB 113 SD	2		✓		✓				
	8/7												
				"LAST Sample," Really									
													4.0°C cooler temp.

Relinquished By: [signature] 8/9/96 1500

Relinquished by:	Date/Time:	Shipped via:	Notified:	Date/Time:	Received by:
[signature]	8/9/96 1315			8/9/96 1315	[signature]

Received for Laboratory by:	Date	Time:
[signature] MAS-A	8/9/96	1500

Revision Date: 4/16/96

AUG 09 '96 03:15PM A.T. ANCHORAGE P.1

8/9/96

MultiChem Analytical Services
(Formerly Analytical Technologies, Inc.-Anchorage)

2000 W. Int'l Airport Rd., Ste. C7, Anchorage AK 99502
◆ (907) 248-8273 ◆ Fax (907) 248-8274

SAMPLE RECEIPT ACKNOWLEDGEMENT FAX

Please deliver to the Project Manager below: Total faxed pages: _____

TO (Company): Mont. Watson

(Client P.M.): Bonnie McLean

On 8 / 9 we received the following samples. Attached is a signed copy of your Chain-of-Custody for your records. Please inspect it for errors. If you find an error, please call your Project Manager at MultiChem Analytical Sciences (MAS) or Sample Control within 24 hrs.
The MAS accession number for your project is: 8206 89.
Please use this number when inquiring about this project. It will help us serve you in a timely manner.

Other comments/actions needed: ____________________

____

____

____

____

Thank you for using MAS, where Quality and Service come first !

MONTGOMERY WATSON

Anchorage, Alaska

Return Cooler # ____ to:
MONTGOMERY WATSON
4000 Credit Union Drive, Suite 600
Anchorage, Alaska 99503
(907) 561-5829

CHAIN OF CUSTODY FORM

PROJ. NO.	LABORATORY NAME
Phase II	NPDL

SAMPLERS: (Signature) Elise Tuzman

DATE	TIME	GRAB	STATION NUMBER/LOCATION	TOTAL NO. OF CONTAINERS	PCB-wipe	TRPH	PCB	BTEX		REMARKS
6/26	1240	G	96GAM021WI	1	X					
6/27	1015	G	96NEC021SW	7		X	X	X		
6/27	1010	G	96NEC901 SW	2				X		
6/27	1100	G	96NEC001SW							
6/27	1100	G	96NEC011SW							
6/27	1130	G	96NEC002SW	7		X	X	X		
6/27	1140	G	96NEC[illegible]SW	2				X		

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date/Time	Received by:
Elise Tuzman	6/27/96 1400				

Received for Laboratory by: Date: Time:

QA/QC for USCOE

5033
6650371

Project Name Phase II
Project Number 2198 0400

Date: 6/28	COC:	Completed By:		
Primary	**Replicate**	**Split**	**Parameters**	
96GAM1001WI	96GAM1011WI	96GAM1021WI	PCB	
96NEC001SW	96NEC011SW	96NEC021SW	~~PCB~~ TR PH	PCB 1504
~~96NEC900SW~~	~~96NEC900SW~~	~~96NEC901SW~~	~~[illegible]~~	Began
	~~96NEC900SW~~			
	Began			
		6/28	NO PCB Duplicate	
				Completed
			Began	

Trip Blank-P	**Trip Blank-S**		**Trip Blank Date**	
96NEC900SW	96NEC901SW		6/27/96	

Rinsate-P	**Rinsate-S**	**Sample Type**	**Sample Prior**	**Sample After**
None				

MONTGOMERY WATSON

C of C # ____________

Page 1 of 1

USACE
Northeast Cape, St. Lawrence Island
Phase II

CHAIN OF CUSTODY FORM

RETURN COOLERS TO:
MONTGOMERY WATSON
4100 Spenard Road
Anchorage, Alaska 99517
(907)248-8883

PROJ. NO.	TO:
2198.0420	NPDL

SAMPLERS: (Signature) [illegible]

S: Soil
W: Water
Sl: Sludge

DATE	TIME	S/W	SAMPLE ID NUMBER	TOTAL NO. OF CONTAINERS	BETX (SW 8020A) W: 3-40 ml vials w/HCl	DRO (SW 8100 Mod) S: 1-4 oz jar W: 2-1 L amber w/HCl	TRPH (EPA 418.1) S: 1-4 oz jar W: 2-1 L amber w/H2SO4	PCB (SW 8080A) S: 1-4 oz jar W: 2-1 L amber	TCLP - Metals (1311-6010/7000) W: 1-1 L plastic Sl: 1-8 oz jar	Fuel Identification (8015M) W: 2-1 L amber Sl: 1-8 oz jar	Glycol (8015M) W: 2-1 L amber Sl: 1-4 oz jar	REMARKS
1996 [illegible]	[illegible]	W	[illegible]	[illegible]	✓		✓	✓				
[illegible]	[illegible]	W	[illegible]	[illegible]		✓		✓				
			[illegible]									
[illegible]												
			[illegible]									
8/1	[illegible]	W	96NE16TB301	3	✓							
[illegible]	[illegible]	[illegible]	[illegible]			✓	✓					

Relinquished by:	Date/Time:	Shipped via:	Notified:	Date/Time:	Received by:
[illegible]	[illegible]	[illegible]			

Received for Laboratory by:	Date	Time:
8/6/96 FED EX		

0366972535

Revision Date:4/16/96

FEDERAL EXPRESS

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS
QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER

0366972

0366972535

Cof c 2

SENDER'S COPY

1 Sender's Federal Express Account Number 1387-3266-5 Date 8/6/

From (Your Name) Please Print Mc... Watson
Your Phone Number (Very Important) (907) 248-8883
Company
Department/Floor No.
Street Address 4100 SPENARD ROAD
City Anchorage State AK ZIP Required 99517

2 To (Recipient's Name) Please Print NO PAC DIV LAB
Recipient's Phone No. (503) 66-
Company ATTN: Panda Harlinberg
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.) 1491 NE Graham Avenue
City Troutdale State OR ZIP Required 9706-

YOUR INTERNAL BILLING REFERENCE INFORMATION (First 24 characters will appear on invoice.)

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City State ZIP Required

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card
5 [ ] Cash/Check Acct./Credit Card No. Exp. Date /

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 [X] YOUR PACKAGING
16 [ ] FEDEX LETTER *
12 [ ] FEDEX PAK *
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon†)
51 [ ] YOUR PACKAGING
56 [ ] FEDEX LETTER *
52 [ ] FEDEX PAK *
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day†)
30 [ ] ECONOMY

Government Overnight (Restricted for authorized users only)
46 [ ] GOVT LETTER
41 [ ] GOVT PACKAGE

Freight Service (for Extra Large or any package over 150 lbs.)
70 [ ] OVERNIGHT FREIGHT **
80 [ ] TWO-DAY FREIGHT **
(Confirmed reservation required)
† Delivery commitment may
*Declared Value Limit $100.

DELIVERY AND SPECIAL HANDLING (Check services required)
1 [ ] HOLD FOR PICK-UP (Fill in Box H)
2 [ ] DELIVER WEEKDAY
3 [ ] DELIVER SATURDAY (Extra charge) (Not available to all locations)
4 [ ] ~~DANGEROUS GOODS~~ (Extra charge)
5 [X] KEEP COOL
6 [ ] DRY ICE ______ Lbs.
7 [ ] OTHER SPECIAL SERVICE ______
8 [ ]
9 [ ] SATURDAY PICK-UP (Extra charge)
10 [ ]
11 [ ]
12 [ ] HOLIDAY DELIVERY (If offered)

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	10	
Total	Total	Total

DIM SHIPMENT Chargeable Weight
[ ] ______ lbs

Received At
1 [ ] Regular Stop 3 [ ] Drop Box
4 [ ] B.S.C.
2 [ ] On-Call Stop 5 [ ] Station
FedEx

SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY

Use of this airbill constitutes your agreement to the service conditions in our current Service Guide, available upon request. See back of sender's copy of this airbill for information. Service conditions may vary for Government Overnight Service. See U.S. Government Service Guide for details.

We will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss for a timely claim. Limitations found in the current Federal Express Service Guide apply. Your right to recover from Federal Express for any loss, including intrinsic value of the package, loss of sale, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the declared value specified to the left. Recovery cannot exceed actual documented loss. The maximum Declared Value for FedEx Letter and FedEx Pak packages is $100.00.

In the event of untimely delivery, Federal Express will at your request and with some limitations, refund all transportation charges paid. See Service Guide for further information.

Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

5 Release Signature:

Date/Time

Fede
Base C
Declar
Other 1
...er 2
Total C

REVISION
PART #1
FORMAT
06
© 1990-9
PRINTED

SENDER'S COPY
DROP OFF YOUR PACKAGE AND SAVE

QA/QC for USCOE

Project Name Northeast Cape Phase II
Project Number 2198.0420/0430

Date:	COC: 1		Completed By: D. Quist	
8/4 & 8/5/96				

Primary	Replicate	Split	Parameters	
96NE16TK[illegible]01	96NE16TK201	96NE16TK301	BETX, PCB, TRPH	
96NENASW101	96NENASW201	96NENASW301	DRO, PCB	
96NENASD101	96NENASD201	96NENASD301	DRO, PCB	
96NEDBSS103	96NEDBSS203	96NEDBSS303	PCB	
96NE10SS101	96NE10SS201	96NE10SS301	DRO TRPH	

Trip Blank-P	Trip Blank-S		Trip Blank Date	
96NE16TB101	96NE16TB301		8/4/96	

Rinsate-P	Rinsate-S	Sample Type	Sample Prior	Sample After

M... GOMERY WATSON

C of C # 4

Page 1 of 1

U... CE
Northeast Cape, St. Lawrence Island
Phase II

CHAIN OF CUSTODY FORM

RETURN COOLERS TO:
MONTGOMERY WATSON
4100 Spenard Road
Anchorage, Alaska 99517
(907)248-8883

PROJ. NO. 2198.0420	TO: NPDL

SAMPLERS: (Signature)

S: Soil
W: Water
Sl: Sludge

DATE	TIME	S/W	SAMPLE ID NUMBER	TOTAL NO. OF CONTAINERS	BETX (SW 8020A) W: 3-40 ml vials w/HCl	DRO (SW 8100 Mod) S: 1-4 oz jar W: 2-1 L amber w/HCl	TRPH (EPA 418.1) S: 1-4 oz jar W: 2-1 L amber w/H2SO4	PCB (SW 8080A) S: 1-4 oz jar W: 2-1 L amber	TCLP - Metals (1311-6010/7000) S: 1-8 oz jar W: 1-1 L plastic	Fuel Identification (8015M) Sl: 1-8 oz jar W: 2-1 L amber	Glycol (8015M) Sl: 1-4 oz jar W: 2-1 L amber	REMARKS
1996 8/6/96	1210	S	96NE16TK302	3					✓	✓	✓	
8/6/96	1310	S	96NE27SS301	1		✓						
8/6/96	2115	W	96NE19TB201	3	✓							

LAST SAMPLE

Relinquished by:	Date/Time: 8/7/96	Shipped via: FedEx	Notified: DP	Date/Time: 8/7/96 1430	Received by:

Received for Laboratory by: 5102917385	Date	Time:

Revision Date:4/16/96

FedEx Federal Express

USE THIS AIRBILL FOR SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO AND ALL NON U.S. LOCATIONS.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

PACKAGE TRACKING NUMBER 5102917385

5073M 5102917385

Copy 4

SENDER'S COPY

1 SENDER'S FEDERAL EXPRESS ACCOUNT NUMBER: 1387-3264-9
Date: 7/7/96

From (Your Name) Please Print:
Your Phone Number (Very Important): (907-248-8883)
Company: MONTGOMERY WATSON
Department/Floor No.:
Street Address: 4100 SPENARD RD
City: ANCHORAGE State: AK ZIP Required: 99517

2 To (Recipient's Name) Please Print: Pam Hertzberg
Recipient's Phone Number (Very Important): 503 665-4166
Company: North Pacific Division Laboratory
Department/Floor No.:
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 1491 N.W. Graham Avenue
City: Troutdale State: OR ZIP Required: 97060-9503

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 18111.8434

H IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here
Street Address
City State ZIP Required

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card 5 [ ] Cash/Check
Acct./Credit Card No. Exp. Date

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning)
11 [X] OTHER PACKAGING
16 [ ] FEDEX LETTER*
12 [ ] FEDEX PAK*
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon, no Saturday delivery)
51 [ ] OTHER PACKAGING
56 [ ] FEDEX LETTER*
52 [ ] FEDEX PAK*
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 [ ] ECONOMY*
* Economy Letter Rate not available. Minimum charge One pound Economy rate.

Government Overnight (Restricted for authorized users only)
46 [ ] GOV'T LETTER
41 [ ] GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
70 [ ] OVERNIGHT FREIGHT** (Confirmed reservation required)
80 [ ] TWO-DAY FREIGHT**
† Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

Weekday Service
1 [ ] HOLD AT FEDEX LOCATION WEEKDAY (Fill in Section H)
2 [X] DELIVER WEEKDAY

Saturday Service
31 [ ] HOLD AT FEDEX LOCATION SATURDAY (Fill in Section H)
3 [ ] DELIVER SATURDAY (Extra charge) (Not available to all locations)
9 [ ] SATURDAY PICK-UP (Extra charge)

Special Handling
4 [ ] DANGEROUS GOODS (Extra charge)
6 [ ] DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice, 9, UN 1845, ___ x ___ kg. 904 III
[X] Wet Ice
12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	44	
Total 1	Total 44	Total

Chargeable Weight ___ lbs.
L ___ x W ___ x H ___
Received At: Drop Box / Station

SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY

Use of this airbill constitutes your agreement to the service conditions in our current Service Guide, available upon request. See back of sender's copy of this airbill for information. Service conditions may vary for Government Overnight Service. See U.S. Government Service Guide for details.

We will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss for a timely claim. Limitations found in the current Federal Express Service Guide apply. Your right to recover from Federal Express for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of $100 or the declared value specified to the left. Recovery cannot exceed actual documented loss. The maximum Declared Value for FedEx Letter and FedEx Pak packages is $500.

In the event of untimely delivery, Federal Express will at your request and with some limitations refund all transportation charges paid. See Service Guide for further information.

7 Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.

Release Signature:

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 4/94
FORMAT #160
160

QA/QC for USCOE

Project Name Northeast Cape Phase II

Project Number 2198 0420

Date:	COC:	Completed By:		
8/7/96	4			

Primary	Replicate	Split	Parameters	
96NE16TK102	96NE16TK202	96NETK302	TPH, Fuel ID,	Glycol
96NE27SS101	96NE27SS201	96NE27SS301	TOC	
			pH	

Trip Blank-P	Trip Blank-S		Trip Blank Date	
96NE19TB101	96NE19TB201		8/6/96	

Rinsate-P	Rinsate-S	Sample Type	Sample Prior	Sample After

MONTGOMERY WATSON
Anchorage, Alaska

Return Cooler # _____ to:
MONTGOMERY WATSON
~~4000 Credit Union Drive, Suite 600~~
Anchorage, Alaska ~~99503~~ 99517
~~(907) 561-5829~~

008

CHAIN OF CUSTODY FORM

PROJ. NO.: [illegible] 04

LABORATORY NAME: [illegible]

SAMPLERS: (Signature) [illegible]

1996 DATE	TIME	GRAB	STATION NUMBER/LOCATION	TOTAL NO. OF CONTAINERS	[illegible]	[illegible]	[illegible]			REMARKS
8/15	133[illegible]	✓	96 NE DB 101 PL	1		✓				
	1[illegible]	✓	96 NE DB 101 BN	3	✓					
	1[illegible]	✓	96 NE DB 101 ZO	1			✓			
	1[illegible]	✓	96 NE DB 102 PL	1						
	1[illegible]	✓	96 NE DB 102 BN	1						
	1[illegible]	✓	96 NE DB 103 ZO	1		✓				
	1[illegible]	✓	96 NE DB 103 PL	1			✓			
	1[illegible]	✓	96 NE DB 103 BN	3	✓					
	13[illegible]	✓	96 NE DB 104 ZO	1		✓				
	13[illegible]	✓	96 NE DB 104 PL	1			✓			
	13[illegible]	✓	96 NE DB 104 BN	3	✓					[illegible]
8/15	1[illegible]	✓	96 NE DB 102 ZO	1		✓				
			LAST SAMPLE							
				# 75 556 74 502						

Relinquished by:	Date/Time	Received by:	Relinquished by:	Date/Time	Received by:
[illegible]	8/15/96 [illegible]	[illegible] FedEx			

Received for Laboratory by: Date: Time:

FedEx. *USA Airbill* Tracking Number 7585674902

Sender's Copy 108 200 34121520

1 From (please print)

Date 8-15-96 Sender's FedEx Account Number 1387-3266-5

Sender's Name [signature] Phone (907)-248-8883

Company MONTGOMERY WATSON Dept/Floor Suite/Room

Address 4100 SPENARD RD

City ANCHORAGE State AK Zip 99517

2 Your Internal Billing Reference Information (Optional) (First 24 characters will appear on invoice) 2198.~~0420/0430~~ 0460

3 To (please print)

Recipient's Name Phone (612)473-4224

Company MONTGOMERY WATSON LABS-MN Dept/Floor Suite/Room

Address (To "HOLD" at FedEx location, print FedEx address here) 14910 28th AVENUE NORTH

(We Cannot Deliver to P.O. Boxes or P.O. Zip Codes)

City PLYMOUTH State MN Zip 55447

For "HOLD" Service check here
- [ ] Weekday
- [ ] Saturday (Not available at all locations)

(Not available with FedEx First Overnight)

For Saturday Delivery check here
- [ ] (Extra Charge. Not available to all locations) (Not available with FedEx First Overnight or FedEx Standard Overnight)

4 Service
- [x] FedEx Priority Overnight (Next business morning)
- [ ] FedEx Standard Overnight (Next business afternoon)
- [ ] FedEx Govt. Overnight (Authorized user only)
- [ ] DESCRIPTION
- [ ] FedEx Overnight Freight
- [ ] FedEx 2Day Freight

(For packages over 150 pounds. Call for delivery schedule.)
- [ ] NEW FedEx First Overnight (Earliest next business morning delivery to select locations) (Higher rates apply)

5 Packaging
- [ ] FedEx Letter*
- [ ] FedEx Pak*
- [ ] FedEx Box
- [ ] FedEx Tube

*Declared value limit $500.

6 Special Handling

Does this shipment contain dangerous goods?
- [x] No
- [ ] Yes (As per attached Shipper's Declaration)
- [ ] Dry Ice — Dry Ice, 9, UN 1845 III ____ x ____ kg. 904

(Dangerous Goods Shipper's Declaration not required)

CA

7 Payment

Bill to:
- [x] Sender (Account no. in Section 1 will be billed)
- [ ] Recipient
- [ ] Third Party
- [ ]

(Enter FedEx account no. or Credit Card no.)

FedEx Account No.

Credit Card No.

Total Packages | Total Weight | Total Declared Value $

*When declaring a value higher than $100 per package, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE AND LIMIT OF LIABILITY section for further information.

8 Release Signature

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

231

Service Conditions, Declared Value, and Limit of Liability – By using this Airbill, you agree to the service conditions in our current Service Guide or U.S. Government Service Guide. Both are available on request. See back of Sender's Copy of this airbill for information and additional terms. We will not be responsible for any claim in excess of $100 per package whether the result of loss, damage, or delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, and document your actual loss in a timely manner. Your right to recover from us for any loss includes intrinsic value of the package, loss of sales, interest, profit, attorney's fees, costs, and other forms of damage, whether direct, incidental, consequential, or special, and is limited to the greater of $100 or the declared value but cannot exceed actual documented loss. The maximum declared value for any FedEx Letter and FedEx Pak is $500. Federal Express may, upon your request, and with some limitations, refund all transportation charges paid.

See the FedEx Service Guide for further details.

Questions?
Call 1·800·Go·FedEx

The World On Time SM

F A X

MONTGOMERY WATSON

4100 Spenard Road
Anchorage, Alaska 99517

Tel: (907) 248-8883
Fax: (907) 248-8884

Date: 8-15-96

To:	MW-LAB	**Fax No:**	612 551 1253
From:	Bonnie McLean	**Reference:**	2198.0460
Subject:	Bugs Coming	**No. of Pages: (including cover)**	2

If you do not receive all pages, or if there are any problems with this transmission, please call Brenda Yaw at 907-248-8883.

Two coolers sent 8-16 from
Anchorage - To Be rec'd
8-19 in MN.

Bon

enc: CoC
Fedx airbill

Army Corps of Engineers

Northeast Cape, Alaska

Sample Log-In Check List
Discrepancy Notice

MONTGOMERY WATSON

ATI-ALASKA

SAMPLE LOG-IN CHECKLIST

Coj C 3

ACCESSION #: 820687

CLIENT NAME: Mont. Watson

INITIALS: AB

SAMPLES TO BE SUBCONTRACTED? YES NO

RENTON X PORTLAND ___ FT COLL ___

PENS'CA X OTHER (list) ___

1. Are Custody seals present on cooler?	YES NO	16. Are all volatile samples headspace-free (<pea-size)?	N/A YES NO
If "YES", intact?	N/A YES NO	17. Are trip blanks included with the samples?	YES NO
2. Are Custody seals present on sample containers?	YES NO	18. Shipping container (circle one):	Cooler Box Other
If "YES", intact?	N/A YES NO	19. Packing material used?	YES NO
3. Is the Chain of Custody (C-O-C) complete ? *		20. Refrigerant (circle one):	Gel Ice Loose Ice None Other
Relinquished by the client?	YES NO	21. Was refrigerant frozen upon receipt?	YES NO
Analysis requested marked off?	YES NO	22. Cooler temperature:	4.5 °C 5.4 °C
4. Is the C-O-C in agreement with samples received?		23. Method of shipping (circle one):	Hand Del Courier Pick-Up
Sample ID's:	YES NO	24. Total number of containers received:	Soil: 25 Water: 9 Other: ___
Date sampled:	YES NO		
Matrix:	YES NO	Sample tagging check for QC:	
# Containers:	YES NO	Sample ID's issued in order of appearance on C-O-C:	YES NO
5. Has Project Notice binder been checked/lab notified?	YES NO	Tags placed in appropriate areas of sample containers:	YES NO
6. Has the main logbook been filled out properly?	YES NO	If not, were samples retagged?	YES NO
7. If samples are RUSH has notice been given?	N/A YES NO	Initials of reviewer:	MM
8. Is proper preservation indicated on label(s)?	N/A YES NO	Describe any "NO" items from checklist above:	
9. Did pH check verify preservative indicated?	N/A YES NO	For Samples 96NG2755106, 96NG2755107, +	
10. Is there correct sample volume for analyses?	YES NO	96NG2755108 the C.O.C. indicates 1 jar and	
11. Are samples in proper containers? (see ref. chart)	YES NO	we recived 2.	
12. Are samples in Brass tubes?	YES NO		
To be returned?	N/A YES NO	Was client contacted YES / NO / N/A	If "YES", date:
13.. Are all samples within holding times for requested analysis?	YES NO	Name of person contacted:	
14. Are all sample containers intact? (i.e. not broken, leaking...)	YES NO	Describe client instructions or actions taken:	
15. Are samples individually bagged ? (i.e. ziplock/bubble bag...)	YES NO		

* C-O-C or other representative documents, letters, and/or shipping memos.

SC_LOGIN.XLS

AK025.00 rev 2

U.S. ARMY CORPS OF ENGINEERS - NORTH PACIFIC DIVISION LABORATORY
1491 NW Graham Road, Troutdale, Oregon 97060-9508

From: Pamela O. Amie	Office: CENPP-PE-L	Telephone: (503) 666-8143
To: Del Thomas / Chris Brown	Office: CENPA / Montgomery Watson	Telephone: 907/753-2684 / (907)248-8883
Date: 8/8/96	Pages Sent: Header + 0	Signature:

HTRW Discrepancy Notification Form

Project Name: Northeast Cape, St. Lawrence Is. Psc II W.O.# 96-0314

Problems Encountered:

1. Custody Seals:
   - a. ☐ None present
   - b. ☐ Broken
   - c. ☐ Signature or date did not match Chain of Custody
   - d. ☐ Other ______
2. Chain of Custody Form:
   - a. ☐ Not signed
   - b. ☐ Not dated Complete date not used
   - c. ☐ Other ______
3. Temperature:
   - a. ☒ EPA requires coolers to arrive at the lab with an internal temperature of 4 ° Celsius ± 2 °, cooler arrived at 1.2 ° Celsius.
4. Packing of Samples:
   - a. ☐ Samples were not in individual plastic bags
   - b. ☐ Broken containers
   - c. ☐ Labels incomplete or did not agree with Chain of Custody
   - d. ☐ Improper container size used
   - e. ☐ Air bubbles in VOA vials, size of bubble _____.
   - f. ☐ Head space in containers
   - g. ☒ Improper preservative used
   - h. ☐ Other ______

Comments & Corrective action taken: 4a Received sample 96NE16TK301 for DRO unpreserved. Received sample 96NE11cTK301 for TRPH 418.1 unpreserved. Sample preserved at NPDL for both parameters

303 →
No Method on Label →
Should be for PCBs

If you have any problems or questions regarding this FAX call (503) 665-4166
Our FAX number is (503) 665-0371

U.S. ARMY CORPS OF ENGINEERS - NORTH PACIFIC DIVISION LABORATORY
1491 NW Graham Road, Troutdale, Oregon 97060-9508

From: Pamela O. Amie	Office: CENPP-PE-L	Telephone: (503) 666-8143
To: Chris Brown Del Thomas	Office: Montgomery Watson CENPA	Telephone: 907/248-8883 907/753-2681
Date: 8/9/96	Pages Sent: Header + 0	Signature: PDA

HTRW Discrepancy Notification Form

Project Name: Northeast Cape, St. Lawrence Island W.O.# 96-0314

Problems Encountered:

1. Custody Seals:
   - a. ☐ None present
   - b. ☐ Broken
   - c. ☐ Signature or date did not match Chain of Custody
   - d. ☐ Other ______________________

2. Chain of Custody Form:
   - a. ☐ Not signed
   - b. ☐ Not dated   Complete date not used
   - c. ☐ Other ______________________

3. Temperature:
   - a. ☒ EPA requires coolers to arrive at the lab with an internal temperature of 4 ° Celsius ± 2 °, cooler arrived at 12 ° Celsius.

4. Packing of Samples:
   - a. ☐ Samples were not in individual plastic bags
   - b. ☐ Broken containers
   - c. ☐ Labels incomplete or did not agree with Chain of Custody
   - d. ☐ Improper container size used
   - e. ☐ Air bubbles in VOA vials, size of bubble ______.
   - f. ☐ Head space in containers
   - g. ☐ Improper preservative used
   - h. ☒ Other Samples leaking

Comments & Corrective action taken: Received sample 96NETK302 for TCLP metals, PID 8015m and 8015 Glycol in separate bags. However, each sample had oil leaking from lid into bag.

If you have any problems or questions regarding this FAX call (503) 665-4166
Our FAX number is (503) 665-0371

ATI-ALASKA

SAMPLE LOG-IN CHECKLIST

Coy C 5

ACCESSION #: 820089

CLIENT NAME: Mont. Watson

INITIALS: AB

SAMPLES TO BE SUBCONTRACTED? YES NO

RENTON X **PORTLAND** ____ **FT COLL** ____

PENS'CA **OTHER (list)**

1. Are Custody seals present on cooler? YES NO
   If "YES", intact? N/A YES NO
2. Are Custody seals present on sample containers? YES NO
   If "YES", intact? N/A YES NO
3. Is the Chain of Custody (C-O-C) complete ? *
   Relinquished by the client? YES NO
   Analysis requested marked off? YES NO
4. Is the C-O-C in agreement with samples received?
   Sample ID's: YES NO
   Date sampled: YES NO
   Matrix: YES NO
   # Containers: YES NO
5. Has Project Notice binder been checked/lab notified? YES NO
6. Has the main logbook been filled out properly? YES NO
7. If samples are RUSH has notice been given? N/A YES NO
8. Is proper preservation indicated on label(s)? N/A YES NO
9. Did pH check verify preservative indicated? N/A YES NO
10. Is there correct sample volume for analyses? YES NO
11. Are samples in proper containers? (see ref. chart) YES NO
12. Are samples in Brass tubes? YES NO
    To be returned? N/A YES NO
13.. Are all samples within holding times for requested analysis? YES NO
14. Are all sample containers intact? (i.e. not broken, leaking...) YES NO
15. Are samples individually bagged ? YES NO
    (i.e. ziplock/bubble bag...)

16. Are all volatile samples headspace-free (<pea-size)? N/A YES NO
17. Are trip blanks included with the samples? YES NO
18. Shipping container (circle one): Cooler Box Other
19. Packing material used? YES NO
20. Refrigerant (circle one): Gel Ice Loose Ice None Other
21. Was refrigerant frozen upon receipt? YES NO
22. Cooler temperature: 4 °C ______ °C
23. Method of shipping (circle one): Hand Del Courier Pick-Up
24. Total number of containers received: Soil: 2 Water: __ Other: ____

Sample tagging check for QC:

Sample ID's issued in order of appearance on C-O-C: YES NO

Tags placed in appropriate areas of sample containers: YES NO

If not, were samples retagged? YES NO

Initials of reviewer: [illegible] 8/9/04

Describe any "NO" items from checklist above:

Was client contacted YES / NO / N/A If "YES", date:

Name of person contacted:

Describe client instructions or actions taken:

* C-O-C or other representative documents, letters, and/or shipping memos.

Army Corps of Engineers

Northeast Cape, Alaska

Field Correspondence

MONTGOMERY WATSON

Facsimile Sheet

U.S. Army Engineer District, Alaska

P.O. Box 898
Anchorage, Alaska 99506-0898

BOB SANDERS	EN-EE-II	Telephone No (907)-753-5617
		Fax No (907)-753-5646
VICTOR HARRIS	Office Symbol	Telephone No 443-3063
		Fax No
RRJ	# Pages 1	8/1/96

ST. Lawrence Projects

Victor,

No possibility on the wires...wrong color money...simply no BD/DR funds available. Do only the wire-cutting hours allocated in the DO. Take some good notes and photos of them under the Recon. part of your DO to serve as basis for a description for a Removal Work Plan. The poles themselves alert the local people as to where these wires are, and the obvious guy wires on the poles would tend to keep intelligent people away anyhow; so I do not think signs are in order. If anything they would attract people. I have no idea as to how to protect the reindeer.... "Wolf "scarecrows" ?? or, you might have Herman (?) Toolie simply talk to the reindeer about it...(hey... it works for Disney)

In trying to learn about Antennas and your manholes (Utilidors?), I read some interesting pamphlets intended to brief incomming crew about the st ation. The following statements intrigue me and therefore probably you, too. All but the third item are of unoffdicial interest. Do not go out of your way, but if you converse with Eugene Toolie you might ask about the following statements I found in the pamphlets:

No date, Apparently 1965: "There are 9 Eskimo families that live near the station in the Northeast Cape Village with 40-60 persons. The fluctuation is because school children live and attend schools on the main land." *Seems likely...homes for the local hires working on the station...such as Toolie. Can Toolie tell us about this. Would this be the "Lintsik" identified on the USGS Map?*

Ibid: "There is evidence of small abandoned camps on the island established temporarily by the Eskimos and other nations such as the Japanese who have been known to go north of Nome in search of coal". *There is coal North of Nome which whalers and Revenue Cutters mined...but I know of no Japanese use...probably an error, but does Eugene know of any "foriegn" camps?*

Ibid: "We have a fishing camp approximately 18 miles from the station. The fishing camp is reached by vehicle and motor boat." *Any Idea where?...Probably a leased or appropriated Native Camp....but could be Military Built, in which case it is of official concern and we should learn all we can about it.*

"From Nov. 1968 "What it is Like": "Local Eskimo Village has a small cofee Shop" *.....That local village again...Lietnik?,...the "Native Fish Camp?*

Incidently, according to a plot plan I found Bldg 101 was "H-shaped", the cross bar being the Laundary. I don't recall seeing such designation previousoly.

-Bob

Printed By: Bonnie Mclean 8/21/96 2:31 PM Page: 1
From: Chris Brown (8/21/96) Frank DeSteno (8/20/96)
To: Bonnie Mclean
CC:
BCC:
Priority: Normal Date sent: 8/21/96 11:56 AM

REGARDING ⇨ FWD>Biological Samples from Alaska

Bonnie, do you have this info?

Date: 8/20/96 14:18
From: Frank DeSteno
Chris, I need to know a few specifics about the biological samples collected on 8/5/96.

1. how many liters of water were filtered for the zooplankton and phytoplankton samples? 60 l. each

2. What are the measurements of the dregde that was used to collect the benthic invert samples? 6" x 6" x 2"

3. were the benthic samples filtered through a number 30 standard sieve size during e washing step? yes

4. Is there a special protocal that you want followed for the sorting procedure? If not I will sort the entire sample, making three complete passes viewing and hand picking out the organisms found. no, hand pick x 3

5. The samples are very heavy in detritous material and hand picking is going to be quite cumbersome, I think that I can pick and sort each jar in approximately two hours time and figure an hour for ID each container. OK, understand

If you can answer these questions, I would greatly appreciate it and I can get going on the sample sorting and ID work. I will keep you posted on how its going during the ID process.
Thanks CHUCK JOHNSON

Army Corps of Engineers

Northeast Cape, Alaska

Miscellaneous

MONTGOMERY WATSON

** stay in nome

	7/22/96	EQUIPMENT SENT TO NOME VIA NAC AIRBILL 49468031				
HAZ MAT						
* CAN GO TO GAMBLE DIRECT						
	ITEM	DISCRIPTION	#	EST. WT. EA.	EXTENDED WT.	REMARKS
	1,2	ATV	2	600	1200	
	3,4	TRL	2	150	300	W/1 WHEEL
	5,6,7	ATV WHEELS	3	20	60	
	8 TO 12	LUMBER	LOT	110	110	
	13	GENERATOR	1	110	110	
	14	PUMPS	2	140	140	2" TRASH
	15	PUMP	1	40	40	11/2"
	16	HOSE	1	45	45	60'
	17	BOTTLES	1	225	225	PALLET
	18	COOLERS	1	505	505	PALLET **
	19	COOLERS	1	505	505	PALLET **
	20,21,22	TOOLS	1	220	220	
	23	WATER	3	40	120	5-GAL. JUGS
	24	PAIL /WATER	1	15	15	GAMBEL
	25	PAIL/FUNNEL	1	10	10	
	26	FUEL PUMP	1	25	25	
	27	SHOVELS	2	10	20	
	28	FUEL CANS	2	10	20	
	29	HEXANE	1	10	10	IN PAIL
	30	BATTREY	1	35	35	W/CHARGER
	31	CAL. GAS	1	20	20	AIR, NOS
	32	H&S BOX	1	40	40	
	33,34	DRUMS	2	65	130	EMGERC.
	35	SLEEPING BAGS	1	20	20	
	36	WATER	2	15	30	DRINKING
	37,38,39	WATER	3	26	78	DI
	40	CUTTING SAW	1	24	24	IN COOLER
	41	PID	1	20	20	
	42	RADIOS	1	10	10	
	43	OFFICE STUFF	1	25	25	
	44	PACKING	1	25	25	**
	45	BUBBLE WRAP	1	12	12	**
	46	PERSONAL BAG	1	40	40	
					0	
GAMBEL					0	
	47	PID	1	20	20	
*	48	COOLERS	1	225	210	PALLET OF 7
*	49	BOTTLES	1	20	20	
570	50,51	WQ EQUIP.	2	45	90	
*	52	TOOLS	1	40	40	
*	53	PAIL/WATER		15	0	
*	54,55,56	BOOTLES	1	20	20	
*	57	PACKING	1	25	25	IN COOLER
*	58	GENERAL	1	35	35	IN COOLER
	59	FREEZER	1	110	110	~~[illegible]~~ Nome **
					4759	
	ADDITIONAL TO FOLLOW:					
		TOOLS	2	100	200	
		BATTRIES	2	25	50	ATV
		FORMIN	1	15	15	
		PERSONAL GEAR	4	40	160	
		PHONE	1	25	25	
					450	
	ADD IN NOME:					
		FUEL	3	550	1650	55-GAL DRUMS
EST. TOTAL					6859	

Airbill 4,868 #

SHIPPER'S DECLARATION FOR DANGEROUS GOODS (Provide at least two copies to the airline.)

Shipper **VWR SCIENTIFIC** **3745 Bayshore Blvd.** **Brisbane, CA 94005** **Ph. (415) 330-4154**	Air Waybill No. 24270974 / 245 71757 Page 1 of 1 Pages Shipper's Reference Number (optional) 005 81125002
Consignee MONTGOMERY WATSON AMERICA 4100 SPENARD ANCHORAGE AK 99517	
Two completed and signed copies of this Declaration must be handed to the operator	**WARNING** **Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.**
TRANSPORT DETAILS This shipment is within the limitations prescribed for: *(delete non-applicable)* PASSENGER AND CARGO AIRCRAFT | ~~CARGO~~ AIRCRAFT ONLY Airport of Departure Airport of Destination:	Shipment type: *(delete non-applicable)* NON-RADIOACTIVE [redacted]

NATURE AND QUANTITY OF DANGEROUS GOODS *(see Subsections 6.6 and 8.1 of IATA Dangerous Goods Regulations)*

Dangerous Goods Identification

Proper Shipping Name	Class or Division	UN or ID No.	Packing Group	Subsidiary Risk	Quantity and Type of packing	Packing Inst.	Authorization
ENVIROMENTALLY HAZARDOUS SUBSTANCES, N.O.S.. (FORMALDEHYDE SOLUTIONS)	9	UN3082	III		2 FIBERBOARD BOX CONTAINING 4L EACH	914	

Additional Handling Information

24 hr. Emergency Contact Tel. No. **1-800-424-9300**

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.	Name/Title of Signatory T UNDERWOOD SHIPPING SPV Place and Date **BRISBANE, CA 94005** 7 26 96 Signature *(see warning above)*

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper: Montgomery Watson
Nome, AK

Air Waybill No.

Page 1 of 2 Pages

Shipper's Reference Number *(optional)*

Consignee: Montgomery Watson
4100 Spenard
Anchorage AK 99575

NORTHERN AIR CARGO
Alaska's First and Only All-Cargo Airline

Two completed and signed copies of this Declaration must be handed to the operator

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: *(delete non-applicable)*

PASSENGER AND CARGO AIRCRAFT	~~CARGO AIRCRAFT ONLY~~

Airport of Departure: Nome

Airport of Destination: Anchorage

Shipment type: *(delete non-applicable)* NON-RADIOACTIVE ~~RADIOACTIVE~~

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification: Proper Shipping Name	Hazard Class & Subsid. risk	UN or ID No.	Packing Inst./Group	Quantity & Description	Pack. INST.	ERG#
BATTRIES, wet, filled W Acid	8	UN 2794	III	2 Battery inside wooden crate, 14 kg total	800	154
HexAnes,	3	UN 1208	II	1-500 ml. glass container inside plastic bucket w/lid	Y305	128
Engines, internal Combustion	9	UN 3166		2-4 wheelers, 905 kg. 1-generator, 55 kg	900 & 901	128
Compressed gas NOS (Isobutylene in Air)	2.2	UN 1956		2-107 Cubic liters metal cylinders inside fiberboard box	200	126

Additional Handling Information

EMERGENCY CONTACT TEL. NO. 1 800 535 5053

This shipment prepared according to: ☐ 49CFR ☒ IATA Regulations ☐ ICAO Regulations

I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labelled, and are in all respects in the proper condition for transport by air according to the applicable International and National Government Regulations.

Name/Title of Signatory: Bonnie McLean FTL

Place and Date: Nome, AK 8/8/86

Signature *(see warning above)*: Bonnie McLean

F-83 DETAILED

SHIPPER'S DECLARATION FOR DANGEROUS GOODS

Shipper: Montgomery WATSON
Nome AK

Air Waybill No.

Page 2 of 2 Pages

Shipper's Reference Number (optional)

Consignee
Montgomery WATSON
4100 Spenard Rd
Anchorage, AK. 99517

NORTHERN AIR CARGO
Alaska's First and Only All-Cargo Airline

Two completed and signed copies of this Declaration must be handed to the operator

WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties. This Declaration must not, in any circumstances, be completed and/or signed by a consolidator, a forwarder or an IATA cargo agent.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: *(delete non-applicable)*

PASSENGER AND CARGO AIRCRAFT	~~CARGO AIRCRAFT ONLY~~

Airport of Departure: Nome, AK

Airport of Destination: Anchorage, AK

Shipment type: *(delete non-applicable)* NON-RADIOACTIVE ~~RADIOACTIVE~~

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification: Proper Shipping Name	Hazard Class & Subsid. risk	UN or ID No.	Packing Inst./Group	Quantity & Description	Pack Inst	ERG#
BATTERIES, wet, filled with acid	8	UN 2794	III	2 - battery in ATV 14 Kg total	800	.. 1
ENVIRONMENTALLY HAZARDOUS Substance, NOS (Formaldehyde Solution)	9	UN 3082	III	2 plastic 4L bottles in fiberboard box, 4 Kg	914	171

Additional Handling Information

24 HR. EMERGENCY CONTACT TEL. NO. 1800 535 5053

This shipment prepared according to: ☐ 49CFR ☑ IATA Regulations ☐ ICAO Regulations

I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labelled, and are in all respects in the proper condition for transport by air according to the applicable International and National Government Regulations.

Name/Title of Signatory: Bonnie McLean FTL

Place and Date: Nome, AK, 8-8-96

Signature *(see warning above)*: Bonnie McLean

F-83 DETAILED

345 | AIRPORT OF DEPARTURE OME 4 938 5453 — 345 4 938 5453

NOT NEGOTIABLE
AIR WAYBILL
(AIR CONSIGNMENT NOTE)
NORTHERN AIR CARGO, Inc.
3900 W. INT'L AIRPORT RD., ANCHORAGE, AK 99502 (907) 243-3331
Copies 1, 2, and 3 of this Air Waybill are originals and have the same validity.

NAC NORTHERN AIR CARGO

PRIORITY ☐ **NACPAC** ☐

SHIPPER'S NAME AND ADDRESS: Montgomery Watson Amer, NOME AK	SHIPPER'S ACCOUNT NUMBER: 1355
CONSIGNEE'S NAME AND ADDRESS: Montgomery Watson Amer. Anchorage	CONSIGNEE'S ACCOUNT NUMBER:
ISSUING CARRIER'S AGENT NAME AND CITY:	
AGENTS IATA CODE:	ACCOUNT NO.:
AIRPORT OF DEPARTURE (ADDR. OF FIRST CARRIER) AND REQUESTED ROUTING: NOME	

IT IS AGREED THAT THE GOODS DESCRIBED HEREIN ARE ACCEPTED FOR CARRIAGE IN APPARENT GOOD ORDER (EXCEPT AS NOTED) AND SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. THE SHIPPER'S ATTENTION IS DRAWN TO NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY.

TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER AS PER TARIFF RULE UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HEREON.

ACCOUNTING INFORMATION (OPTIONAL ALSO NOTIFY NAME AND ADDRESS)
Prepaid charge
218.0460

ROUTING AND DESTINATION: TO ANC | BY FIRST CARRIER HU | TO | BY | TO | BY

CURRENCY | CHGS PP | WT/VAL PPD COLL | OTHER PPD COLL | DECLARED VALUE FOR CARRIAGE: 0 | DECLARED VALUE FOR CUSTOMS: 0

AIRPORT OF DESTINATION: Anchorage | FOR CARRIER USE ONLY: FLIGHT/DATE 0 | FLIGHT/DATE 0 | AMOUNT OF INSURANCE: 0

INSURANCE - If shipper requests insurance in accordance with conditions on reverse hereof, indicate amount to be insured in figures in box marked amount of insurance. | TC

HANDLING INFORMATION These commodities licensed by US for ultimate destination. Diversion contrary to US law is prohibited
ATTN: BONNY
1-907-248-8883

NO. OF PIECES RCP	GROSS WEIGHT	kg/lb	RATE CLASS / COMMODITY ITEM NO.	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)
12	4,277			4,277	.28	1,197.56	Tools, Fourwheels trailers.
12	4,277					1,197.56	

PREPAID	WEIGHT CHARGE	COLLECT
$1,197.56		
	VALUATION CHARGE	
	TAX	
$70.65	TOTAL OTHER CHARGES DUE AGENT	
$25.00	TOTAL OTHER CHARGES DUE CARRIER	
COD	CURRENCY	
TOTAL PREPAID: 1293.21		TOTAL COLLECT
CURRENCY CONVERSION RATES		TOTAL COLLECT IN DESTINATION CURRENCY

P-UP ZONE | PICKUP CHARGES B. | ORIGIN ADVANCE CHARGES K. | DESCRIPTION OF ORIGIN ADVANCE | ITEMS PREPAID

DEL ZONE | DELIVERY CHARGES C. | DEST. ADVANCE CHARGES L. | DESCRIPTION OF DEST. ADVANCE | ITEMS COLLECT

SHIPPER'S R.F.C. (AMOUNT TO BE ENTERED BY SHIPPER) J.

OTHER CHARGES AND DESCRIPTION: Fuel $70.65 $25.00 Hazmat

Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods (hazardous materials) such part is properly described by name and is in proper condition for carriage by air according to the applicable government regulations and, for international shipments, the current International Air Transport Association's Dangerous Goods Regulations. It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. THE SHIPPER'S ATTENTION IS DRAWN TO THE NOTICE CONCERNING CARRIERS LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and pay a supplemental charge if required.

X Bonnie McLeo [signature]
SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW.

☐ THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS
☒ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

EXECUTED ON 8/8/96 (Date) (Time) at ATS Nome (Place) Brent M. Walker SIGNATURE OF ISSUING CARRIER OR ITS AGENT

FOR CARRIERS USE ONLY AT DESTINATION (ALL COLLECT CHARGES IN DESTINATION CURRENCY) | CHARGES AT DESTINATION | TOTAL COLLECT CHARGES

345 4 938 5453

DISTRIBUTION MASTER

Consignee Montgomery Watson

Origin EME Destination ANC

Master Airway Bill 4938 5453

Part A Name	Contact Phone	# Pieces 6
Description		
Signature in Anchorage Clint 8/12		
Part B Name	Contact Phone	# Pieces 4
Description		
Signature in Anchorage Clint		
Part C Name	Contact Phone	# Pieces 2
Description missing pcs		
Signature in Anchorage		
Part D Name	Contact Phone	# Pieces
Description		
Signature in Anchorage		
Part E Name	Contact Phone	# Pieces
Description		
Signature in Anchorage		

7¢
11

distrib.pla.10/14/93

345 4938 5453

345 4938 5453

NOT NEGOTIABLE

AIR WAYBILL

(AIR CONSIGNMENT NOTE)

NORTHERN AIR CARGO, Inc.

3900 W. INT'L AIRPORT RD. ANCHORAGE, AK 99502 (907) 243-3331

Copies 1, 2, and 3 of this Air Waybill are originals and have the same validity

PRIORITY **NACPAC**

SHIPPER'S NAME AND ADDRESS: Montgomery Watson Amer. — Nome AK

SHIPPER'S ACCOUNT NUMBER: 1555

CONSIGNEE'S NAME AND ADDRESS: Montgomery Watson Amer. — Anchorage

ISSUING CARRIER'S AGENT NAME AND CITY

AGENTS IATA CODE | ACCOUNT NO.

AIRPORT OF DEPARTURE: NOME

TO: ANC BY FIRST CARRIER: [illegible]

PP

AIRPORT OF DESTINATION: Anchorage

HANDLING INFORMATION: ATTN: [illegible] [illegible]

Ref AWB# 4938555[illegible]

ACCOUNTING INFORMATION: Prepaid Charge

ANC 8/16/[illegible]

NO. OF PIECES RCP	GROSS WEIGHT	RATE CLASS	CHARGEABLE WEIGHT	RATE	TOTAL	NATURE AND QUANTITY OF GOODS
10	~~3863~~		~~4207~~	.28	~~1177.96~~ 1[illegible]	[illegible]
2	[illegible]	400		51.00	162.40	[illegible]
					1378.76	
12	4,3[illegible]				~~1177.96~~	

PREPAID | **COLLECT**

~~1177.96~~

75.45

SHIPPER'S R.F.C.

F[illegible] 137

~~75.45~~

~~[illegible]~~ 111.45

COD

TOTAL PREPAID: ~~1292.31~~ 1390.31

EXECUTED ON: [illegible] (Date) (Time) at Nome (Place) — Brent [illegible] — SIGNATURE OF ISSUING CARRIER OR ITS AGENT

FOR CARRIERS USE ONLY AT DESTINATION

ALL COLLECT CHARGES IN DESTINATION CURRENCY

345 4938 5453

COPY 2 ORIGINAL FOR CONSIGNEE

345 4 938 5556 345 4 938 5556

NOT NEGOTIABLE

AIR WAYBILL

(AIR CONSIGNMENT NOTE)

NORTHERN AIR CARGO, Inc.
3900 W. INT'L AIRPORT RD. ANCHORAGE, AK 99502 (907) 243-3331
Copies 1, 2, and 3 of this Air Waybill are originals and have the same validity.

PRIORITY **NACPAC**

PIECES | SHIPPER'S NAME AND ADDRESS: Cape Smythe | SHIPPER'S ACCOUNT NUMBER

Nome

WEIGHT | CONSIGNEE'S NAME AND ADDRESS | CONSIGNEE'S ACCOUNT NUMBER: 1355

Montgomery Watson
~~~~ 266-1147
Anchorage AK Attn: Victor

It is agreed that the goods described herein are received in apparent good order, except as noted on the face hereof, SUBJECT TO THE CONDITIONS OF CONTRACT on the reverse hereof.

X Bommerich NAC 8/16/96 1200

DEST | ISSUING CARRIER'S AGENT NAME AND CITY | ACCOUNTING INFORMATION (OPTIONAL ALSO NOTIFY NAME AND ADDRESS)

INITIALS | AGENT'S IATA CODE | ACCOUNT NO.

P/3 Void AWB Ref #4938 5453
Called Charge

AIRPORT OF DEPARTURE (ADDR OF FIRST CARRIER) AND REQUESTED ROUTING: Nome

PERCENT | TO: A.C. | BY FIRST CARRIER: 21 | TO | BY | TO | BY | CURRENCY | CHGS CODE | PPD | COLL: X | PPD | COLL: X | DECLARED VALUE FOR CARRIAGE: ∅ | DECLARED VALUE FOR CUSTOMS: No Charge

AIRPORT OF DESTINATION: Anchorage | FLIGHT DATE | FLIGHT DATE | AMOUNT OF INSURANCE: ∅ | INSURANCE – If shipper requests insurance in accordance with conditions on reverse hereof, indicate amount to be insured in figures in box marked amount of insurance.

NACPAC | HANDLING INFORMATION

266-1147 8/14/96. 1.00 (N/A) Steph
Von ~~~~ Attn: Victor Harris

PRIORITY

NO. OF PIECES RCP	GROSS WEIGHT	kg lb	RATE CLASS / COMMODITY ITEM NO.	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)
9	326			326	.32	104.32	Lumber Earth NOT THIER. 3 five gal buckets Water
9	326					104.32	

DESCRIPT

11

PREPAID	WEIGHT CHARGE	COLLECT	PICK-UP CHARGES	ORIGIN ADVANCE CHARGES	DESCRIPTION OF ORIGIN ADVANCE	TERMS PREPAID
A.		104.32	B X	K		
	VALUATION CHARGE		DELIVERY CHARGES	DEST. ADVANCE CHARGES	DESCRIPTION OF DEST. ADVANCE	TERMS COLLECT
D.			C X	L		
	TAX		**SHIPPER'S R.F.C.**	OTHER CHARGES AND DESCRIPTION		
			J.	6.15 Fuel		

TOTAL OTHER CHARGES DUE AGENT

TOTAL OTHER CHARGES DUE CARRIER: 6.15

COD O/C

TOTAL PREPAID | TOTAL COLLECT: 110.47

Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Government regulations and for international shipments, the current International Air Transport Association's Dangerous Goods Regulations. It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. THE SHIPPER'S ATTENTION IS DRAWN OF THE NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and paying a supplemental charge if required.

X

SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW

☐ THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS ☐ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

EXECUTED ON 8/13/96 4:00 OME ATS TL
(Date) (Time) at (Place) SIGNATURE OF ISSUING CARRIER OR ITS AGENT

FOR CARRIERS USE ONLY AT DESTINATION (ALL COLLECT CHARGES IN DESTINATION CURRENCY) | CHARGES AT DESTINATION | TOTAL COLLECT CHARGES

345 4 938 5556

COPY 2 ORIGINAL FOR CONSIGNEE
~~~~

345 | OME 4 938 5556

345 4 938 5556

SHIPPER'S NAME AND ADDRESS

Cape Smythe

Nome

SHIPPER'S ACCOUNT NUMBER

NOT NEGOTIABLE

AIR WAYBILL

(AIR CONSIGNMENT NOTE)

NORTHERN AIR CARGO, Inc.

3900 W. INT'L AIRPORT RD., ANCHORAGE, AK 99502 (907) 243-3331

Copies 1, 2, and 3 of this Air Waybill are originals and have the same validity.

NAC NORTHERN AIR CARGO

PRIORITY ☐ **NACPAC** ☐

PIECES

WEIGHT

DEST

INITIALS

PERCENT

NAC-PAC

PRIORITY

DESCRIPT

CONSIGNEE'S NAME AND ADDRESS

CONSIGNEE'S ACCOUNT NUMBER: 1355

Montgomery Watson

~~[illegible]~~ 266-1147

Anchorage AK Attn: Victor

IT IS AGREED THAT THE GOODS DESCRIBED HEREIN ARE ACCEPTED FOR CARRIAGE IN APPARENT GOOD ORDER (EXCEPT AS NOTED) AND SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. THE SHIPPER'S ATTENTION IS DRAWN TO NOTICE CONCERNING CARRIER'S LIMITATION OF LIABILITY.

TO EXPEDITE MOVEMENT, SHIPMENT MAY BE DIVERTED TO MOTOR OR OTHER CARRIER AS PER TARIFF RULE UNLESS SHIPPER GIVES OTHER INSTRUCTIONS HEREON.

ISSUING CARRIER'S AGENT NAME AND CITY

FAX 248-8884

ACCOUNTING INFORMATION (OPTIONAL ALSO NOTIFY NAME AND ADDRESS)

Collect Charge

AGENTS IATA CODE | ACCOUNT NO

AIRPORT OF DEPARTURE (ADDR OF FIRST CARRIER) AND REQUESTED ROUTING: Nome

ROUTING AND DESTINATION

TO	BY FIRST CARRIER	TO	BY	TO	BY	CURRENCY	CHGS CODE	WT/VAL PPD	WT/VAL COLL	OTHER PPD	OTHER COLL	DECLARED VALUE FOR CARRIAGE	DECLARED VALUE FOR CUSTOMS
Anc	21					USD	CX		X		X	Ø	Ø

AIRPORT OF DESTINATION: Anchorage

FOR CARRIER USE ONLY — FLIGHT/DATE | FLIGHT/DATE

AMOUNT OF INSURANCE: Ø

INSURANCE — If shipper requests insurance in accordance with conditions on reverse hereof, indicate amount to be insured in figures in box marked amount of insurance.

HANDLING INFORMATION

266-1147

NOA ~~[illegible]-8883~~ Attn: Victor

NO OF PIECES RCP	GROSS WEIGHT	kg lb	RATE CLASS / COMMODITY ITEM NO	CHARGEABLE WEIGHT	RATE / CHARGE	TOTAL	NATURE AND QUANTITY OF GOODS (INCL. DIMENSIONS OR VOLUME)
9	326			326	.32	104.32	Lumber Ladder 3 five gal buckets Water
9	326					104.32	

PREPAID	WEIGHT CHARGE	COLLECT
A.		104.32

PICKUP CHARGES: B. X (PUP ZONE X)

ORIGIN ADVANCE C: K.

VALUATION CHARGE: D.

DELIVERY CHARGES: C. X (DEL ZONE X)

DEST ADVANCE CH: L.

TAX: I.

SHIPPER'S R.F.C. (AMOUNT TO BE ENTERED BY SHIPPER): J.

OTHER CH: 6.15

ITEMS PREPAID

ITEMS COLLECT

Do Not pay

TOTAL OTHER CHARGES DUE AGENT

TOTAL OTHER CHARGES DUE CARRIER: 6.15

Shipper certifies that the particulars on the face hereof ar[e correct and that insofar] as any part of the consignment contains dangerous goods (hazardous materials) such part is properly described by name and is in proper condition for carriage by air according to the applicable government regulations and, for international shipments, the current International Air Transport Association's Dangerous Goods Regulations. It is agreed that the goods described herein are accepted in apparent good order and condition (except as noted) for carriage. SUBJECT TO THE CONDITIONS OF CONTRACT ON THE REVERSE HEREOF. THE SHIPPER'S ATTENTION IS DRAWN OF THE NOTICE CONCERNING CARRIERS LIMITATION OF LIABILITY. Shipper may increase such limitation of liability by declaring a higher value for carriage and pay a supplemental charge if required.

X K. Buenthu - Cape Smythe Air

SIGNATURE OF SHIPPER ABOVE AND INITIAL APPLICABLE BOX BELOW.

COD → CURRENCY

☐ THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS ☐ THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

TOTAL PREPAID | TOTAL COLLECT: 110.47

CURRENCY CONVERSION RATES | TOTAL COLLECT IN DESTINATION CURRENCY

EXECUTED ON 8/13/96 (Date) 400 (Time) at OME (Place) ATS

SIGNATURE OF ISSUING CARRIER OR ITS AGENT

FOR CARRIERS USE ONLY AT DESTINATION (ALL COLLECT CHARGES IN DESTINATION CURRENCY)

CHARGES AT DESTINATION | TOTAL COLLECT CHARGES

345 4 938 5556

COPY 3 ORIGINAL FOR SHIPPER

Army Corps of Engineers

Northeast Cape, Alaska

1998 Sample Plan Checklist

MONTGOMERY WATSON

Army Corps of Engineers

Northeast Cape, Alaska

1998 Field Notebooks

MONTGOMERY WATSON

SAMPLE CHECKLIST
1998 PHASE II REMEDIAL INVESTIGATION
NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Quanterra
~~Multichem Analytical Services,~~ Contact: ~~Mike Vogel~~ Cindy LeFevre
~~2008 W. International Airport R~~ Phone: (907) ~~248-8273~~ 265-8128 / 265-9263 FAX
Anchorage, AK 99502 Fax: (907) ~~248-8274~~

7-DAY TURNAROUND				Field		Water												Soil											
Sample Identification	Date	Time	Depth	PID Sample Required	PID Reading (in PID Units)	BTEX - EPA 8021A 3- 40 ml glass vials w/ teflon-lined cap, HCl	GRO - AK101 1L amber glass w/teflon lined cap, 7/8 full, HCl	DRO - AK102 1L amber glass w/teflon lined cap, 7/8 full, HCl	AAF DRO - ADEC 18 AAC 75 2- 1L amber glass w/teflon lined cap, 7/8 full, HCl	RRO - AK103 1L amber glass w/teflon lined cap, 7/8 full, HCl	AAF RRO - ADEC 18 AAC 75 2- 1L amber glass w/teflon lined cap, 7/8 full, HCl	PAHs - EPA 8270 SIM 2- 1L amber glass w/Teflon line cap, 7/8 full	VOCs - EPA 8260 3- 40 ml glass vials w/ teflon-lined cap, HCl	PCBs - EPA 8082 8 oz amber glass	Lead - EPA 7241 500 ml polyethylene w/HNO3	Total Organic Carbon - EPA 415.1 250 ml amber glass w/H2SO4	Natural Attenuation Parameters see CoC	BTEX - EPA 8021A 4 oz jar w/ teflon-lined cap, MeOH	DRO - AK102 4 oz amber glass with teflon-lined cap	AAF DRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	RRO - AK103 4 oz amber glass with teflon-lined cap	AAF RRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	PAHs EPA 8270 SIM 8 oz amber glass w/teflon lined cap	PCBs - EPA 8270 SIM 8 oz amber	Dioxin	TOC 9060 MOD 4 oz glass w/teflon lined cap	Bulk Density ASTM D2937	Moisture Content ASTM D2216	Seive Analysis D2487-93
SITE 2		Budgeted Maximum Number of Samples																2	2		1		1						
SOIL																													
98NE02SS 801	9-14	1600	2.1'	X		DRO/RRO/PAH/DC 301 @ 1610												X	X		X		X						
98NE02SS 802	9-14	1615	.5	X		201 @ 1615												X	X		~~X~~		~~X~~						
SITE 3		Budgeted Maximum Number of Samples				1		1				1																	
GROUNDWATER																													
98NE03GW 801	9-11	1730	WP1			X		X				X																	
SITE 4		Budgeted Maximum Number of Samples				1		1				1																	
GROUNDWATER																													
98NE04GW 801	9-11	1800	WP1			X		X				X																	
SITE 6		Budgeted Maximum Number of Samples																1	1	1						1	1	1	
SOIL																													
98NE06SS 801	9-15	1500		X														X	X	X						X	X	X	
98NE06SS 802	9-15	1510																											
SITE 7		Budgeted Maximum Number of Samples				1		1				1							1		1					1			
GROUNDWATER																													
98NE07GW 801	9-12	1215	7-4			X		X				X																	
SOIL																													
98NE07SS 801	9-15	1520		X															X		X								
98NE07SS				X																						X			

SAMPLE CHECKLIST
1998 PHASE II REMEDIAL INVESTIGATION
NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Quanterra
~~Multichem Analytical Services~~, Contact: ~~Mike Vogel~~ Cindy Lefevre
2000 W. International Airport R Phone: (907) ~~248-8273~~ 265-6128 / 265-9263 FAX
Anchorage, AK 99502 Fax: (907) ~~248-8274~~

7-DAY TURNAROUND

Field and Water analyses:

Sample Identification	Date	Time	Depth	Field: PID Sample Required	Field: PID Reading (in PID Units)	Water: BTEX - EPA 8021A 3 - 40 ml glass vials w/ teflon-lined cap, HCl	GRO - AK101 1L amber glass w/teflon lined cap, 7/8 full, HCl (2 - 40 ml)	DRO - AK102 1L amber glass w/teflon lined cap, 7/8 full, HCl	AAF DRO - ADEC 18 AAC 75 2 - 1L amber glass w/teflon lined cap, 7/8 full, HCl	RRO - AK103 1L amber glass w/teflon lined cap, 7/8 full, HCl	AAF RRO - ADEC 18 AAC 75 2 - 1L amber glass w/teflon lined cap, 7/8 full, HCl	PAHs - EPA 8270 SIM 2 - 1L amber glass w/Teflon line cap, 7/8 full	VOCs - EPA 8260 3 - 40 ml glass vials w/ teflon-lined cap, HCl	PCBs - EPA 8082 8 oz amber glass	Lead - EPA 7241 500 ml polyethylene w/HNO3	Total Organic Carbon - EPA 415.1 250 ml amber glass w/H2SO4	Natural Attenuation Parameters see CoC
SITE 9		**Budgeted Maximum Number of Samples**				3		3									
GROUNDWATER																	
98NE09GW 801	9-12	1500	9-1			X		X	White bottle liter?								
98NE09GW 802	9-12	1600	9-2			X		X	"				"				
98NE09GW 803	9-12	1630	9-3			X		X	"				"				
SOIL																	
98NE09SS 801	9-15	1540		X													
98NE09SS 802	9-15	1530		X													
SITES 10,11		**Budgeted Maximum Number of Samples**				4		4		4							
GROUNDWATER																	
98NE10GW 801	9-12	1730	10-1		QA/QC	X		X		X							
98NE10GW 802	9-12	1800	10-4			X		X		X							
98NE11GW 801	9-13	1130	11-2			X		X		X							
98NE11GW 802	9-13	1200	11-3			X		X		X							
SOIL																	
BKG 98NE10SS 801	9-15	1550		X													
SITE 14		**Budgeted Maximum Number of Samples**				1	1	1		1		1					1
GROUNDWATER																	
BKG 98NE14GW	9-11	1600	WP-1			X	X	X		X		X					X
98NE00GW 801																	
SOIL																	
98NE14SS 801	9-14	1330		X													
98NE14SS 802	9-14	1345		X													
98NE~~14SS~~				X													
00SS 801	9-14	1200															

Soil analyses:

Sample Identification	BTEX - EPA 8021A 4 oz jar w/ teflon-lined cap, MeOH	DRO - AK102 4 oz amber glass with teflon-lined cap	AAF DRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	RRO - AK103 4 oz amber glass with teflon-lined cap	AAF RRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	PAHs EPA 8270 SIM 8 oz amber glass w/teflon lined cap	PCBs - EPA 8270 SIM 8 oz amber	Dioxin	TOC 9060 MOD 4 oz glass w/teflon lined cap	Bulk Density ASTM D2937	Moisture Content ASTM D2216	Sieve Analysis D2487-93
SITE 9 (Budgeted Maximum Number of Samples)	1	1		1		1			1			
98NE09GW 801												
98NE09GW 802												
98NE09GW 803												
98NE09SS 801	X	X		X		X						
98NE09SS 802									X			
SITES 10,11 (Budgeted Maximum Number of Samples)	1	1	1	1					1		1	
98NE10GW 801												
98NE10GW 802												
98NE11GW 801												
98NE11GW 802												
98NE10SS 801	X	X	X	X					X		X	
SITE 14 (Budgeted Maximum Number of Samples)	2	2	1	2		1	1		1		1	
98NE14GW												
98NE14SS 801							X					
98NE14SS 802	X	X		X		X						
98NE~~14SS~~	X	X	X	X					X		X	
00SS 801												

SAMPLE CHECKLIST
1998 PHASE II REMEDIAL INVESTIGATION
NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Quanterra
~~Multichem Analytical Services~~, Contact: ~~Mike Vogel~~ Andy LaFevre
2000 W. International Airport Rd Phone: (907) ~~248-8293~~ 268-8128/268-9263 FAX
Anchorage, AK 99502 Fax: (907) ~~248-8274~~

7-DAY TURNAROUND

Sample Identification	Date	Time	Depth	Field: PID Sample Required	Field: PID Reading (in PID Units)	Water: BTEX - EPA 8021A (3- 40 ml glass vials w/ teflon-lined cap, HCl)	Water: GRO - AK101 (1L amber glass w/teflon lined cap, 7/8 full, HCl)	Water: DRO - AK102 (1L amber glass w/teflon lined cap, 7/8 full, HCl)	Water: AAF DRO - ADEC 18 AAC 75 (2- 1L amber glass w/teflon lined cap, 7/8 full, HCl)	Water: RRO - AK103 (1L amber glass w/teflon lined cap, 7/8 full, HCl)	Water: AAF RRO - ADEC 18 AAC 75 (2- 1L amber glass w/teflon lined cap, 7/8 full, HCl)	Water: PAHs - EPA 8270 SIM (2- 1L amber glass w/Teflon line cap, 7/8 full)	Water: VOCs - EPA 8260 (3- 40 ml glass vials w/ teflon-lined cap, HCl)	Water: PCBs - EPA 8082 (8 oz amber glass)	Water: Lead - EPA 7241 (500 ml polyethylene w/HNO_3)	Water: Total Organic Carbon - EPA 415.1 (250 ml amber glass w/H_2SO_4)	Water: Natural Attenuation Parameters (see CoC)	Soil: BTEX - EPA 8021A (4 oz jar w/ teflon-lined cap, MeOH)	Soil: DRO - AK102 (4 oz amber glass with teflon-lined cap)	Soil: AAF DRO - 18 AAC 75 (8 oz amber glass with teflon-lined cap)	Soil: RRO - AK103 (4 oz amber glass with teflon-lined cap)	Soil: AAF RRO - 18 AAC 75 (8 oz amber glass with teflon-lined cap)	Soil: PAHs EPA 8270 SIM (8 oz amber glass w/teflon lined cap)	Soil: PCBs - EPA 8270 SIM (8 oz amber)	Soil: Dioxin	Soil: TOC 9060 MOD (4 oz glass w/teflon lined cap)	Soil: Bulk Density ASTM D2937	Soil: Moisture Content ASTM D2216	Soil: Seive Analysis D2487-93
SITE 16		Budgeted Maximum Number of Samples											2		2														
GROUNDWATER																													
98NE16GW 801	9-13	1500	16-1			QA/QC+MS/MSD							X		X														
98NE16GW 802	9-13	1515	16-3										X		X														
98NE16GW 201	9-13	1510	16-1																										
SITE 25		Budgeted Maximum Number of Samples																							1				
SOIL																													
98NE25SS 801	9-13	1000	.5																						X				
MAIN OPERATIONS COMPLEX		Maximum Number of Samples				6	1	6		6			1				1							3					
GROUNDWATER																													
98NE13GW 801	9-13		13-1			X		X		X																			
98NE13GW 001	9-13	1630				X		X		X																			
98NE15GW 801	9-13	1630	15-1			X	QA/QC	X		X	QA/QC																		
98NE19GW 801	9-13	1230	19-1		MS/MSD	X		X		X			MS/MSD				ALL												
98NE27GW 801	9-12	1700	27-1			X		X		X																			
98NE27GW 001	9-13	1600				~~X~~	X	~~X~~		~~X~~			X				X												
98NECHGW 801	9-13	1430	R-2			X		X		X																			
SOIL																													
98NE13SS 801	9-14	1200																						X					
98NE13SS 802	9-14	1215																						X					
98NE13SS 803	9-14	1230																						X					
			14-1																										

RKC-98NEC CCSS01
9-14 1200
801?

98NEC 27SW001 9-16 1200 X X X
(2801?)
98NEC13GW802 9-16 1730

Soop

SAMPLE CHECKLIST
1998 PHASE II REMEDIAL INVESTIGATION
NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Multichem Analytical Services, Contact: Mike Vogel
2000 W. International Airport Phone: (907) 248-8273
Anchorage, AK 99502 Fax: (907) 248-8274

7-DAY TURNAROUND				Field		Water												Soil											
Sample Identification	Date	Time	Depth	PID Sample Required	PID Reading (in PID Units)	BTEX - EPA 8021A 3- 40 ml glass vials w/ teflon-lined cap, HCl	GRO - AK101 1L amber glass w/teflon lined cap, 7/8 full, HCl	DRO - AK102 1L amber glass w/teflon lined cap, 7/8 full, HCl	AAF DRO - ADEC 18 AAC 75 2- 1L amber glass w/teflon lined cap, 7/8 full, HCl	RRO - AK103 1L amber glass w/teflon lined cap, 7/8 full, HCl	AAF RRO - ADEC 18 AAC 75 2- 1L amber glass w/teflon lined cap, 7/8 full, HCl	PAHs - EPA 8270 SIM 2- 1L amber glass w/Teflon line cap, 7/8 full	VOCs - EPA 8260 3- 40 ml glass vials w/ teflon-lined cap, HCl	PCBs - EPA 8082 8 oz amber glass	Lead - EPA 7241 500 ml polyethylene w/HNO_3	Total Organic Carbon - EPA 415.1 250 ml amber glass w/H_2SO_4	Natural Attenuation Parameters see CoC	BTEX - EPA 8021A 4 oz jar w/ teflon-lined cap, MeOH	DRO - AK102 4 oz amber glass with teflon-lined cap	AAF DRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	RRO - AK103 4 oz amber glass with teflon-lined cap	AAF RRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	PAHs EPA 8270 SIM 8 oz amber glass w/teflon lined cap	PCBs - EPA 8270 SIM 8 oz amber	Dioxin	TOC 9060 MOD 4 oz glass w/teflon lined cap	Bulk Density ASTM D2937	Moisture Content ASTM D2216	Sieve Analyses D2487-93
DRAINAGE BASIN AREA		**Budgeted Maximum Number of Samples**																5	9	9	9	9	5	2		3	3	3	3
SEDIMENT																													
98NEDBSD 801	[illegible]	1710	6"															X	X	X	X	X	X				X	X	X
98NEDBSD 802	[illegible]	1730	6"															X	X	X	X	X	X				X	X	X
98NEDBSD 803	[illegible]	1750	6"															X	X	X	X	X	X				X	X	X
SOIL																													
98NEDBSS 803	[illegible]	[illegible]	6"	X																						X			
98NEDBSS 804	[illegible]	[illegible]	6	X																						X			
98NEDBSS 80[illegible]	[illegible]	[illegible]	6	X																						X			
98NEDBSS [illegible]	[illegible]	[illegible]	6	X															X	X	X	X							
98NEDBSS [illegible]	[illegible]	[illegible]	6	X															X	X	X	X							
98NEDBSS [illegible]	[illegible]	1840	[illegible]	X															X	X	X	X							
98NEDBSS [illegible]	[illegible]	[illegible]	6	X															X	X	X	X							
98NEDBSS 802	[illegible]	18[illegible]		X														X	X	X	X	X	X	X					
98NEDBSS 801	[illegible]	[illegible]	6	X														X	X	X	X	X	X	X					

SAMPLE CHECKLIST
1998 PHASE II REMEDIAL INVESTIGATION
NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Quanterra
~~Multichem Analytical Services~~, Contact: ~~Mike Vogel~~ Cindy LeFevre
2000 W. International Airport F Phone: (907) ~~248-8273~~ 265-8128/265-9263 FAX
Anchorage, AK 99502 Fax: (907) ~~248-8274~~

40ml

7-DAY TURNAROUND Sample Identification	Date	Time	Depth	Field: PID Sample Required	Field: PID Reading (in PID Units)	Water: BTEX - EPA 8021A 3- 40 ml glass vials w/ teflon-lined cap, HCl	Water: GRO - AK101 1L amber glass w/teflon lined cap, 7/8 full, HCl	Water: DRO - AK102 1L amber glass w/teflon lined cap, 7/8 full, HCl	Water: AAF DRO - ADEC 18 AAC 75 2- 1L amber glass w/teflon lined cap, 7/8 full, HCl	Water: RRO - AK103 1L amber glass w/teflon lined cap, 7/8 full, HCl	Water: AAF RRO - ADEC 18 AAC 75 2- 1L amber glass w/teflon lined cap, 7/8 full, HCl	Water: PAHs - EPA 8270 SIM 2- 1L amber glass w/Teflon line cap, 7/8 full	Water: VOCs - EPA 8260 3- 40 ml glass vials w/ teflon-lined cap, HCl	Water: PCBs - EPA 8082 8 oz amber glass	Water: Lead - EPA 7241 500 ml polyethylene w/HNO3	Water: Total Organic Carbon - EPA 415.1 250 ml amber glass w/H_2SO_4	Water: Natural Attenuation Parameters see CoC	Soil: BTEX - EPA 8021A 4 oz jar w/ teflon-lined cap, MeOH	Soil: DRO - AK102 4 oz amber glass with teflon-lined cap	Soil: AAF DRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	Soil: RRO - AK103 4 oz amber glass with teflon-lined cap	Soil: AAF RRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	Soil: PAHs EPA 8270 SIM 8 oz amber glass w/teflon lined cap	Soil: PCBs - EPA 8270 SIM 8 oz amber	Soil: Dioxin	Soil: TOC 9060 MOD 4 oz glass w/teflon lined cap	Soil: Bulk Density ASTM D2937	Soil: Moisture Content ASTM D2216	Soil: Seive Analysis D2487-93
UNCONTAMINATED (REFERENCE) DRAINAGE																													
Budgeted Maximum Number of Samples						2		2	2	2	2	2				2		2	2	2	2	2	2			2			
SURFACE WATER																													
98NEBKSW						X		X	X	X	X	X				X													
98NEBKSW						X		X	X	X	X	X				X													
SEDIMENT																													
98NEBKSD																		X	X	X	X	X	X			X			
98NEBKSD																		X	X	X	X	X	X			X			
98NEBKSD																													
TOTAL NUMBER OF PRIMARY SAMPLES						25	6	25	8	19	8	12	3	6	2	2	2	20	25	20	23	17	16	12	1	10	4	6	3
DUPLICATE SAMPLES					1	3	1	3	1	2	1	2	?	1				3	3	2	3	2	2	2		1			
QA SPLIT SAMPLES					1	3	1	3	1	2	1	2	1	1				3	3	2	3	2	2	2		1			
TRIP BLANK													1																
MS/MSD					1	~~2~~	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	1	1	1					
TOTAL SAMPLES						33	11	32	10	24	10	17	5	9	3	3	3	28	33	25	31	22	21	17	1	12	4	6	3

NO QC

NO QA/QC

MS/MSD

SAMPLE CHECKLIST
1998 PHASE II REMEDIAL INVESTIGATION
NORTHEAST CAPE, ST. LAWRENCE ISLAND, ALASKA

Quanterra
~~Multichem Analytical Services~~, Contact: ~~Mike Vogel~~ Andy LeFevre
2000 W. International Airport Rd Phone: (907) ~~248-8273~~ 265-8128/265-9263 FAX
Anchorage, AK 99502 Fax: (907) ~~248-8374~~

7-DAY TURNAROUND				Field		Water												Soil											
Sample Identification	Date	Time	Depth	PID Sample Required	PID Reading (in PID Units)	BTEX - EPA 8021A 3-40 ml glass vials w/ teflon-lined cap, HCl	GRO - AK101 1L amber glass w/teflon lined cap, 7/8 full, HCl	DRO - AK102 1L amber glass w/teflon lined cap, 7/8 full, HCl	AAF DRO - ADEC 18 AAC 75 2-1L amber glass w/teflon lined cap, 7/8 full, HCl	RRO - AK103 1L amber glass w/teflon lined cap, 7/8 full, HCl	AAF RRO - ADEC 18 AAC 75 2-1L amber glass w/teflon lined cap, 7/8 full, HCl	PAHs - EPA 8270 SIM 2-1L amber glass w/Teflon line cap, 7/8 full	VOCs - EPA 8260 3-40 ml glass vials w/ teflon-lined cap, HCl	PCBs - EPA 8082 8 oz amber glass	Lead - EPA 7241 500 ml polyethylene w/HNO_3	Total Organic Carbon - EPA 415.1 250 ml amber glass w/H_2SO_4	Natural Attenuation Parameters see CoC	BTEX - EPA 8021A 4 oz jar w/ teflon-lined cap, MeOH	DRO - AK102 4 oz amber glass with teflon-lined cap	AAF DRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	RRO - AK103 4 oz amber glass with teflon-lined cap	AAF RRO - 18 AAC 75 8 oz amber glass with teflon-lined cap	PAHs EPA 8270 SIM 8 oz amber glass w/teflon lined cap	PCBs - EPA 8270 SIM 8 oz amber	Dioxin	TOC 9060 MOD 4 oz glass w/teflon lined cap	Bulk Density ASTM D2937	Moisture Content ASTM D2216	Seive Analyses D2487-93
RECEPTOR CREEK AREA		Budgeted Maximum Number of Samples				6	6	6	6	6	6	6		6				6	6	6	6	6	6	6					
SURFACE WATER																													
98NERCSW 806	9-13	1245	6"			X	X	X	X	X	X	X		X															
98NERCSW 805	9-13	1330	6"			X	X	X	X	X	X	X		X															
98NERCSW 804	9-13	1400	6"			X	X	X	X	X	X	X		X															
98NERCSW 803	9-13	1430	6"			X	X	X	X	X	X	X		X															
98NERCSW 802	9-13	1530	6"		MS/SD	X	X	X	X	X	X	X		X															
98NERCSW 801	9-13	1755	6"			X	X	X	X	X	X	X		X															
202	9-13	1535	6"																										
SEDIMENT																													
98NERCSD 806	9/12/98	1830	6"															X	X	X	X	X	X	X					
98NERCSD 805	9/12/98	1900	6"															X	X	X	X	X	X	X					
98NERCSD 804	9/13/98	1415	6"															X	X	X	X	X	X	X					
98NERCSD 803	9/13/98	1415	6"															X	X	X	X	X	X	X					
98NERCSD 802	9/13/98	1600	6"			MS/SD												X	X	X	X	X	X	X					
98NERCSD 801	9/13/98	1800	6"															X	X	X	X	X	X	X					
202	9/13/98	1605	6"																										

NEG

SEPTEMBER 1998

"Rite in the Rain"

ALL-WEATHER

Horizontal Line

No. 390

Victor HARRIS

INCH CM

MEASUREMENT CONVERSIONS

IF YOU KNOW	MULTIPLY BY	TO FIND
LENGTH		
inches	2 540	centimeters
feet	30 480	centimeters
yards	0 914	meters
miles	1 609	kilometers
millimeters	0 039	inches
centimeters	0 393	inches
meters	3 280	feet
meters	1 093	yards
kilometers	0 621	miles
WEIGHT		
ounces	28 350	grams
pounds	0 453	kilograms
grams	0 035	ounces
kilograms	2 204	pounds
VOLUME		
fluid ounces	29 573	milliliters
pints	0 473	liters
quarts	0 946	liters
gallons (U S)	3 785	liters
milliliters	0 033	fluid ounces
liters	1 056	quarts
liters	0 264	gallons (U S)
TEMPERATURE		

°C = (°F - 32) x .555
°F = (°C x 1 8) + 32

Inches	Decimals of foot	Millimeters
1/16	0052	1 5875
1/8	0104	3 1750
3/16	0156	4 7625
1/4	0208	6 3500
5/16	0260	7 9350
3/8	0313	9 5250
1/2	0417	12 700
5/8	0521	15 875
3/4	0625	19 050
7/8	0729	22 225
1"	0833	25 400
2"	1667	50 800
3"	2500	76 200
4"	3333	101 60
5"	4167	127 00
6"	5000	152 40
7"	5833	177 80
8"	6667	203 20
9"	7500	228 60
10"	8333	254 00
11"	9167	279 40
1 foot	1 0000	304 80

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

Name Victor HARRIS

Address 4100 SPENARD ROAD
Anchorage, AK 99517

Phone (907) 266-1140

Project Northeast Cape
1998 Phase II FIELD Work

"Rite in the Rain" - a unique all-weather writing surface created to shed water and to enhance the written image. Makes it possible to write sharp, legible field data in any kind of weather.

a product of
J. L. DARLING CORPORATION
TACOMA, WA 98424-1017 USA

CONTENTS

ATT 1-800-528-6556
Apt No 12 443-2998
Apt No 6 443-2916
NAC - Shannon 5035
Jacobs 563-3322
Morie/MERRIAM - 984 6228 (Savoonga)
Rich Jackson 753-5606
Floyd Kingeekuk 984-6514

Bernie
Dee
Doug Dickerd
Rel.
Harold Brown

②

③

Chronological Notes –

9/9/98 Arr AIA w/ Bonnie 5:30a
FLT @ 6:15 cancelled – take
6:40 FLT via Kotzebue

Arr OME 10:00 – Bering has flown
to NEL w/ NAC pilot. check into
aptments

12:30p – NAC informs us NEL
fogged. NAC will offload gear
and transfer to Bering. Bonnie
investigate other transport. routes

13:00 Call Rich – request weather
day PFAQ and inform. Deb
not in office.

14:00 FLOYD calls – cannot reach Eugene

15:00 Vic & Bonnie mob to BERING

17:00 FINISH mob / repack tasks
@ Bering. Schedule CASA and
Navajo for work

17:30 – eat dinner, off

4

September 10, 1998 Thursday

7:30 Mob to Bering Air Bonnie loads Navajo. Casa will standby until word of clear weather Purchase supplies at store

9:10 LOAD INTO Navajo N4117B

9:16 ROTATE - 2 pilots

10:00 ARRIVE NEC ~ 300' CIELING

11:30 CASA ARRIVE - Bonnie, Vic SQUARE GEAR

13:30 CALL Deb - ADVISE

14:30 VIC/BONNIE RECON WELLS

SQUIRT BOTTLE

HAMMER TOW ROPE

1st USED

5

MW	STEEL ABOVE GL	FROM PVC T.D.	FROM PVC DTW	PVC ABOVE G.S	
	3.1'	12.09	3.66	3.31'	14:45
7-4					

APPARENT JACKING ~ 0.7'

NO SHEEN or ODOR OBSERVED

		(MUD)			
9-1	STEEL LOOSE	9.82	3.81	3.75'	15:00

APPARENT JACKING > 0.7'

NO SHEEN OR ODOR

9-2	STEEL LOOSE	8.57	4.93	3.81'	15:10

APPARENT JACKING > 1.2'

NO ODOR OR SHEEN

		MUD			
9-3	STEEL LOOSE	11.39	4.86	3.55	15:20

APPARENT JACKING 0.80'

NO ODOR or SHEEN

10-1 11.75' 2.00 2.01' 15:50

No APPARENT JACKING, but both casings loose

No APPARENT ODOR OR SHEEN

10-4 8.06 2.24 2.4' 16:00

No APPARENT JACKING, BUT CONC. CRACKED - CULVERT TYPE. No SHEEN or ODOR

11-2 12.01 6.74 6.56 16:10

CEMENT CRACKED, JACKING MINOR

(6)

MW	STEEL ABOVE G.L	FROM PVC T.D	FROM PVC DTW	PVC ABOVE G.L
11-3	2.79	20.11	8.69	2.41

No SHEEN, ODOR. Apparent Jacking ~ 0.2'

16-3	2.84	17.28	11.17	2.58

No JACKING APPARENT, NO ODOR, SHEEN

16-1	3.29	16.84	10.92	2.96

No APPARENT JACKING, smells similar to paint Thinner

13-2	2.75	16.40	8.05	2.42

No APPARENT JACKING. Diesel ODOR - slight -sheen?

13-1	3.09	17.65	11.11	2.82

No APP. JACKING Diesel smell

15-1	3.10	16.52	6.90	2.99

No APP JACKING. H.C (Diesel?) smell

27-1	2.27	20.19	2.53	2.22

SLIGHT JACKING of inner CASING, No JACKING of outer. Smell slight, No sheen - gas?

19-1	3.10	20.10	6.50	2.92

No APPARENT JACKING, No odor or sheen

(7)

MW	STEEL ABOVE G.L	PVC TD	PVC DTW	PVC ABOVE G.L
19.2	2.89	21.86	13.59	2.68

Jacking Approx 0.2' of outer steel - NO ODOR

22-1	3.55	35.51	25.96	2.95

Apparent Jacking 0.35' (steel only)

UNKNOWN - MW @ UST near Water Tanks

17:30 Mob to AIRPORT TO CALL BERING AIR. Drive to Site 4 to ASK Eugene to call us AT 8:00 Am for weather report

18:50 Take off from NEC ... 1 - 2 pilots

19:45 Arr Nome

20:15 Pick up Doug

20:30 Back to Apts, off

(8)

9-11-98

Mob to Bering 8:30A
-LOAD Navajo
Rotate 9:16 for NEL
pilot Larry +1

10:00 Mob gear and sat phone

11:00 → 14:00 INSTALL well points at Sites 3 + 4, 14

14:00 → 15:00 Lunch

15:30 - Stake ss locs (3) at NO., EAST, WEST SIDE of powerplant
16:00 - Stake site 25
17:00 Recon Site 9 AND STAKE
- MOUND SHOWN ON MAP IS only Approximately correct (map Appears inaccurate) It is an elongate E-W trending MOUND that Appears native (not a part of the landfill mass).

(9)

17:00 → 1900
Doug finishes sampling of WP @ site 3 (Bonnie and Doug have previously finished the background WP @ Site 14 and the WELL point @ Site 4.
- STOW GEAR
20:00 TAKE off from NEL in Navajo w/ Larry & Blond

20:45 Arr OME. Amanda & Eileen have taken Van - get taxi

21:30 Arr Home - off

NOT USED

(10)

NOTES ON TO-DO ITEMS

Site 2 - MAP STAINED SOILS - NONE
HAND AUGER or DIG ON PAD
(MOVE STAKE TO MARGINS)
Sites 3 & 4 - AS SURVEYOR ABOUT
apparent DISCREPANCY. DEBRIS
INVENTORY
Site 5 - BD/DE ✓
Site 6 - Staining Remap + water ✓
observe (sheen?). BD/DE

Site 7 - BD/DE, Note contents ✓
surface water map (sheen

Site 9 - map surface water ✓
Map MOUND. Note DEBRIS
type. Locate BACKGROUND

10, 11 Ask Eugene to visit
SITE AND Describe spill
- NAME CRK
update maps

(11)

STAKES:

Site	States
✓ 2	2 (SS)
7	1 background, 1 DRO/RRO
✓ 6	1 BKGRND
✓ 9	1 SOIL, 1 BCKGRND
✓ 10, 11	1 background
✓ 14	1 AST 1 DOOR [illegible] 14 1 BCKGRND
✓ 16	NONE
✓ 25	DIOXIN
✓ 13	3 DOOR

DB 3 SED FROM 27-1 to unnamed
2 SS FROM W.O CHANNEL
4 SS Delineation
6 Water / SED
* 2 SW/SED FROM UNKNOWN Ref
cannot take until
Ref channel selected

* Site 22 - Remap stained area

(12)

9-12-98

7:30 Mob to store for supplies
Amanda and Eileen have arrived
last night. Bonnie briefs Eileen.
8:20 Mob to Bering for
flight to NEC
ROTATE 8:58 w Koren + Blond
Piper Navajo 12E
Doug, Bonnie, Vic, Amanda

ARR NEC 9:45 - UNLOAD
10:30 - 15:00 Doug & Vic stake.
DB AND RC AREA. Bonnie
& Amanda sample 7-4

13:00-13:30 LUNCH
13:30 - 18:30 Bonnie & Amanda
sample sites 9, 10. Doug samples
SS & SEDS FROM DB and RC
AREA. Vic completes STAKING
of All remaining sites (including
photos).
19:04 ROTATE NEC w/ Blonde
+ 1 fem + Piper Navajo 12E.
* NOTE: CHON LOG SKIPS to p 25

(13)

Photo Log
Roll 1 9-12-98
FRAME
1 - RC SD 801 VIEW WEST
2 - " 802 " "
3 - " 803 " "
4 - " 804 " "
5 - DB SD 803 VIEW WEST - NOTE THIS sample
IS coincident w/ loc of SF-3
6 - DB 801 VIEW SO. THIS IS 20'
N.O. SF-3 line
7 - DB SS 804, VIEW NW. NOTE. pole 1
AND SD 802
8 - DB SD 802 VIEW SW
9 - DB SS 807 VIEW SOUTH
NOTE: THIS IS 15' E.O. 96 sample
10 - DB SD 803 @ No SIDE of POND
11 - DB SS 805 (TOC) VIEW SE
12 - DB SS 808 VIEW SW
13 DB SS 809 " "
14 DB SS 806 SE
15 DB SS 802
16 DB SS 801 SE
17 RC SD 806 WEST ~150' FROM BEND
18 RC SD 805 Note Pole 2

PHOTO Log Con't

19 - 13 SS 801 SE (W. SIDE of ECRN)
20 - 13 SS 802 SE (No. " ")
21 - 13 SS 803 V. SW
22. 09 SS 802 VIEW NW. Note MW 9-3
AND CB ROAD IN BCKGROUND
23 - MW 9-2 w/ 09 SS 801 IN BCKGRND
VIEW NE
24 - 09SS 801 9-2 IN BCKGRND VIEW SW
25 - 09SS 801 VIEW E. SHOWING MOUND
26 - 09 SS 801 VIEW SE
27 - 10 SS801 VIEW NW TANK 1 IN BCKGRND

—— ROLL 2 -

FRAME:
1 - 14SS 802, NW (E END of TANK 14-1)
2 - 14SS 801 VIEW W. (ENTRANCE to DRUMS)
3 - WT 14-1 and 00 SS 801. VIEW SE
MIK PAD and WHITE ALICE IN BCK.
4 - DB SHOWING DELIN, SED, and TOC
DOUG TAKING SAMP?, POLE 1, 2
5 - 06 SS 801 VIEW SO to SITE 6
6 - SO. SIDE of SITE 7 VIEW WEST
7 - 07SS 801 VIEW WEST. Note, this
is AN isolated AREA near DRUM
SIZE ≈ 5 ft²
8, 9 - Site 6 - SAMPLE LOC MAY be visable
left of SILVER CANNISTER (surf zone)

PHOTO Log Con't (ROLL 2)

10 - 07 SS 802 VIEW NE SHOWING
9-13-98 SLOPE OF L.F. MASS
11 - Site 5 Photo NW
12 - Site 25 SS 801 now west
13 - FROM 25 SHOWING CABLE AND
DRUMS to Site 24
14 - Site 5 DB Cat, DRUMS, Marston
matting in behind beach berm VIEW NE
15 - Site 3 pumphouse - note well point, TANKS
(SOIL sample was from TANK pan, 1994)
VIEW NNW
16 - Site 4 - LARGE TANK, VERTICAL WF
(note smaller tank not visable behind
larger tank)
17 - Site 6 (VIEW) E-SE
18 - Site 6 - close up of stained area
- this is probably heavy oil
19 - Site 6 - VIEW NO. Note stained
AREA AND BKGRND SAMPLE loc. in distance
20 - Site 6 - VIEW NE FROM OTHER SIDE
of POND. Note MW 6-1 AND BCKGND
sample loc. to RIGHT of ATV.
21 - Site 13 - Bonnie/Amanda sampling
of 13-1

(16)

22-27 - Site 21
PANORAMA - VIEW EAST to CISTERN,
ROTATING clockwis
Roll 3
FRAME 1-7 - completion of panorama
8 - Site 21 - typicall IRON OXIDE staining w/organic (vs. Petroleum sheen)
9 - inside of my pocket
10 - SITE 21 TANK - VIEW WEST, Note previous panorama was taken from cistern in background
11 - Site 16 - DRUMS believed to have been left by NES
12 - Site 2 view No. 2 soil sample loc
13 - Site 2 Staging area photo

(17)

22

23

Chron Log Con't 9-12-98

Note: TODAY I ASKED Eugene to NAME the receptor creek. He SAID IT HAD a name: "Sauki" This is UNDOUBTEDLY incorrect spelling, but Eugene could not HELP me w/ THE SPELLING

19:45 - LAND IN NOME
20:30 - End day @ Nanook apts

9-13-98
Mob to Airport 8:10
8:36 Rotate Navajo 12E w/Larry + Bela
Arr Nec 9:30
10:30 Vic mobs to Site 3, 4
Bonnie, Amanda to main ops
Doug = DB + Site 25

11:00 Visit SITE 5 - 55-60 RUSTED + empty
DRUMS 1 small engine (ie compressor)
and ~ 30 lbs misc metalic debris
- No evidence of release.
+ 2 gal metal trash cans
DRUMS BADLY RUSTED
msc Elec Debris (40lbs) 30' NW

11:25 Site 25
Foundation w/ ~ 1,000 lbs
of metal debris. W/ 20 drums.

12:00 - 12.45 Doug & Vic Recon
potential Ref Stream V.O. SITE
25. Access stream by end
of runway, left on beach,
then ~ 1 mi to point. ~ 1/4 mi
past shack

12:50 Site 5 - Loc of Cat on
beach. This SITE IS 300 to
500' E.O Eugene's House (scattered)
Estimate 75 Rusted DRUMS +
3,000 lbs marston matting
D-8 Cat on beach left circa
1961 Note: 100 W.O CAT
is only safe barge landing
Area (Rocks)

13:00 → 18:30 Bonnie / Amanda complete
MW sampling. Vic completes BD/OR
Doug works at Drainage basin

Note: Site 21 - No sheen Apparent
vegetation is lush. Iron bacteria
AND iron sheen typical. No disturbed
veg found.

18:00 Recon. site

19:00 Rotate NEC w/ Bede, Larry
Navajo

20:00 Arr OME

20:45 Talk with Rich on the
phone from Nome. He will
bring out Dee Ginter, Bernie
Gagnon, HAROLD BROWN (and
Rick Jackson)

NOT USED

9-14-98 (MONDAY)

07:45 Mob to AIRport

08:42 Rotate on King Air N79CF w/ Don Mulligen + Shane (helper) Bonnie, Amanda, Vic plus pilots Lorry and Jim

9:30 Per NEC, Line out surveyors

10:00 Coe ARRIVE - Bernie Gagnon, Rich Jackson, Dee Ginter, Harold Brown, Doug Dieter

MOB TO Main Op Complex so that Eugene can Explain how fuel leaked. Eugene explains: "There were 8 guys working on snow removal, 1 guy volunteered because there was lots of snow. He got too close to the tank and hit it. This happened on a Friday night. Three days later the commander

→ He covered it w/ snow and didn't tell anyone

It happened in March

discovered it, and saw fuel in the snow. This was in 1967/68. His name was Sgt. Keith. No cleanup was attempted. The diesel was 1" thick all the way to the mouth of the river. At least 100,000 gallons was lost. There was no ice, just blowing snow. The diesel probably followed the drainage course.

Eugene also described the drum storage at Site 10. Many drums, unknown contents. Removed by GI's in 1977.

Eugene also described the leak in the pipeline (3"?) that ran from the tanks to the 20K UST. It was discovered when the UST would not fill. It had been filling slowly for some time. Nobody knows how much was lost. This fuel was found in the snow in the adjacent drainage basin. This is the snow that was collected and burned north of Site 16 on the pad.

Eugene also described the Site 8 spill (junction of cargo and Airport roads). About 500 gallons was lost. This fuel was pumped by Eugene into a tank that now sits NE of the paint & dope building. Eugene later used this fuel for personal use after water separated from freezing.

RECAP:

YEAR	EST GALLONS	DESCRIPTION
1973	500	SITE 8 spill
1967/68	> 110K gal	Tank No 2
1971	UNKN	rupture of buried line - Site 15
1977	UNKN	fuel bladder

What sites

Eugene said that to his knowledge, there were no other major losses of fuel.

Vic also toured Site 13 and 14 with the group. We also looked at the estimated area of clean fill from the 1996 Phase II report. We looked at the MK well and the well by the water tanks. Rich and Dee went with me to the borrow area. Then Bernie, Dee, and Doug walked the drainage basin to the Airport.

Doug Dielert and went to the reference stream and staked two locations. The landward-most location is where bio sampling should occur.

Harold, Dee, Bernie and I tried to go to site 7 and spent about 5 min, but weather turned bad. COE left site about 16:00.

9-14-98 Con't

16:30 Went to talk to Eugene about spending the night.

Eugene noted that there is no fish in the reference stream we had selected. He noted also that the "unamed stream" (goes past Site 2) usually has breached the beach berm in the summer time.

Marie helped me with the spelling of the stream "Suqi" from hence forth we will call it the Suqi River. (There is no "O" in the Yupik language.

Amanda, Bonnie, Vic, Don, Shane leave NEC about 6:00 pm with Larry and another pilot → Kenai Air

9-15-98

8:00 am call Bering Air for weather report - unknown. Receive call about 8:15 that weather looks ok in Savoonga. MB to Airport and pick up Don Mulligan. After waiting for Shane, we leave Nome about 9:16 with Beth and blond male pilot in Navajo 12E.

Arr NEC 10:00

. Vic/Bonnie MIB STB and DS-2 gear to staging area

. Doug/Amanda take soil samples from reference creek

- Surveyors Don Mulligan and Shane finish surveying

13:00 Begin packing of STB

- fill Blue 55gal onepack. Est. wt 350 lbs

- 4 containers of DS-2 in yellow drums, only top container had fluid

2 - No 2 gouls, No Squad

1 - PPE

7 - yellow DRUMS total

1 - blue onepack

(34)

9-15-98 Con't

15:30 Demob from BLDG 101 w
Doug / Amanda continue
soil sampling. Bonnie completes
labeling of DRUMS AND paperwork
Swzerors complete work

Vic pays Eugene:

ATV	7 @ $100	700
BEAR	7 @ $100	700
	SHOES	(100)
	CIGS	(100)
		$ 1,200

18:15 Lv NEL w/ Pilots Lou
AND Dove IN King Aire
PAX: Bonnie / Doug / Amanda / Shane / Don / Vic

(35)

9-16-98

9:00 Doug, Bonnie, Amanda mob
to boring. Fly Navajo to
NEC arr 10:50
Casa follows
Navajo stands by
Ret. Nome. Left NEC
13:30
Arr Ome 14:00
Vic stays back - ERRANDS
PAY hotel bill and mail
certified mail for HAZ waste.

18:00 mob to Nome AIRport
to catch 18:40 flight

END FIELD NOTES

Victor E [signature]

"Rite in the Rain"®

All-Weather
HORIZONTAL LINE
NOTEBOOK
No. 391

1998 Northeast Cape, St. Lawrence
Montgomery Watson
Douglas Quist
9-11-98 to 9-16-98

4 5/8" x 7" with 48 Numbered Pages

"Rite in the Rain"®
ALL-WEATHER WRITING PAPER

INCHES

Name Douglas Quist
Montgomery Watson
Address 4100 Spenard Road
Anchorage, AK 99517
Phone (907) 248-8883

Project Northeast Cape RI 1998

CONTENTS

9-11-98 Northeast Cape, St. Lawrence Island

Mob to Site @ 0900

Begin Push Technology Well Point Installation @ Site 4.

Site 4 Well Point Complete

Begin Well Point Installation @ Site 3.

Site 3 Well Point Complete

Notice Discrepancy on Maps as to location of Sites 3 & 4 relative to one another Appears that Site 4 Should be up the Cargo Beach Road 100-150' towards the Main Complex Will have Surveyor

[signature] 9-11-98

9-11-98 Northeast Cape, St. Lawrence Island

Go to Sample Well Point @ Site 14
Geopump not working @ that depth
Will Hand Bail instead.

Sample Well Point 3-1 with hand Bailer goes dry will return.

Sample Well Point 4-1 with hand Bailer

Return to Complete Sampling @ 3-1 WP.

See Bonnie McClean Field Book for field parameters

[signature] 9-11-98

9-12-98 Northeast Cape, St. Lawrence Island

		Sampled	8 oz	8 oz	8 oz, 8 oz, 8 oz Mealt	
98NECDB~~SS~~801	✓	AAF DRO/RRO, DRO/RRO, PAH, PCB, BTEX				
98NECDBSS802	✓	"				
98 NECDBSS 803	✓	TOC				4 oz
98 NEC DB SS 804	✓	TOC				4 oz
98 NEC DB SS 805	✓	TOC				4 oz
98 NEC DB SS 806	✓	AAF DRO/RRO, DRO/RRO				
98 NEC DB SS 807	✓	"				
98 NEC DB SS 808	✓	"				
98 NEC DB SS 809	✓	"				

~~98 NEC DB SD 801~~ AAF DRO/RRO, DRO/RRO, PAH, BTEX
98 NEC DB SD 801 ✓ "
~~98 NEC DB SD 802~~ "
98 NEC DB SD 802 ✓ "
~~98 NEC DB SD 803~~ "
98 NEC DB SD 803 ✓ "

98 NEC RC SW/SD 801 AAF DRO/RRO, DRO/RRO, PAH, BTEX, SD PCB
98 NEC RC SW/SD 802
98 NEC RC SW/SD 803
98 NEC RC SW/SD 804
98 NEC RC SW/SD 805
98 NEC RC SW/SD 806

[signature] 9/12/98

9-12-98 Northeast Cape, St. Lawrence Island
Will Combine the following Due to Sample Jars Available.

DRO/RRO/AAF DRO/AAF RRO 8 oz
PAH/PCB 8 oz

Sampled All SS + SD from DB
Sampled SD from RC 801 + RC 802
Will Finish SD Sampling + SW's for all of RC on 9-13-98

DB
BD
RC ←
BK
TB

[signature] 9/12/98

9-13-98 Northeast Cape, St. Lawrence Island
0800 - Depart for Bering Air
Arrive @ NEC prepare for SS, SW/SD Sampling to Complete DB/RC then Continue onto Site 25.
Calibrated PID @ Ø + 97.00 ppm

Collect 98NEC25SS801 Next to
1000 SS(78 from 1994 RI.
PID Over Entire Site 0ppm

Follow Background Stream to Outlet @ Bering Sea

7/13/98

9-13-98 Northeast Cape, St Lawrence Island

- Collect 98NEC RCSW/SD 804
Water No Sheen / Sediment Very Stained & Odor
Collect 98NEC RCSW/SD 803
Water No Sheen When Undisturbed
Sediment Very Stained & Odor.

Collect 98NECRCSW/SD 802.
802 SW - 1530 202 SW - 1535 302 SW 1540
802 SD - 1600

Water	Primary	QA	QC	MS/MSD
DRO	1530	1540	1535	
DRO AAF	1530	1540	1535	
RRO	1530			~~1530~~
RRO AAF	1530	1540	1535	1530
PAH	1530	1540	1535	1530
PCB	1530	1540	1535	1530

Soil	P	QA	QC
	1600	1605	1610

7/13/98

9-13-98 Northeast Cape, St. Lawrence.

98NECRCSW801 1755
98NECRCSD801 1800
98NECRCSD201 1805 QC
98NECRCSD301 1810 QA

Sample appears unaffected by Diesel Spill @ Site 10. Very Deep Channel > 6'.

[signature] 9/13/98

9-14-98 Northeast Cape, St. Lawrence Island
Staying in Nome to Package Samples w/ Eileen -

[signature] 9/14/98

9-15-98 Northeast Cape, St. Lawrence Island
Reference Drainage
BTEX, DRO, RRO, DRO AAF, RRO AAF, PAH, TOC
3 VOAS, 4 X HCL, 2 X ϕ, 2 X VOA (X 2 sites)

BTEX, DRO, RRO, DRO AAF, RRO AAF, PAH, TOC
4 oz, (8 oz X 2) 4 oz X (2 sites)

98NECBKSW801 - 1030
98NECBKSD801 - 1045
98NECBKSW802 - 1000
98NECBKSW802 - 1015

Both Samples Appear Clean and have not been impacted by the Northeast Cape Site

Regroup @ site 2 for continued Surface Soil Sampling)

[signature] 9/15/98

9-15-98 Surface Soils
Site 6 98NEC06SS801 - BTEX, DRO, RRO 1500

Site 7 98NEC06SS802 - Relocate to Similar Soil
98NEC07SS802 - TOC 1520
Site 9 98NEC09SS801 1540
98NEC09SS802 1530
Site 10 98NEC10SS801 1550

Groundwater.
Site 13 MW13-1 1730

Site 27 MW27-1 1700
Amend COC to include PAH from DRO/or RRO Jar Collected 9-13-98
∞ Methane 1700

[signature] 9-15-98

1-16-98 Northeast Cape, St Lawrence Island
Depart Nome for Nec for Demob + Collect 1 SW.
27-Site - 1200

98NEC27SW801 -

BTEX	3 VOA
GRO	3 VOA
DRO	1 HCL
RRO	1 HCL
PAH	1 ø
~~TOC~~ e Pel	
Manganese	1 HNO_3
Nitrate/Sulfate/Alkalinity	1 cube
Field Parameters.	1 cube

Return to Complete DeMob.
Arrive Anchorage ≈ 2140

[signature] 9-16-98

"Rite in the Rain"®

All-Weather HORIZONTAL LINE NOTEBOOK
No. 391

NEC
1998
1189098.050101

4 5/8" x 7" with 48 Numbered Pages

Day 1
9-9-98 NEC 98 Wed.

0530 Arrived AIA
flight cancelled, rebooked on 645A to KOZ - Nome arriving 945

Called NEC - Don said can take two on jump seats from Nome

Called - left message Bering air to take NAE pilot to NEC

1000 arrived Nome - P/u VAN
Bering air - NEC
flight left 940 - [illegible]
Got apt help - Bering air
Called - heavy fog @ NEC
Could not see ground
NAE will off load equipmt

Spoke w/ Dave - Bering air
will use Cassa & Beach 1800
to get equipmt to NEC

@ B.A had to repack
Equipmt & prioritize

Bryan

9-9-98 (cont) NEC 98

for Cassa shipment.

1530 Completed breakdown
- Ice in freezer
- Gambell stuff on separate pallet
- to Store
- get gas 3 gals.

Called Deb - not in.
VH called Rich left message - for weather day.
Delayed DQ & Eileen for Thus
Broke out bottles.
Notify don't need apt. #6 this date.
Bgm

9-10-98 NEC Dz
Thurs

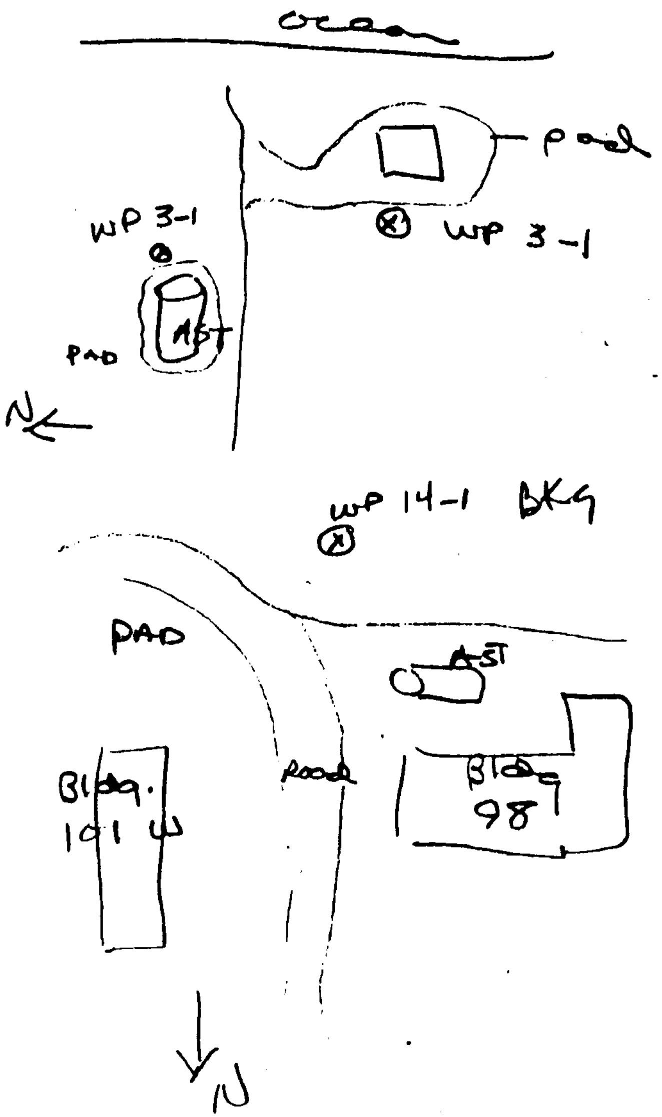
0800 @ BA loaded NAJ.
reviewed load plan for CASSA
1000 @ NEC - off loaded NAJ set up mob area
1120 Cassa arrives.
off loaded stuff
Eugene helps.
Set-up & sort equipmt
Set-up & test phone.
Victor starts staking sampling points
Calibrate all WQ equipment.

1900 NAJ arrives
2000 arrives Nome
Doug arrives AK Air
Get set up for Fridays sampling

Bgm

9-11-98

Well pt. construction



9-11-98 NEC D3 Friday

0800 arrive BA
0845 leave Nome
1000 arrive NEC
1030 Safety meeting
Set-up for Well pt. installation
Doug & Victor set DB sampling pt.
1230 Black arrives w/ ATV & Trl
1330 load up for well pt. construction
at Site 4, set WP 4-1 @ 3'
at Site 3 set WP 3-1 @ 3'
at Site 27-S of pad
Set WP-00 @ 9'

Well pt installed easily.

DB & I started sampling
WP 3, 4 & 27 completed
Packed up for travel to Nome, BA arrives 1930

Bgm

NO entry

9-11-98 (cont) NEC D3 Friday

Arrive Nome 2030
Eileen & Amanda arrived
Via AKAL
Plus VAN
DQ, VH, & I taxi to apt.
Called Eileen we arrived.
Call Don confirm survey Monday
2000 Reviewed samples complete this date.

Byrne

NO entry

no entry

D4
Sat

9-12-98

815 arrive BA, load up
900 leave Nome
1030 arrive NEC, off. load
1110 Safety meeting
Amanda & I set up for
GW sampling
Doug for SD/SW in DB
Victor to do inventory
Sampled
MW 7-1
MW 9-1, 9-2, 9-3
MW 10-1 10-2
1800 start pack up to Nome
1900 BA arrives
2000 arrive Nome,
2040 arrive Apt
review samples w/
Eileen

Byrne

D5

9-13-98 NEC Sun

810 @ BA
850 leave Nome
1000 arrive NEC
Safety meeting.
Prepare Sampling

GW 11-1 27-1
11-2
16-2 Collect
16-3 Sulfate only
15-1 for BKG "OO"
13-1 WP" 14-1

1900 B.A. arrives, leave NEC
2050 arrive Nome, offload
Confirm COE have NAJ for NEC-Mon.
Don calls confirms is in
Nome will be at B A.
@ 800

D6

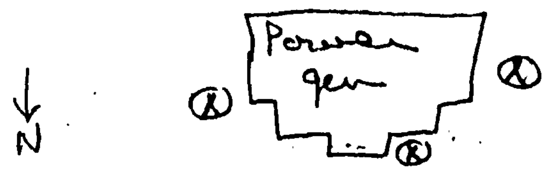
9-14-98 NEC Mon

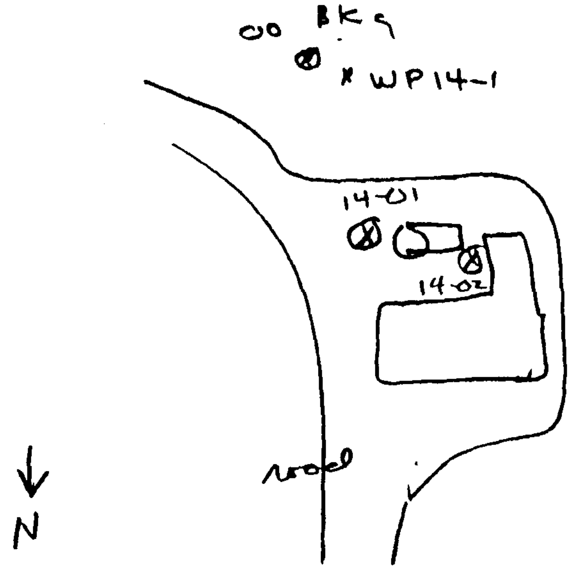
0800 at B A. load equip
take King air - Doug stays Nome
0830 leave Nome /w Surveyors
0930 arrive NEC
Weather heavy rain, cold
wind 20 knots
Eugene says will be
40 knots by pm.
Prepare to sample S.S.
Nay. arrives w/ 5 COE
Safety meeting - completed
Review needs w/ Don
for survey info.
Our radios won't work
with GPS running -

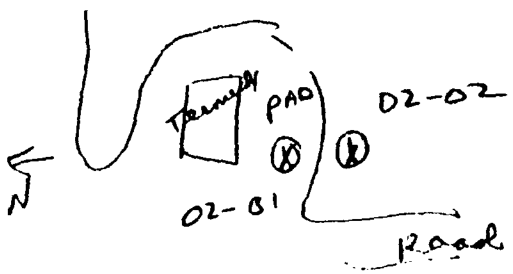
Weather a major factor
Some COE don't have
rain gear nor boots
Supply lined rubber
gloves, trash bags.
TAKE Rich to main complex
TAKE Eugene to house -
his ATV won't start

Barn

9-14-98







9-14-98 (cont) Monday

Dee is ATV Trained, review how ours work
Helmets offered - all refused
Wind increasing.

at site 13 completed

SS	13-1	@ .5'
	13-2	@ .5'
	13-3	at doors to @ .5'

Power gen Bldg

SS	00 -	Bkg near WP14-1
SS	14-1	.5
SS	14-2	.5

Terminal

SS 2-01	2'
SS 2-02	.5

Dee sign manifest for STB NEC 02
Nay pilots want to leave because of severe weather
Call BA for a phone for us.

B[illegible]

D6

9-14-98 NEC Mon
Cont
1600 CoE phone leaves
prepare for severe
winds
TAke down phone antennia
17.45 B.A. m
visibility better
leave for Nome
18.45 arrive Nome
Pack out Equipment
Review samples
Doug & Eileen get out
15 coolers - lays out
all wet gear
2000 to Dougs for dinner

Bagm

D7

9-15-98 NEC Tues
0810 @ BA
1010 NAO to NEC arrive
1040 Safety meeting -
Vic & I will set-up
for waste removal
DP & AD will complete
sampling:
MW 13-1
27-1 for addition
parameter
00- methane
only
and all remaining
soils.

1230 at Bldg 101 W.
Complete Safety Briefing
Doug & I will pack
waste.
Victor will be safety
person -
Amanda will not Suit
up & will be runner
& safety

Bagm

9-15-98 (cont.) NEC 1189098 . 050101

VH, DQ & Bgm suited up
w/ resp. - chlorine / HEPA
filter.
DQ & Bgm packed
STB - powder, wet from

5 - 5 gal rusted pails
in 1 - 55 gal HDP drum.
We shoveled with plastic
scoop, STB which had
spilled on floor from
rusted pail
The powder had gotten
wet & expanded - "Blowing"
the pails -
The STB had Expanded
to 150% of original size -
3-
The waste container was
completely full & weighed
≈ 400 lbs.
Moving was slow &
dangerous. The drum was
washed in the room. Bgm

The waste was removed.
Heavy rain had flooded
the room - 2-4" water was
on the floor.

The drum was moved
onto an ATV TLR &
secured.

Gloves & respirators filters
were changed to organic
& HEPA.

The four five gallon pails
of DB2 were stacked one on top
of each other in the
SW corner - Only the
top pail had any product
in it. the three remaining
pails were empty -
Each was placed into
a 12 gal epoxy lined
open top drum.
Bgm

9-15-98 (cont.) NEC

Six smaller cans-qt size were laying on the floor. three had "2" three had "3" on sides. The "2"'s were placed in one drum and the "3"'s in a separate drum.

All six drums were secured in a 2nd ATV.

Equipment was decontamined (wrench & shovel) placed in 6 mil bag. Gloves and Boots washed. PPE removed & bagged.

The drums were taken to the Terminal area. The STB remained on the ATV trl. placed on a liner.

The 6 little drums were placed on plywood

9-15-98 (cont.) NEC

over a liner at the pad area.

Drums were labeled and marked as appropriate.

De mob of equipment was started.

Surveyor reports finished. Weather getting worse. Call for King Air - 1730 King air arrives load some equipment. David (Bering Air) says remaining stuff should fit on Casa & NAW. 1900 arrive Nome - off load. Begun

1189098

9-16-98 NEC .050101

7^30 DQ takes cooler to AK AL

8 Calls Bering Air

Ck. out weather

awaiting gold shark manifest

of DS2 NEC-01

900 Victor to mail ADEC notes,

910 plu manifest NEC-01

1000 leave for NEC

1050 arrive NEC -

Visibility @ 110' - rough landing

Doug to collect Seep Sample

Start demob NAT.

Eugene arrives to help.

Cassa arrives

Drive ATV w/ STB Trl. on plane

Load DS2 in front

David sign Transporter #, for Bering Air

Completed demob.

1230 Take off NEC

1315 arrive Home

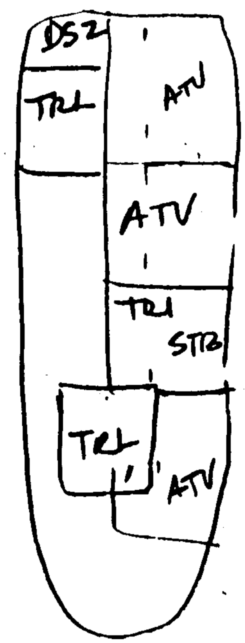
[signature]

Wed.

9-16-98 1189098 050101

Cassa load plan

Front CASSA Load



9-16-98 (cont) NEC
TOOK TRlr w/ STB & 6-drums
to NAC. Directly.
Went w/ David & observed
Transportation #2 sign off
by Sterling Buffas for NAC

Shipment Should go out WED
to Anchorage.
Call Deb let her know

Complete demob
separated some stuff to
Gambell.

To apt. cleaned out
refrig. / cupboards
Call Stamped - VAN will
be left at airport - keys
over visor per V. V. inst.

Filled w/ gas 31^{50} N/e.
automated system failed
to produce.
1845 Left Nome
2140 arrive Anchorage.
BJM

NEC

DURA Rite
WATERPROOF

HORIZONTAL LINE

NOTEBOOK NO. 691

St. Lawrence Island /
North East Cape 1998 Summer
Property of Montgomery Watson,
Anchorage, Alaska.
Amanda Dreyer/Environmental
Specialist

September 12, 1998
Amanda Dreyer; Bonnie
Doug
Victor

Arrived at airport "Bering Air" at 8:00am
Took off from airport at 8:30am
Arrived at campsite North East Cape at 9:45am
We unloaded the plane (not too difficult) and went into the camp. I recieved a safety and instrumentation use breifing by Bonnie.
We then took off to engage in some awsome monitoring well sampling.
We began sampling wells at 12:00am
We came back to unload the ATV from the beach plaine that landed around 3pm
then went back into the field to collect more samples.
The samples collected were:
Site 7
Site 13
Site 27
We finished sample collection for today at 6:00pm
We then loaded up the plane and took off at around 7pm. Now we are flying! We arrived back at the airport at 7:46pm
Amanda Dreyer

September 13th, 1998

Arrived at Airport at 8:15am, took off in plane at 8:30am. Arrived at North East Cape at 9:30am. We had our safety breifing and went out into the field. Bonnie and I collected samples from Monitoring Wells 11-2, 11-3, 19-1, 19-2, 16-1, 16-3, 15-1, 27-1, 13-1. We ~~kickout~~ AD kicked out a bunch! The plane arrived early. We packed it up and ~~was~~ AD took off at 7:00pm. We arrived at Nome at 8:00pm.
Amanda Dreyer

Sept. 14th on page 5

September ~~14th~~ 15th AD, 1998
Arrived at Airport at 8:15am, took off in plane at 8:30am, Arrived at NEC at 9:46am. Doug and I started sampling. We collected soil samples from Site 6 and took water surface samples from the Unnamed Receptor Creek - upstream and downstream. I collected samples from site 13 and 27-2 or 1 AD monitoring wells.
con't.

I also assisted in Decontamination of tools used to clean up the hazardous materials in one of the buildings. We then took the contained wastes to the airport staging area. We left NEC at 6pm and arrived in Nome at 7pm. I then assisted Doug in labeling for 1 hour later tonight.

Amanda Dreyer

September 16th, 1998
We left the airport at 9:30am and arrived at NEC at ~~9:3~~ 10:30am. We started packing up the ~~van at~~ plane and the bigger plane which flew in. We left at 12:30pm. We arrived at 1:30pm and unpacked and repacked untill 5:30pm. We then left for Alaska Airlines for our 6:45pm flight out of Nome to Anchorage. We arrived in Anchorage at 9:45pm.

Amanda Dreyer

September 14th, 1998
We left the airport at 8:30am and ~~at~~ started soil sampling. We left at ~~7pm~~ 8pm and returned to Nome at 8pm.

Amanda Dreyer

Army Corps of Engineers

Northeast Cape, Alaska

1998 Field Forms

MONTGOMERY WATSON

MONTGOMERY WATSON

FIELD NOTE FORM

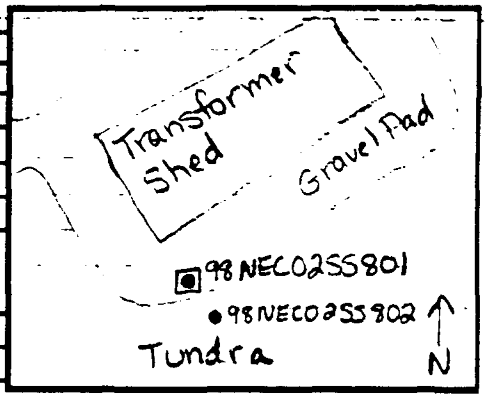
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site No. 2
Description:
98 NEC 02 SS 801

Sample ID:
Date: 9/14/1998
Time: 1600
Temperature: 35°F
Weather: rain 60 mph wind
Physical Description:(color, size, turbidity, stained soil, etc.)

Field Team: [redacted] BGM /AD
Sampler: BGM
Custody: Maintained
Photo: Roll# ______ Frame# ______

Swing Tie Data



Shipping Information

Chain-of-Custody Number: 98NEC012
Custody Seal Number:
Date Shipped: 9/15/98
Shipped Via: Gold streak
Laboratory Notified: ____ Initial ____ Phone X Fax ____ Date/Time

COMMENTS/PROBLEMS: grab taken at a depth of 2ft and one inch.

Complete Back Side

MONTGOMERY WATSON

FIELD NOTE FORM

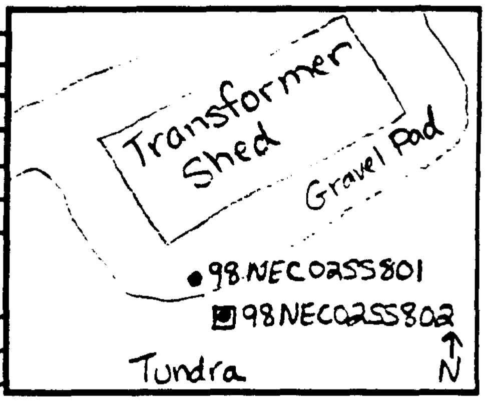
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site No. 2
Description:
98 NEC 02 SS 802

Sample ID:
Date: 9/14/1998
Time: 1615
Temperature: 35°F
Weather: rain 60 mph wind
Physical Description:(color, size, turbidity, stained soil, etc.)

Field Team: [redacted] BGM /AD
Sampler: AD
Custody: Maintained
Photo: Roll# ______ Frame# ______

Swing Tie Data



Shipping Information

Chain-of-Custody Number: 98NEC012
Custody Seal Number:
Date Shipped: 9/15/98
Shipped Via: Goldstreak
Laboratory Notified: ____ Initial ____ Phone X Fax ____ Date/Time

COMMENTS/PROBLEMS:

sample taken at a [illegible]

Complete Back Side

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NEC06SS801	Date 9 / 14 / 98 (month / day / year)	Time 1500

Sample Type

Surface Soil X	**Sample ID**		**Wipe**
Depth (ft) 6"	Temperature (°C)		**Lead Paint Chip**
Sediment	Conductivity (umhos/cm)		**TCLP Core Samples**
	pH		**Asbestos**
	TDS (mg/l)		
	BOD (mg/l)		

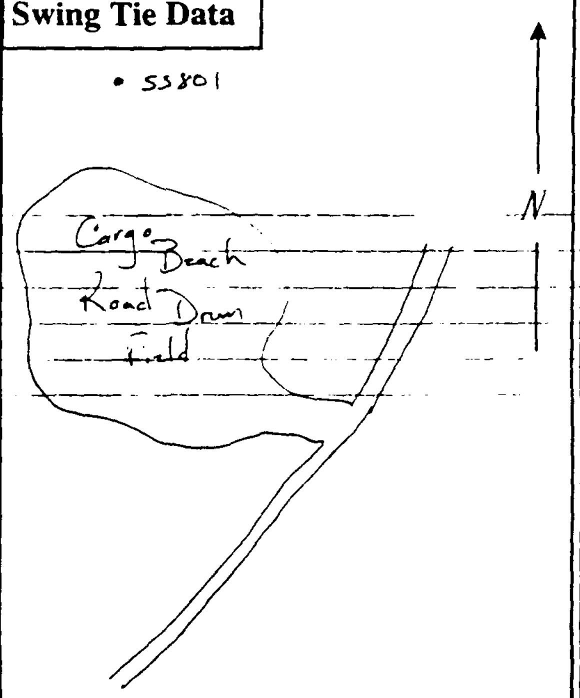
Field Information

Field Team DQ + AD	**Weather**
Sampler AD	Snow ____ Rain ____ Sleet ____ Hail
PID (ppm) 0	Foggy Overcast Partly Cloudy Clear
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Ambient Temperature** (°C)
	Photo Yes No Roll# Frame #

Shipping Information

Chain of Custody Number	98NEC015
Shipped Via	Goldstreak UPS FedEx DHL
Date Shipped	/ /
Airbill Number	

Swing Tie Data



Comments Background Sample - No Visible Contamination.

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NEC06SS802	Date 9 / 14 / 98 (month / day / year)	Time 1510

Sample Type

Surface Soil [X] Depth (ft) 6"	Sample ID [ ]	Wipe [ ]
Sediment [ ]	Temperature (°C) ____	Lead Paint Chip [ ]
	Conductivity (umhos/cm) ____	TCLP Core Samples [ ]
	pH ____	Asbestos [ ]
	TDS (mg/l) ____	
	BOD (mg/l) ____	

Field Information

Field Team DCf + AD

Sampler DCf

PID (ppm) NA

ELISA screening (<less than, >greater than): DRO 100 1000 ____; GRO 50 200 ____; PCB 5 50 ____; spectrophotometer ____

Weather
Snow Rain Sleet Hail
Foggy Overcast Partly Cloudy Clear

Ambient Temperature (°C) 42

Photo Yes No
Roll# NA Frame # NA

Shipping Information

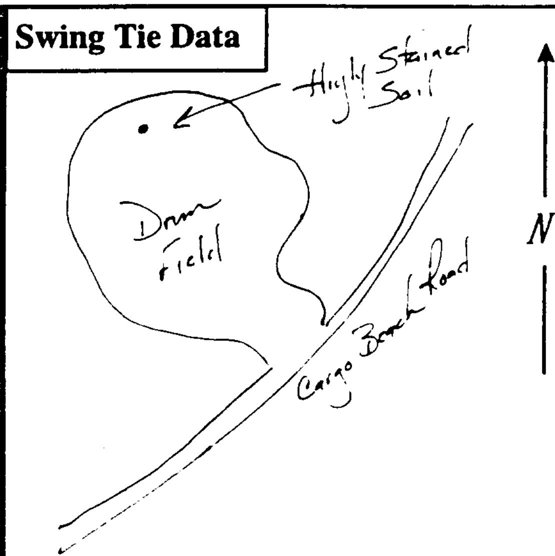
Chain of Custody Number 98NEC015

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/15/98

Airbill Number

Swing Tie Data



Comments

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NEC07SS802	Date 9 / 14 / 98 (month day year)	Time 1520

Sample Type

Surface Soil [X] Depth (ft) 6"	Sample ID [ ]	Wipe [ ]
Sediment [ ]	Temperature (°C) ____	Lead Paint Chip [ ]
	Conductivity (umhos/cm) ____	TCLP Core Samples [ ]
	pH ____	Asbestos [ ]
	TDS (mg/l) ____	
	BOD (mg/l) ____	

Field Information

Field Team DQ & AD	Weather: Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler AD	
PID (ppm) NA	Ambient Temperature (°C) 42
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	Photo Yes No; Roll# NA Frame # NA

Shipping Information

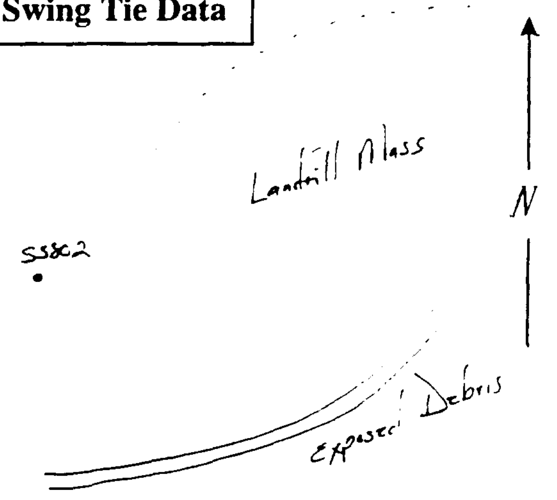
Chain of Custody Number 98NECC15

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/15/98

Airbill Number

Swing Tie Data



Comments

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NEC095SS801	**Date** 9 / 14 / 98 (month / day / year)	**Time** 1540

Sample Type

Surface Soil X	**Sample ID**		**Wipe**	
Depth (ft) 6"	Temperature (°C)	___	**Lead Paint Chip**	
Sediment	Conductivity (umhos/cm)	___	**TCLP Core Samples**	
	pH	___		
	TDS (mg/l)	___	**Asbestos**	
	BOD (mg/l)	___		

Field Information

Field Team LC & NA	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler LC	
PID (ppm) NA	**Ambient Temperature** (°C) 42
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No — Roll# NA Frame # NA

Shipping Information

Chain of Custody Number 98NEC015

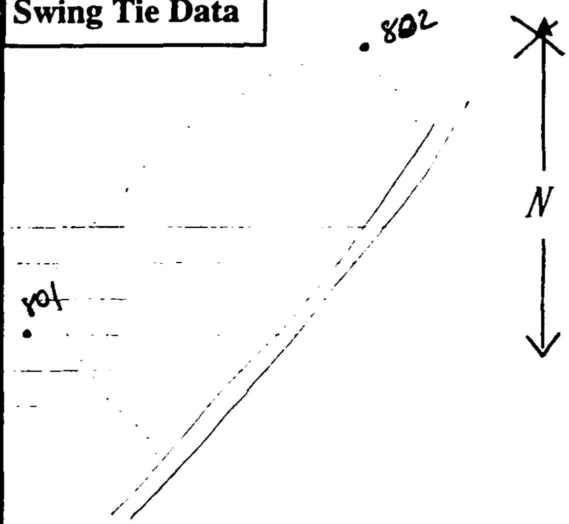
Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 7/15/98

Airbill Number

Comments

Swing Tie Data



MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NEC095S802	Date 9 / 14 / 98 (month day year)	Time 1530

Sample Type

Surface Soil [Y] Depth (ft) 6"	Sample ID [ ]	Wipe [ ]
	Temperature (°C) ___	Lead Paint Chip [ ]
	Conductivity (umhos/cm) ___	
Sediment [ ]	pH ___	TCLP Core Samples [ ]
	TDS (mg/l) ___	
	BOD (mg/l) ___	Asbestos [ ]

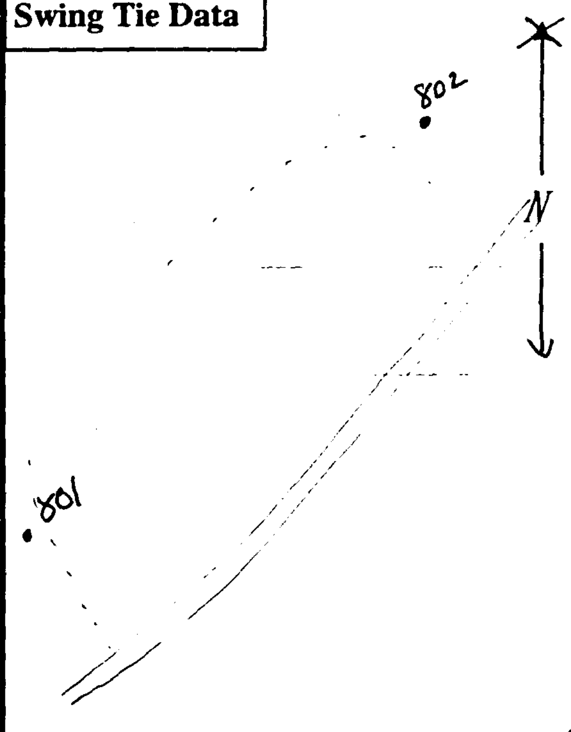
Field Information

Field Team DC + AL	Weather: Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DC	
PID (ppm) NA	Ambient Temperature (°C) 42
ELISA screening (<less than, >greater than, spectrophotometer): DRO 100 1000; GRO 50 200; PCB 5 50	Photo Yes No; Roll# NA Frame # NA

Shipping Information

Chain of Custody Number	98NEC015
Shipped Via	Goldstreak UPS FedEx DHL
Date Shipped	9/15/98
Airbill Number	

Swing Tie Data



Comments

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NEC1055801	Date 9 / 14 / 98 (month day year)	Time 1550

Sample Type

Surface Soil	X
Depth (ft)	6"
Sediment	

Sample ID
- Temperature (°C) ______
- Conductivity (umhos/cm) ______
- pH ______
- TDS (mg/l) ______
- BOD (mg/l) ______

Wipe	
Lead Paint Chip	
TCLP Core Samples	
Asbestos	

Field Information

Field Team	DG + AD
Sampler	DG
PID (ppm)	NA
ELISA screening <less than >greater than spectrophotometer	DRO 100 1000 ____ GRO 50 200 ____ PCB 5 50 ____

Weather
Snow Rain Sleet Hail
Foggy Overcast Partly Cloudy Clear

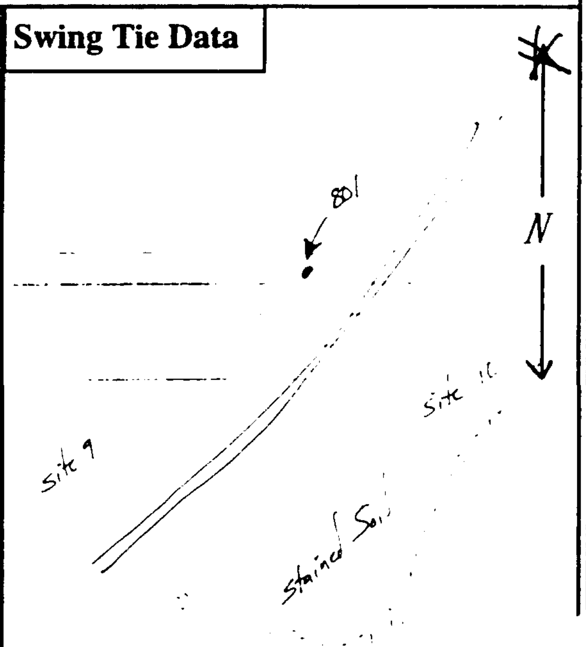
Ambient Temperature (°C) 42

Photo Yes No
Roll# NA Frame # NA

Shipping Information

Chain of Custody Number	98NECC15
Shipped Via	Goldstreak UPS FedEx DHL
Date Shipped	9/15/98
Airbill Number	

Swing Tie Data



Comments

MONTGOMERY WATSON

FIELD NOTE FORM

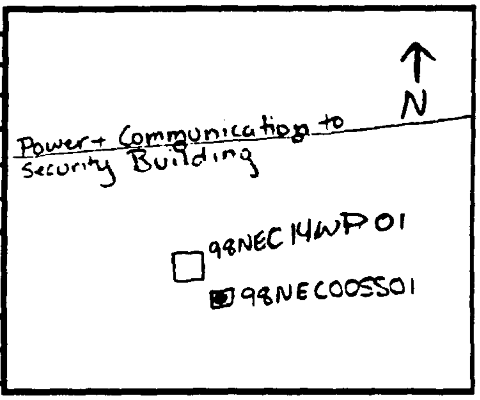
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site No. 14
Description: 98NEC00SS801

Sample ID:
Date: 9-14-1998
Time: 1200
Temperature: 35°
Weather: Windy, Rainy
Physical Description:(color, size, turbidity, stained soil, etc.)
No stain

Field Team: [redacted]
Sampler: BGM/AD
Custody: 98NEC012
Photo: Roll# ______ Frame# ______

Swing Tie Data



Shipping Information

Chain-of-Custody Number: 98NEC012
Custody Seal Number:
Date Shipped: 9-15-98
Shipped Via: Hand delivered
Laboratory Notified: ____Initial ____Phone ____Fax ____Date/Time

COMMENTS/PROBLEMS: at depth of 6 inches

Complete Back Side

MONTGOMERY WATSON

FIELD NOTE FORM

USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

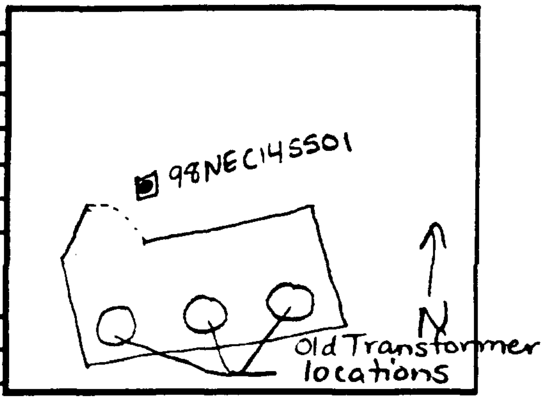
Site No. 14

Description: 98NEC14SS801

Sample ID:
Date: 9/14/98
Time: 1330
Temperature: 35°
Weather: Windy, Rainy
Physical Description:(color, size, turbidity, stained soil, etc.)

Field Team: [redacted]
Sampler: BGM/AD
Custody: 98NEC012
Photo: Roll# _____ Frame# _____

Swing Tie Data



Shipping Information

Chain-of-Custody Number: 98NEC012
Custody Seal Number:
Date Shipped: 9-15-98
Shipped Via: Hand delivered
Laboratory Notified: ____ Initial ____ Phone ____ Fax ____ Date/Time

COMMENTS/PROBLEMS: depth 6 inches

Complete Back Side

MONTGOMERY WATSON

FIELD NOTE FORM

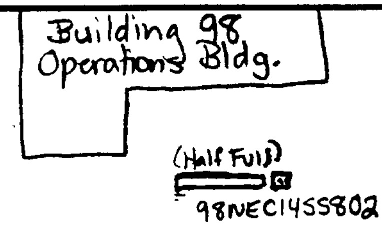
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site No. 14
Description: 98NEC14SS802

Sample ID:
Date: 9-14-1998
Time: 1345
Temperature: 35°F
Weather: Rainy, Windy
Physical Description:(color, size, turbidity, stained soil, etc.)

Field Team: [redacted]
Sampler: BGM/AD
Custody: 98NEC012
Photo: Roll# ______ Frame# ______

Swing Tie Data



Shipping Information

Chain-of-Custody Number: 98NEC012
Custody Seal Number:
Date Shipped: 9-15-1998
Shipped Via: Hand delivered
Laboratory Notified: ____ Initial ____ Phone ____ Fax ____ Date/Time

COMMENTS/PROBLEMS: depth @ 6 inches

Complete Back Side

MONTGOMERY WATSON

FIELD NOTE FORM

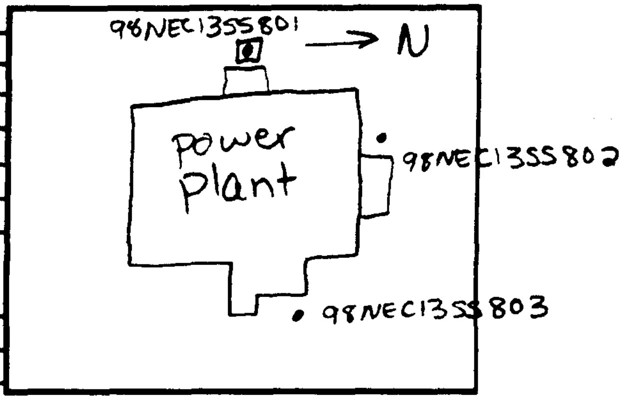
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site No. 13
Description: 98NEC 13 SS 801

Sample ID:
Date: 9-14-1998
Time: 1200
Temperature: 35°F
Weather: Rainy, Windy
Physical Description:(color, size, turbidity, stained soil, etc.)

Field Team: [redacted]
Sampler: BGM/AD
Custody: 98NEC012
Photo: Roll# ______ Frame# ______

Swing Tie Data



Shipping Information

Chain-of-Custody Number: 98NEC012
Custody Seal Number:
Date Shipped: 9-15-98
Shipped Via: Hand delivered
Laboratory Notified: ____ Initial ____ Phone ____ Fax ____ Date/Time

COMMENTS/PROBLEMS: depth @ 6 inches

Complete Back Side

MONTGOMERY WATSON

FIELD NOTE FORM

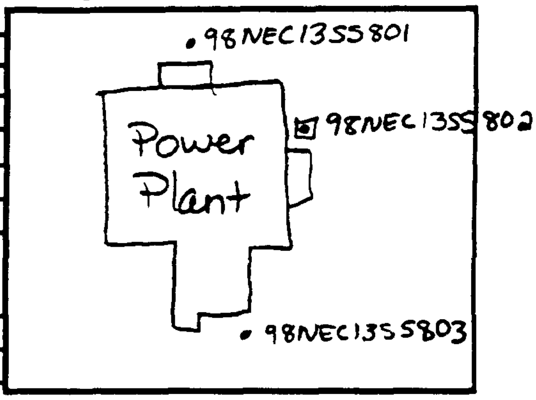
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site No. 13
Description: 98NEC 13 SS 802

Sample ID:
Date: 9-14-98
Time: 1230
Temperature: 35°F
Weather: Rain, Windy
Physical Description:(color, size, turbidity, stained soil, etc.)

Field Team: [redacted]
Sampler: BGM/AD
Custody: 98NEC012
Photo: Roll# ______ Frame# ______

Swing Tie Data



Shipping Information

Chain-of-Custody Number: 98NEC012
Custody Seal Number:
Date Shipped: 9-15-98
Shipped Via: Hand delivered
Laboratory Notified: ____Initial ____Phone ____Fax ____Date/Time

COMMENTS/PROBLEMS: depth @ 6 inches

Complete Back Side

MONTGOMERY WATSON

FIELD NOTE FORM

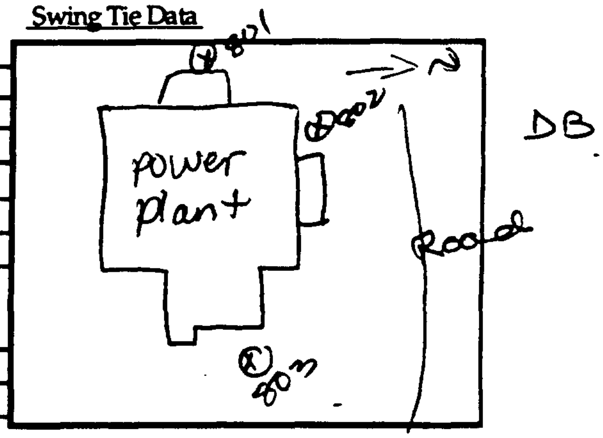
USCOE (ALASKA)
Northeast Cape, St. Lawrence Island

Site No. 13
Description:
19 NEC 13 SS 803

Sample ID:
Date: 9-14-98
Time: 1215
Temperature: 35°F
Weather: rain 10 mph
Physical Description:(color, size, turbidity, stained soil, etc.)
stained

Field Team: [redacted] Berm 4D
Sampler: Berm
Custody:
Photo: Roll# Frame#

Swing Tie Data



Shipping Information

Chain-of-Custody Number:
Custody Seal Number:
Date Shipped:
Shipped Via:
Laboratory Notified: ____Initial ____Phone ____Fax ____Date/Time

COMMENTS/PROBLEMS:

Complete Back Side

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

____
Location

Sample ID 98NECDBSS801	**Date** 9 / 12 / 98 (month / day / year)	**Time** 1822

Sample Type

Surface Soil [X] Depth (ft) 6"	**Sample ID** [ ]	**Wipe** [ ]
Sediment [ ]	Temperature (°C) ______	**Lead Paint Chip** [ ]
	Conductivity (umhos/cm) ______	**TCLP Core Samples** [ ]
	pH ______	**Asbestos** [ ]
	TDS (mg/l) ______	
	BOD (mg/l) ______	

Field Information

Field Team DCF	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DF	
PID (ppm) 0	**Ambient Temperature** (°C) 42
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000 ____ ; GRO 50 200 ____ ; PCB 5 50 ____	**Photo** Yes No — Roll# NA Frame # NA

Shipping Information

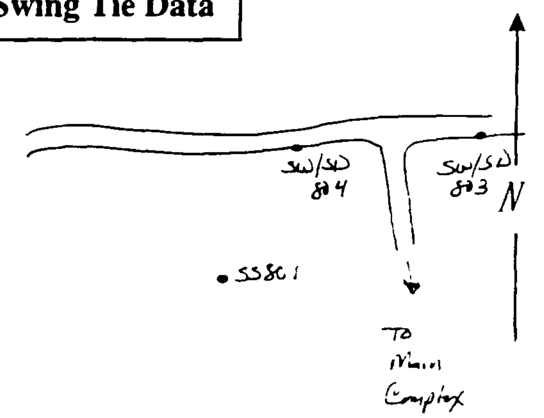
Chain of Custody Number 98NECD05

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/12/98

Airbill Number

Swing Tie Data



Comments Background Sample - No Staining / Odor

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECDBSS802	**Date** 9 / 14 / 98 (month / day / year)	**Time** 1820

Sample Type

Surface Soil	X	**Sample ID**		**Wipe**
Depth (ft)	6"	Temperature (°C)		**Lead Paint Chip**
Sediment		Conductivity (umhos/cm)		**TCLP Core Samples**
		pH		**Asbestos**
		TDS (mg/l)		
		BOD (mg/l)		

Field Information

Field Team	DCF
Sampler	DCF
PID (ppm)	0
ELISA screening (<less than, >greater than, spectrophotometer)	DRO 100 1000; GRO 50 200; PCB 5 50

Weather
Snow Rain Sleet Hail
Foggy Overcast Partly Cloudy Clear

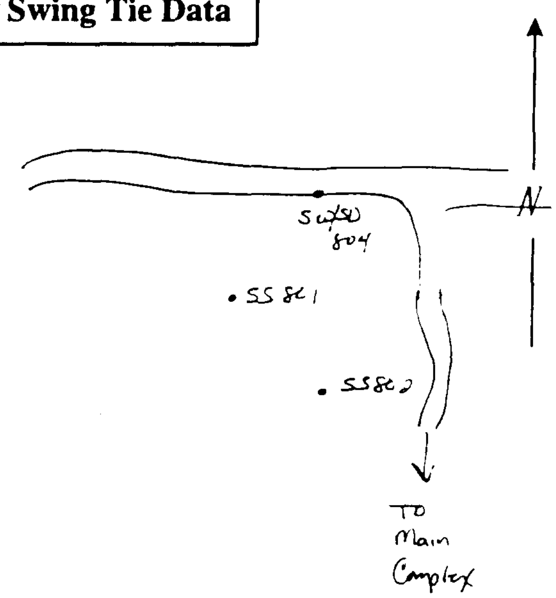
Ambient Temperature (°C) 42

Photo Yes No
Roll# NA Frame # NA

Shipping Information

Chain of Custody Number	98NEC005
Shipped Via	Goldstreak UPS FedEx DHL
Date Shipped	9/14/98
Airbill Number	

Swing Tie Data



Comments Background Soil Sample - No Staining/Odor

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location: ______

Sample ID	98NECDBSS803
Date	9/12/98 (month / day / year)
Time	1740

Sample Type

Surface Soil	X
Depth (ft)	6"
Sediment	
Sample ID	
Temperature (°C)	
Conductivity (umhos/cm)	
pH	
TDS (mg/l)	
BOD (mg/l)	
Wipe	
Lead Paint Chip	
TCLP Core Samples	
Asbestos	

Field Information

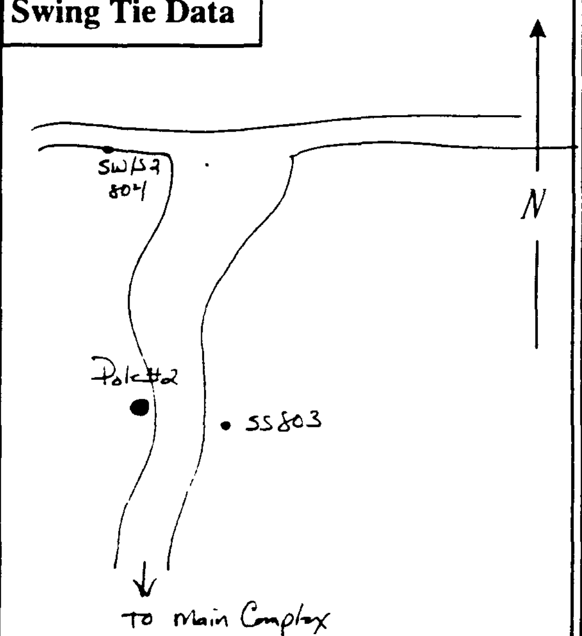
Field Team	DG
Sampler	DG
PID (ppm)	0
ELISA screening (<less than, >greater than, spectrophotometer)	DRO 100 1000; GRO 50 200; PCB 5 50
Weather	Snow, Rain, Sleet, Hail, Foggy, **Overcast** (circled), Partly Cloudy, Clear
Ambient Temperature (°C)	42
Photo	**Yes** (circled) No
Roll #	NA
Frame #	NA

Shipping Information

Chain of Custody Number	98NECOO5
Shipped Via	**Goldstreak** (circled) UPS FedEx DHL
Date Shipped	9/14/98
Airbill Number	

Comments TOC Sample - Highly Organic

Swing Tie Data



MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECDBSS804	Date 9 / 12 / 98 (month / day / year)	Time 1720

Sample Type

Surface Soil [X] Depth (ft) 6"	Sample ID [ ]	Wipe [ ]
Sediment [ ]	Temperature (°C) ____	Lead Paint Chip [ ]
	Conductivity (umhos/cm) ____	TCLP Core Samples [ ]
	pH ____	Asbestos [ ]
	TDS (mg/l) ____	
	BOD (mg/l) ____	

Field Information

Field Team DQ	Weather: Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DQ	
PID (ppm) 0	Ambient Temperature (°C) 42
ELISA screening (< less than, > greater than, spectrophotometer) DRO 100 1000; GRO 50 200; PCB 5 50	Photo Yes No; Roll# NA Frame # NA

Shipping Information

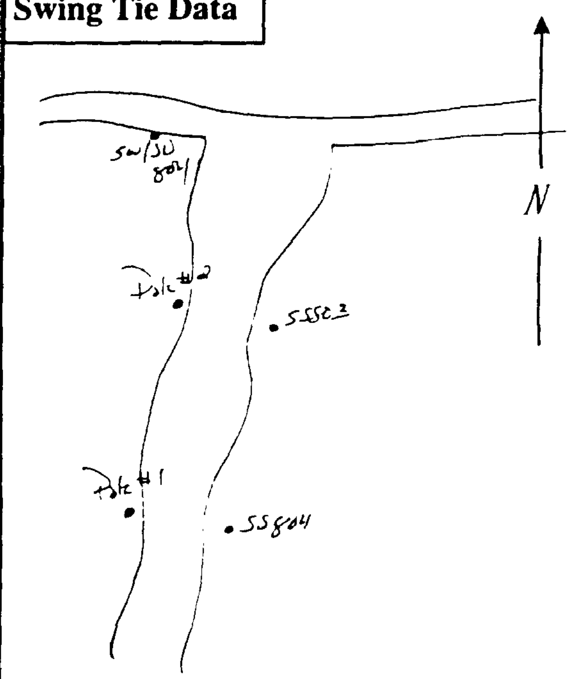
Chain of Custody Number 98NEC005

Shipped Via: Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Swing Tie Data



Comments TOC - Sample Highly Organic

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECDBSS805

Date 9 / 12 / 98 (month / day / year)

Time 1700

Sample Type

Surface Soil [X] Depth (ft) 6"	**Sample ID** [ ]		**Wipe** [ ]
	Temperature (°C)		**Lead Paint Chip** [ ]
	Conductivity (umhos/cm)		**TCLP Core Samples** [ ]
Sediment [ ]	pH		**Asbestos** [ ]
	TDS (mg/l)		
	BOD (mg/l)		

Field Information

Field Team BCP

Sampler BCP

PID (ppm) 0

ELISA screening (<less than, >greater than, spectrophotometer): DRO 100 1000; GRO 50 200; PCB 5 50

Weather Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear

Ambient Temperature (°C) 42

Photo Yes No

Roll# NA Frame # NA

Shipping Information

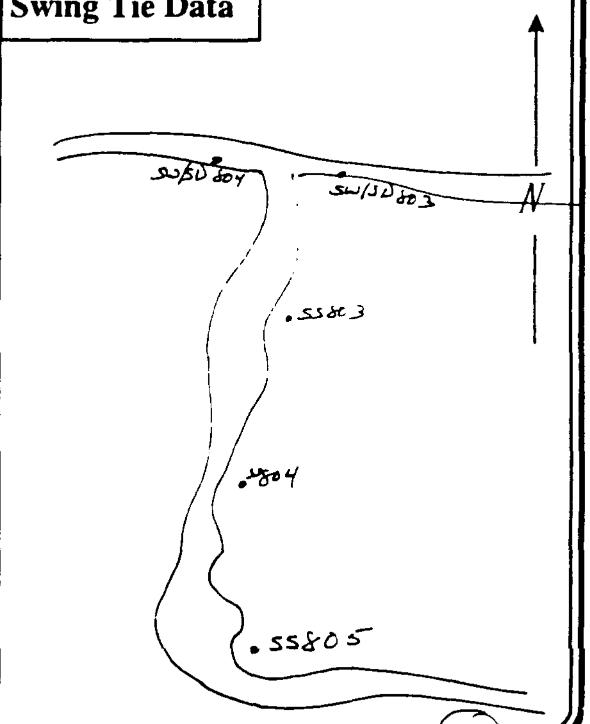
Chain of Custody Number 98NEC005

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Swing Tie Data



Comments TOC - Sample Highly Organic

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECDB3SS806	**Date** 9 / 12 / 98 (month / day / year)	**Time** 1640

Sample Type

Surface Soil X Depth (ft) 6"	**Sample ID** Temperature (°C) ____ Conductivity (umhos/cm) ____ pH ____ TDS (mg/l) ____ BOD (mg/l) ____	**Wipe** ☐ **Lead Paint Chip** ☐ **TCLP Core Samples** ☐ **Asbestos** ☐
Sediment ☐		

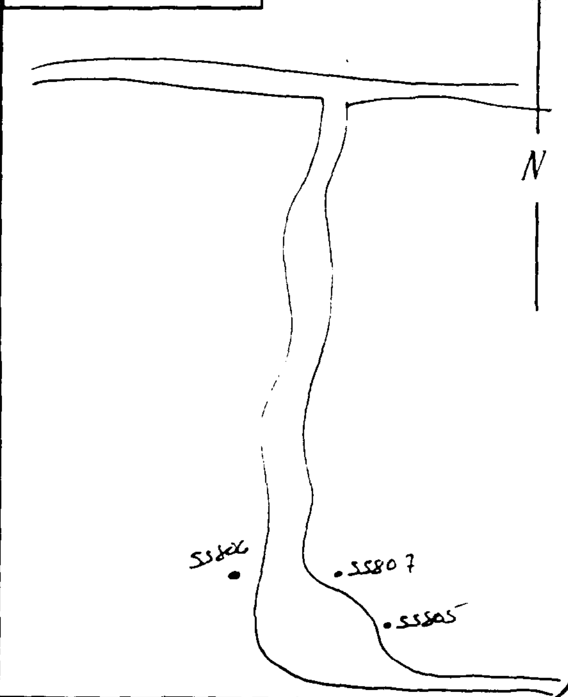
Field Information

Field Team DCJ	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DCJ	
PID (ppm) 0	**Ambient Temperature** (°C) 42
ELISA screening (< less than, > greater than, spectrophotometer) DRO 100 1000 ____ GRO 50 200 ____ PCB 5 50 ____	**Photo** Yes No Roll# NA Frame # NA

Shipping Information

Chain of Custody Number 98NEC005
Shipped Via Goldstreak UPS FedEx DHL
Date Shipped 9/14/98
Airbill Number

Swing Tie Data



Comments Boundary Sample - Healthy Greenery.
No Contamination Noted

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECDBSS807	**Date** 9 / 12 / 98 (month day year)	**Time** 1620

Sample Type

Surface Soil [X] Depth (ft) 6"	**Sample ID** [ ]	**Wipe** [ ]
	Temperature (°C) ______	**Lead Paint Chip** [ ]
Sediment [ ]	Conductivity (umhos/cm) ______	
	pH ______	**TCLP Core Samples** [ ]
	TDS (mg/l) ______	
	BOD (mg/l) ______	**Asbestos** [ ]

Field Information

Field Team DCL

Sampler DCL

PID (ppm) 0

ELISA screening (<less than, >greater than, spectrophotometer)

DRO 100 1000	GRO 50 200	PCB 5 50

Weather: Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear

Ambient Temperature (°C) 42

Photo Yes No

Roll# NA Frame # NA

Shipping Information

Chain of Custody Number 98NECC005

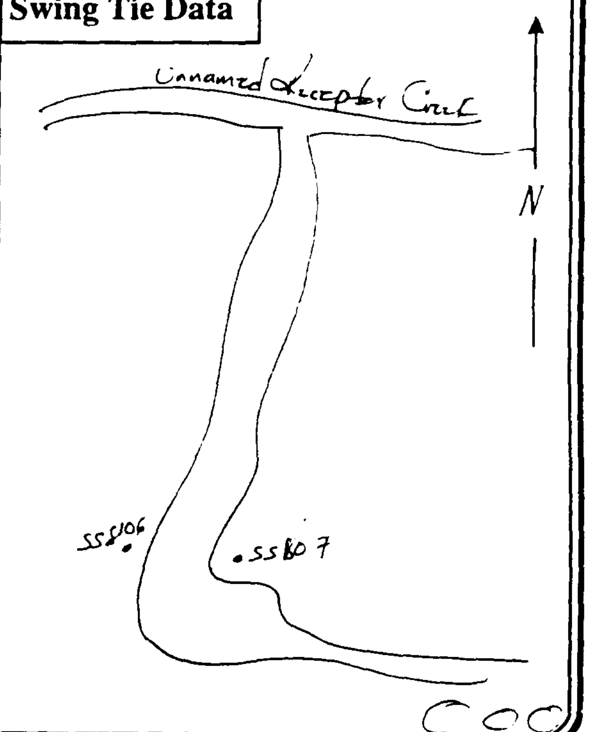
Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Comments Background Sample - Highly Organic
No Contamination Noted

Swing Tie Data



COC

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECDB SS 808	Date 9/12/98 (month / day / year)	Time 1840

Sample Type

Surface Soil [X] Depth (ft) 6"	Sample ID [ ] Temperature (°C) ____ Conductivity (umhos/cm) ____ pH ____ TDS (mg/l) ____ BOD (mg/l) ____	Wipe [ ]
Sediment [ ]		Lead Paint Chip [ ]
		TCLP Core Samples [ ]
		Asbestos [ ]

Field Information

Field Team DCF	Weather Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DCF	
PID (ppm) 0	Ambient Temperature (°C) 42
ELISA screening (<less than, >greater than, spectrophotometer) DRO 100 1000 ____ GRO 50 200 ____ PCB 5 50 ____	Photo Yes No Roll# NA Frame # NA

Shipping Information

Chain of Custody Number 98NEC005

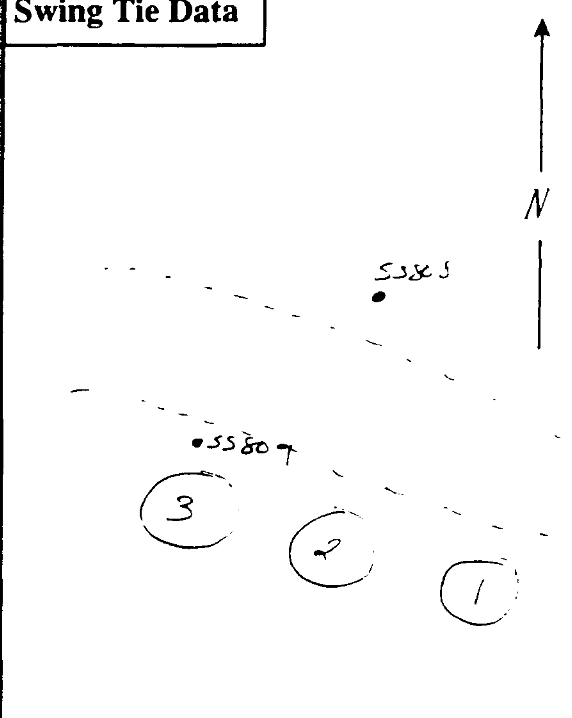
Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Comments Boundary Sample - No Visible Contamination

Swing Tie Data



MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECDB SS 809	**Date** 7 / 12 / 98 (month / day / year)	**Time** 1600

Sample Type

Surface Soil X Depth (ft) 6"	**Sample ID** ☐ Temperature (°C) ____ Conductivity (umhos/cm) ____ pH ____ TDS (mg/l) ____ BOD (mg/l) ____	**Wipe** ☐	
Sediment ☐		**Lead Paint Chip** ☐	
		TCLP Core Samples ☐	
		Asbestos ☐	

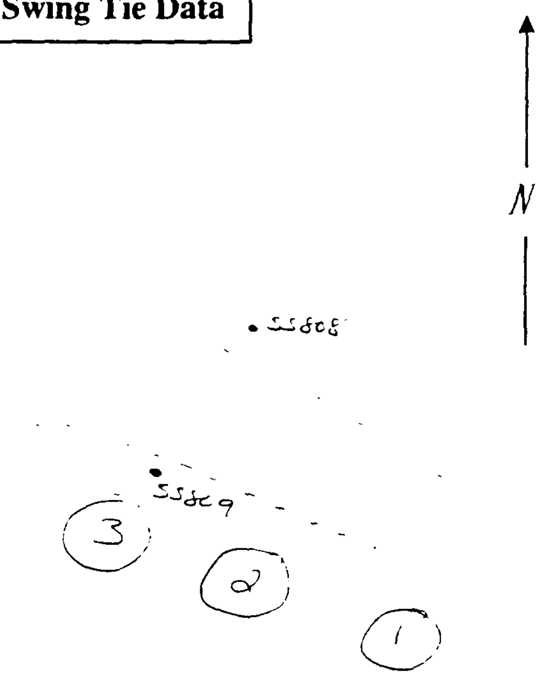
Field Information

Field Team DQ	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DQ	
PID (ppm) 0	**Ambient Temperature** (°C) 42
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000 ____; GRO 50 200 ____; PCB 5 50 ____	**Photo** Yes No Roll# NA Frame # NA

Shipping Information

Chain of Custody Number 98NEC005
Shipped Via Goldstreak UPS FedEx DHL
Date Shipped 7/14/98
Airbill Number

Swing Tie Data



Comments Boundary Sample - No Contamination Noted

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID	Date	Time
98NECBKSW801 / 98NECBKSD801	9 / 15 / 98 (month day year)	1030 / 1045

Sample Type

Surface Soil ☐	Sample ID ☐		Wipe ☐
Depth (ft)	Temperature (°C)		Lead Paint Chip ☐
Sediment ☒ Surface Water	Conductivity (umhos/cm)		TCLP Core Samples ☐
	pH		Asbestos ☐
	TDS (mg/l)		
	BOD (mg/l)		

Field Information

Field Team	DP + AD
Sampler	DP
PID (ppm)	∅
ELISA screening (<less than, >greater than; spectrophotometer)	DRO 100 1000; GRO 50 200; PCB 5 50

Weather: Snow Rain Sleet Hail Foggy **Overcast** Partly Cloudy Clear

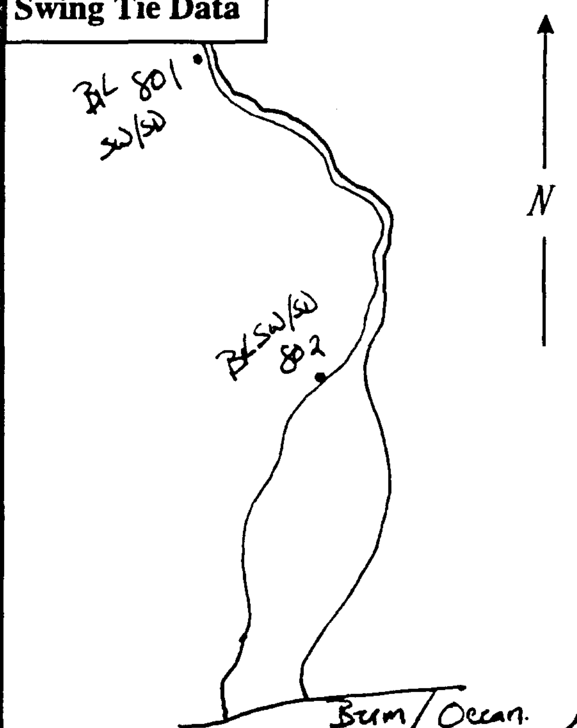
Ambient Temperature (°C) 42

Photo **Yes** No
Roll# NA Frame # NA

Shipping Information

Chain of Custody Number	98NEC013
Shipped Via	**Goldstreak** UPS FedEx DHL
Date Shipped	9/16/98
Airbill Number	

Swing Tie Data



Comments

Background Creek Surface Water/Sediment Sample

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECBKSW802 / 98NECBKSD802	Date 9 / 15 / 98 (month day year)	Time 1000/1015

Sample Type

Surface Soil [ ] Depth (ft)	Sample ID [ ]	Wipe [ ]
Sediment [X] Surface Water	Temperature (°C) ____ Conductivity (umhos/cm) ____ pH ____ TDS (mg/l) ____ BOD (mg/l) ____	Lead Paint Chip [ ] TCLP Core Samples [ ] Asbestos [ ]

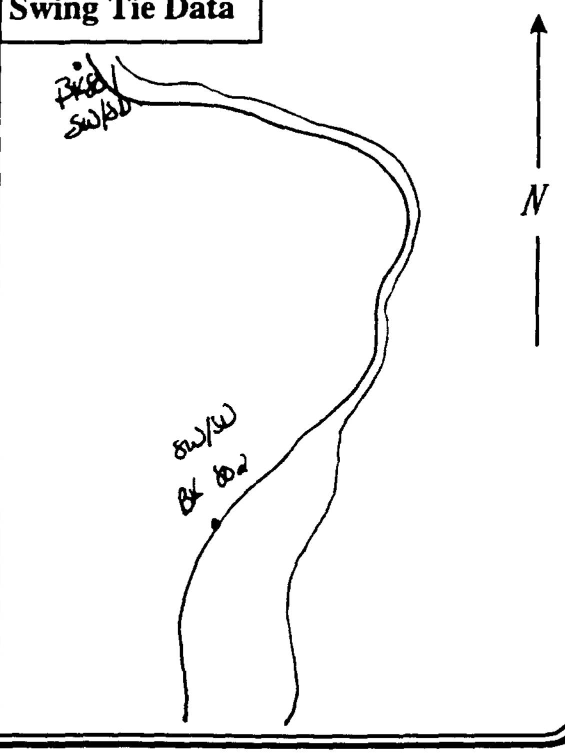
Field Information

Field Team DQ & AD	Weather Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DQ	
PID (ppm) Ø	Ambient Temperature (°C) 42
ELISA screening <less than >greater than spectrophotometer DRO 100 1000 GRO 50 200 PCB 5 50	Photo Yes No Roll# NA Frame # NA

Shipping Information

Chain of Custody Number	98NEC 013
Shipped Via	Goldstreak UPS FedEx DHL
Date Shipped	9/16/98
Airbill Number	

Swing Tie Data



Comments Background Creek Surface Water / Sediment Sample.

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NEC27SW801	**Date** 9 / 16 / 98 (month day year)	**Time** 1200

Sample Type

Surface Soil ☐ Depth (ft)	**Sample ID** ☐	**Wipe** ☐
~~**Sediment**~~ ☒ Surface Water	Temperature (°C) ____	**Lead Paint Chip** ☐
	Conductivity (umhos/cm) ____	**TCLP Core Samples** ☐
	pH ____	**Asbestos** ☐
	TDS (mg/l) ____	
	BOD (mg/l) ____	

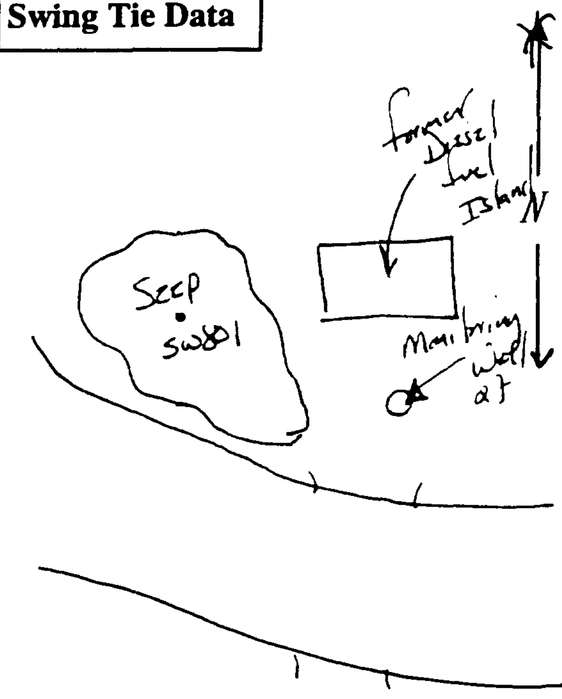
Field Information

Field Team DQ	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DQ	
PID (ppm) NA	**Ambient Temperature** (°C) 42
ELISA screening (<less than, >greater than) — DRO 100 1000; GRO 50 200; PCB 5 50; spectrophotometer	**Photo** Yes No — Roll# NA Frame # NA

Shipping Information

Chain of Custody Number	98N 2016
Shipped Via (Goldstreak UPS FedEx DHL)	Hand Delivered
Date Shipped	9/17/98
Airbill Number	NA

Swing Tie Data



Comments Surface Water Seep Emminating from

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECRCSW801 / 98NECRCSD801	**Date** 9/13/98 (month day year)	**Time** 1755 / 1800

Sample Type

Surface Soil	☐	**Sample ID**	☐	**Wipe**	☐
Depth (ft)		Temperature (°C) ____		**Lead Paint Chip**	☐
Sediment Surface Water	X	Conductivity (umhos/cm) ____		**TCLP Core Samples**	☐
		pH ____			
		TDS (mg/l) ____		**Asbestos**	☐
		BOD (mg/l) ____			

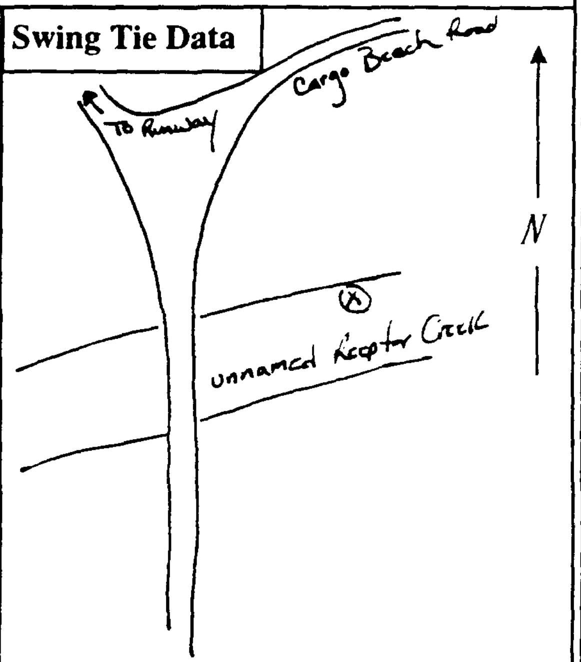
Field Information

Field Team DQ	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DQ	
PID (ppm) NA	**Ambient Temperature** (°C) 42
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000 — GRO 50 200 — PCB 5 50	**Photo** Yes No — Roll# NA Frame # NA

Shipping Information

Chain of Custody Number 98NEC005
Shipped Via Goldstreak UPS FedEx DHL
Date Shipped 9/14/98
Airbill Number

Swing Tie Data



Comments QA Sediment Sample 98NECRCSD301
QC Sediment Sample 98NECRCSD201

No Visible Staining/Sheen or odor detected/

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECRCSW802 / 98NECRCSD802	**Date** 9/14/98 (month day year)	**Time** 1530/1600

Sample Type

Surface Soil ☐ Depth (ft)	**Sample ID** ☐	**Wipe** ☐
Sediment ☒ Surface Water	Temperature (°C) ____	**Lead Paint Chip** ☐
	Conductivity (umhos/cm) ____	**TCLP Core Samples** ☐
	pH ____	**Asbestos** ☐
	TDS (mg/l) ____	
	BOD (mg/l) ____	

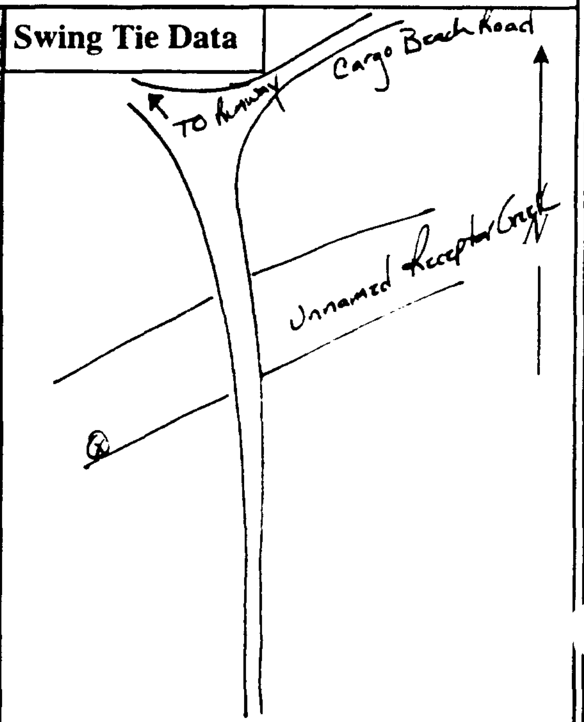
Field Information

Field Team DQ	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DQ	
PID (ppm) NA	**Ambient Temperature** (°C) 43
ELISA screening (<less than, >greater than, spectrophotometer) — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No — Roll# NA Frame # NA

Shipping Information

Chain of Custody Number 98NEC006
Shipped Via Goldstreak UPS FedEx DHL
Date Shipped 9/14/98
Airbill Number

Swing Tie Data



Comments QA/QC Surface Water + Sediment MS/MSD
98NECRCSW302
98NECRCSD302
98NECRCSW302
98NECRCSD302
No Visible Staining / Sheen or Odor.

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECRCSW803 / 98NECRCSD803	Date 9 / 13 / 98 (month day year)	Time 1430 /

Sample Type

Surface Soil [ ] Depth (ft)	Sample ID [ ]	Wipe [ ]
Sediment [X] Surface Water	Temperature (°C) ____	Lead Paint Chip [ ]
	Conductivity (umhos/cm) ____	TCLP Core Samples [ ]
	pH ____	Asbestos [ ]
	TDS (mg/l) ____	
	BOD (mg/l) ____	

Field Information

Field Team DP	Weather: Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DP	
PID (ppm) NA	Ambient Temperature (°C) 42
ELISA screening (<less than, >greater than, spectrophotometer): DRO 100 1000; GRO 50 200; PCB 5 50	Photo Yes No — Roll# NA Frame # NA

Shipping Information

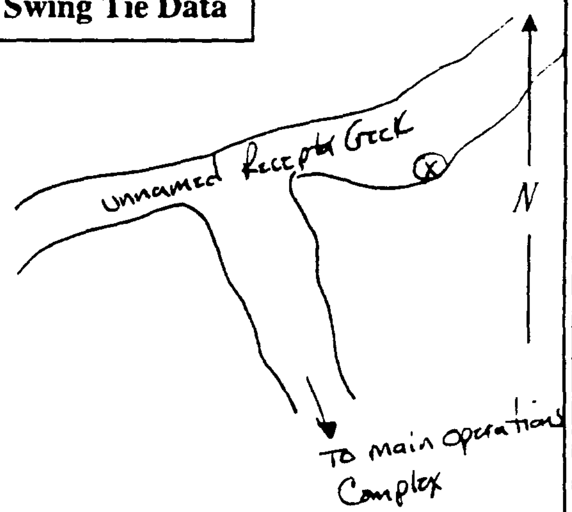
Chain of Custody Number / 98NECOO5 / 98NECO11

Shipped Via: Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Swing Tie Data



Comments No Sheen on Water When Sediment Undisturbed. Sediment Very Stained beneath Surface heavy petrol odor

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECRCSW804 / 98NECRCSD804	Date 9 / 13 / 98 (month day year)	Time 1400

Sample Type

Surface Soil ☐ Depth (ft)	Sample ID ☐	Wipe ☐
Sediment ☒ Surface Water	Temperature (°C) ____	Lead Paint Chip ☐
	Conductivity (umhos/cm) ____	TCLP Core Samples ☐
	pH ____	
	TDS (mg/l) ____	Asbestos ☐
	BOD (mg/l) ____	

Field Information

Field Team DCF	Weather Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DCF	
PID (ppm) NA	Ambient Temperature (°C) 42
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000 — GRO 50 200 — PCB 5 50	Photo Yes No Roll# NA Frame # NA

Shipping Information

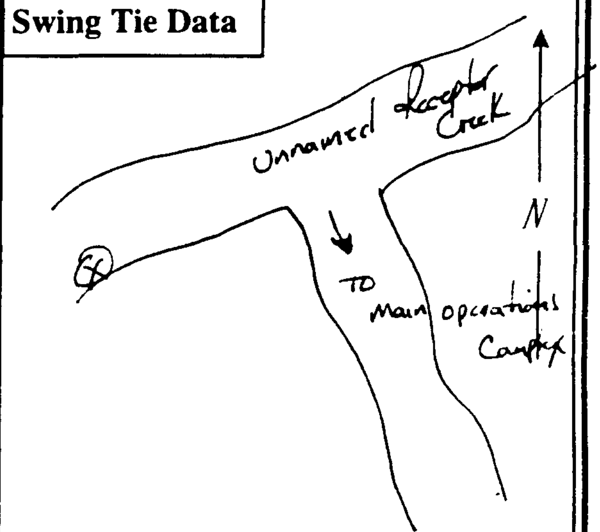
Chain of Custody Number 98NEC011

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Swing Tie Data



Comments No Sheen on Water When Sediment undisturbed. Sediment Very Stained beneath Surface, heavy Petrol odor.

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NELRCSW805	**Date** 9 / 13 / 98 (month / day / year)	**Time** 1330

Sample Type

Surface Soil ☐ Depth (ft)	**Sample ID** ☐	**Wipe** ☐
~~**Sediment**~~ ☒ Surface Water	Temperature (°C) ____	**Lead Paint Chip** ☐
	Conductivity (umhos/cm) ____	**TCLP Core Samples** ☐
	pH ____	**Asbestos** ☐
	TDS (mg/l) ____	
	BOD (mg/l) ____	

Field Information

Field Team Jcf	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler Jcf	
PID (ppm) NA	**Ambient Temperature** (°C) 42
ELISA screening (<less than, >greater than, spectrophotometer) — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No — Roll# NA Frame # NA

Shipping Information

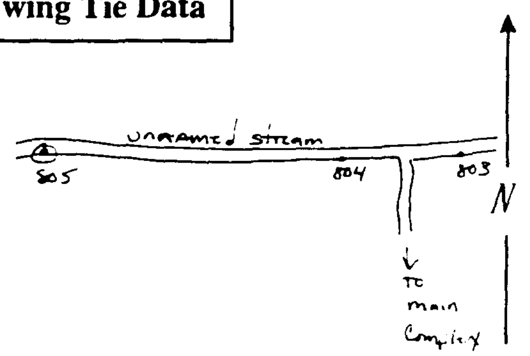
Chain of Custody Number 98NECC

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Swing Tie Data



Comments No Sheen Noted when Sediments undisturbed

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NEC RCSD806	**Date** 9 / 12 / 98 (month day year)	**Time** 1850

Sample Type

Surface Soil [ ] Depth (ft)	**Sample ID** [ ]	**Wipe** [ ]
Sediment [X]	Temperature (°C) ____	**Lead Paint Chip** [ ]
	Conductivity (umhos/cm) ____	**TCLP Core Samples** [ ]
	pH ____	**Asbestos** [ ]
	TDS (mg/l) ____	
	BOD (mg/l) ____	

Field Information

Field Team DCF	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DCF	**Ambient Temperature** (°C) 42
PID (ppm) NA	**Photo** Yes No
ELISA screening <less than >greater than spectrophotometer — DRO 100 1000; GRO 50 200; PCB 5 50	Roll# NA Frame # NA

Shipping Information

Chain of Custody Number 98NEC C

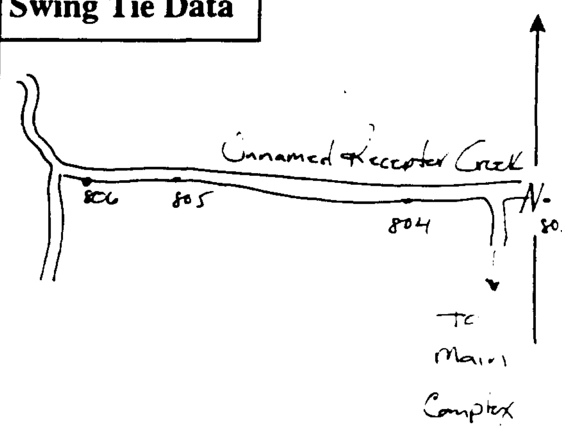
Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Comments No Staining, No Odor

Swing Tie Data



MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

Location

Sample ID 98NECRCSD805	**Date** 7 / 12 / 98 (month day year)	**Time** 1900

Sample Type

Surface Soil	☐	**Sample ID**	☐	**Wipe**	☐
Depth (ft)		Temperature (°C)		**Lead Paint Chip**	☐
Sediment	X	Conductivity (umhos/cm)		**TCLP Core Samples**	☐
		pH			
		TDS (mg/l)		**Asbestos**	☐
		BOD (mg/l)			

Field Information

Field Team DL	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DL	
PID (ppm) NA	**Ambient Temperature** (°C) 42
ELISA screening (<less than, >greater than, spectrophotometer) — DRO 100 1000; GRO 50 200; PCB 5 50	**Photo** Yes No — Roll# NA Frame # NA

Shipping Information

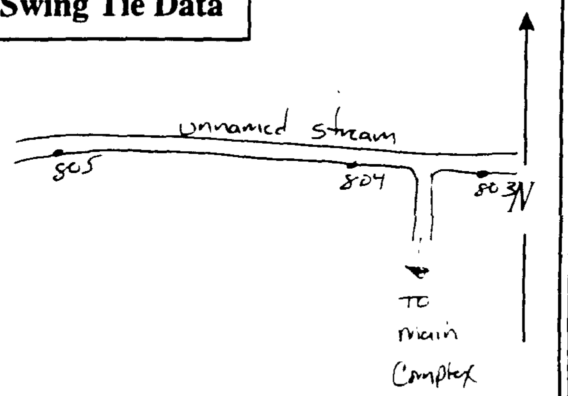
Chain of Custody Number 98NEC

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 7/14/98

Airbill Number

Swing Tie Data



Comments No Staining Noted, No Odor.

MONTGOMERY WATSON

FIELD NOTE FORM
USCOE (ALASKA)

____
Location

Sample ID 98NECRCSW806	**Date** 7/13/98 (month day year)	**Time** ~~1850~~ 1330

Sample Type

Surface Soil ☐ Depth (ft)	**Sample ID** ☐ Temperature (°C) ______ Conductivity (umhos/cm) ______ pH ______ TDS (mg/l) ______ BOD (mg/l) ______	**Wipe** ☐
~~**Sediment**~~ X Surface Water		**Lead Paint Chip** ☐ **TCLP Core Samples** ☐ **Asbestos** ☐

Field Information

Field Team DC	**Weather** Snow Rain Sleet Hail Foggy Overcast Partly Cloudy Clear
Sampler DCF	
PID (ppm) NA	**Ambient Temperature** (°C) 42
ELISA screening <less than >greater than spectrophotometer DRO 100 1000 ______ GRO 50 200 ______ PCB 5 50 ______	**Photo** Yes No Roll# NA Frame # NA

Shipping Information

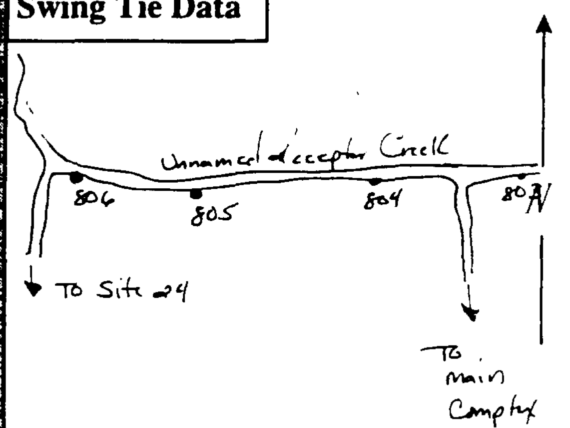
Chain of Custody Number 98NEC

Shipped Via Goldstreak UPS FedEx DHL

Date Shipped 9/14/98

Airbill Number

Swing Tie Data



Comments No Sheen When Sediments Disturbed
No Odor

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: WP 3-1 DATE: 9-10-98
SAMPLE TYPE: **GRAB** FIELD CREW: B[illegible] / DQ TIME: start 1700 end Cont.
WEATHER: SKY: cldy PRECIP: fog WIND: 5-10 Kn E
AIR TEMP: ______

GROUNDWATER SAMPLING X
Well Condition: 1.25" - SS screen 3' - well point
Casing Ht. Above Ground: 2.6 (FT.) Diameter: 1.25 in.
Well Depth: 5.25 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 3.15 ft. BTOC
Casing (C) = X Well N/A Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= ______ gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (μmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer	~~1715~~ 1	1715	3.7	318	7.2	70		N/R
Subm. Pump								
Ded. Pump								
Suction Pump								
(other)								

* TEMP. CORRECTED @ 25C

N/R Turb. & contamination interference w/ DO - photometer

98 NEC 03 GW801 [illegible]

SAMPLE COLLECTION METHOD: silty - Fuel odor
Method: Purge ______ Bailer ✓ Appearance: DRK BRN, sheen

	Analyte		Time	Analyte	Time			
1	DRO/~~RRO AK102/103~~	✓	1730	Lead				
	~~GRO AK101~~			Manganese				
	~~DRO/RRO AAF ADEC~~			Sulfate				
4	BETX	✓	1730	NO3				
	~~VOC 8260~~			Alkalinity				
2	PAH	✓	1730					
	~~PCBs~~							
	~~TOC~~							

COMMENTS: Split ______ Dupl. ______ Trip Blank ______ Other ______
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO HR & LA CO2
Decon completed: by B[illegible] date 9-10-98
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: WP 4-1 DATE: 9-11-98
SAMPLE TYPE: **GRAB** FIELD CREW: [illegible] TIME: start 1750 end [illegible]
WEATHER: SKY: Cldy PRECIP: Fog WIND: 5-10 Kn East
AIR TEMP: 40°F

GROUNDWATER SAMPLING X
Well Condition: WELL pt. -3' Airoon
Casing Ht. Above Ground: 2.75 (FT.) Diameter: 1.25 in.
Well Depth: 5.25 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 3.00 ft. BTOC
Casing (C) = X Well N/A Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)=_____ gal.

N/A

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer (circled)	1	1750	4.8	186	7.1	50		N/A
Subm. Pump								
Ded. Pump								
Suction Pump								
(other)								

98 NEC 04 GW 801 * TEMP. CORRECTED @ 25C

N/R - high turbidity interference unable to read
redox +3.4

SAMPLE COLLECTION METHOD:
Method: Purge ___ Bailer ✓ Appearance: Very Turb. reddish brown

Analyte	Time	Analyte	Time			
DRO/~~RRO~~ AK102/~~103~~	1800	Lead				
~~GRO AK101~~		Manganese				
~~DRO/RRO AAF ADEC~~		Sulfate				
BETX	1800	NO3				
~~VOC 8260~~		Alkalinity				
PAH	1800					
~~PCBs~~						
~~TOC~~						

COMMENTS: Split___ Dupl.___ Trip Blank___ Other___
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO HR/LH CO2
Decon completed: by date
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM
MW

SITE: **NORTHEAST CAPE** Sample ID #: 7-4 DATE: 9-12-98
SAMPLE TYPE: **GRAB** FIELD CREW: BGM / AD TIME: start 1140 end 1230
WEATHER: SKY: pt cldy PRECIP: Ø WIND: 10-15 Kn
AIR TEMP: 31.5°F

GROUNDWATER SAMPLING ✓
Well Condition: Concrete broken ...
Casing Ht. Above Ground: 3.31 (FT.) PVC Diameter: 2 in.
Well Depth: 12.09 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 3.66 ft. BTOC
Casing (C) = ✓ Well ____ Outside Protective
ONE PURGE VOLUME: 3 ~~x 7.48~~ x (dia./24)^2 x 3.14 x (Depth-W. L.)= 4.2 gal. 1.5 gal

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (μmhos/cm)*	pH*	Fe (II)	Methane	DO mg
	1.5	1210	4.7	244	5.4	Dry	—	1.5
Bailer								
Subm. Pump								
Ded. Pump								
Suction Pump								
Purger (other)								

* TEMP. CORRECTED @ 25C

98 NEC 07 GW 801

3.1' steel to GRD

SAMPLE COLLECTION METHOD:
Method: Purge ✓ Bailer ____ Appearance: No sheen no odor

Analyte	Time	Analyte	Time			
~~DRO/BRO AK102/103~~	1215	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1215	NO3				
VOC 8260		Alkalinity				
PAH	1215					
PCBs						
TOC						

COMMENTS: Split____ Dupl.____ Trip Blank____ Other____
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO HR CO2
Decon completed: by BGM date 9-12-98
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: MW 9-1 DATE: 9-12-98
SAMPLE TYPE: **GRAB** FIELD CREW: Bergman / A.D. TIME: start 1430 end ____
WEATHER: SKY: Cldy PRECIP: Ø WIND: 5-10 kn
AIR TEMP: 35-40°

GROUNDWATER SAMPLING ____
Well Condition: Protective casing loose
Casing Ht. Above Ground: 3.75 (FT.) pvc Diameter: 2 in.
Well Depth: 9.82 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 3.81 ft. BTOC
Casing (C) = ✓ Well ____ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 3 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (μmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer	1.00	1445	4.4	882	7.0	Dry	—	Dry
Subm. Pump	1.5	1500	4.1	867	6.7	—	—	7.1
Ded. Pump								
Suction Pump								
Purger (other)								

* TEMP. CORRECTED @ 25C

98 NEC 09 GW801

SAMPLE COLLECTION METHOD: Very slow recharge
Method: Purge ✓ Bailer ✓ Appearance: Extremely Turb, TAN color, No sheen, No odor

Analyte	Time	Analyte	Time			
4 — DRO/~~RRO~~ AK102/103	1520	Lead				
~~GRO AK101~~	—	Manganese				
~~DRO/RRO AAF ADEC~~	—	Sulfate				
1 — BETX	1520	NO3				
~~VOC 8260~~	—	Alkalinity				
4 — PAH	1520					
~~PCBs~~	—					
~~TOC~~						

COMMENTS: Split____ Dupl.____ Trip Blank____ Other____
PHOTO TAKEN: YES NO
Calibration/Standard: pH 4/7 EC 1413 DO HR CO2
Decon completed: by Bergman date 9-12-98
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: MW 9-2 DATE: 9-12-98
SAMPLE TYPE: **GRAB** FIELD CREW: Bgm / AD TIME: start 1510 end
WEATHER: SKY: Cldy PRECIP: ∅ WIND: <10 mph
AIR TEMP: 38 °F

GROUNDWATER SAMPLING ✓
Well Condition: Jacking apparent, steel casing loose
Casing Ht. Above Ground: 3.81 (FT.) PVC Diameter: 2 in.
Well Depth: 8.57 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 4.93 ft. BTOC
Casing (C) = X Well ___ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 2 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer	1.	1530	1.9	134	7.29	—	—	5.1 mg/l
Subm. Pump								
Ded. Pump								
Suction Pump								
Purger (other)								

* TEMP. CORRECTED @ 25C

98 NEC 09 GW802

SAMPLE COLLECTION METHOD: MEO Turb/silty TAN
Method: Purge ✓ Bailer ✓ Appearance: no sheen, NO odor

Analyte	Time	Analyte	Time			
DRO/~~RRO AK102/103~~	1600	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1600	NO3				
VOC 8260		Alkalinity				
PAH	1650					
PCBs						
TOC						

COMMENTS: Split_____ Dupl._____ Trip Blank_____ Other_____
PHOTO TAKEN: YES NO
Calibration/Standard: pH 4/7 EC 1413 DO Hr CO2
Decon completed: by Bgm date 9-12-98
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

MW

SITE: **NORTHEAST CAPE** Sample ID #: 9-3 DATE: 9-12-98
SAMPLE TYPE: **GRAB** FIELD CREW: Bgm/KD TIME: start 1600 end ______
WEATHER: SKY: Cldy PRECIP: Ø WIND: 5-10 km
AIR TEMP: 40 °F

GROUNDWATER SAMPLING X
Well Condition: Loose, tracking apparent, .8'
Casing Ht. Above Ground: 3.55 (FT.) Diameter: 2 in.
Well Depth: 11.39 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 4.86 ft. BTOC
Casing (C) = ✓ Well ______ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 3 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane
	1	1610	3.1	263	7.15	N/A	Dry
Bailer							
Subm. Pump							
Ded. Pump							
Suction Pump							
Purger (other)							

* TEMP. CORRECTED @ 25C

98NEC09GW803

SAMPLE COLLECTION METHOD:
Method: Purge ✓ Bailer ✓ Appearance: High Turb. TAN

Analyte	Time	Analyte	Time			
DRO/~~RRO~~ AK102/103	1630	Lead				
GRO AK101	—	Manganese				
DRO/RRO AAF ADEC	—	Sulfate				
BETX	1630	NO3				
VOC 8260	—	Alkalinity				
PAH	1630					
PCBs						
TOC						

COMMENTS: Split______ Dupl.______ Trip Blank______ Other______
PHOTO TAKEN: YES NO
Calibration/Standard: pH 4/7 EC 1430 DO HR CO2
Decon completed: by Bgm date 9-12-98
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: 10-1 DATE: 9-12-98
SAMPLE TYPE: **GRAB** FIELD CREW: Byrn / AD TIME: start 1715 end 1740
WEATHER: SKY: cldy PRECIP: 0 WIND: < 5 kn
AIR TEMP: 35

GROUNDWATER SAMPLING
Well Condition: casing loose
Casing Ht. Above Ground: 2.00 (FT.) PVC Diameter: 2 in.
Well Depth: 11.75 ft. BTOC (Meas./Rec) Static Water Level: 2.00 ft. BTOC
Casing (C) = X Well ______ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 4.5 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	D.O
Bailer	2	1725	3.4	98	7.67	—	—	
Subm. Pump	5	1728	3.1	92	6.7	—	—	
Ded. Pump	8	1730	3.0	93	6.6	—	—	
Suction Pump								
(other)								

* TEMP. CORRECTED @ 25C

@ 1730 Primary 98NEC 10 GW801 7D
1740 QC 98NEC 10 GW207
1745 QC 98NEC 10 GW301

SAMPLE COLLECTION METHOD:
Method: Purge ______ Bailer ______ Appearance: no odor, NO sheen

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	✓ 1730	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	✓ 1730	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split 1745 X Dupl. 1740 X Trip Blank ______ Other ______
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by date
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: 10-4 DATE: 9-12
SAMPLE TYPE: **GRAB** FIELD CREW: B[illegible]/AD TIME: start 1745 end 1836
WEATHER: SKY: cldy PRECIP: NONE WIND: <5Km
AIR TEMP: 35°

GROUNDWATER SAMPLING X Culvert protective
Well Condition: Concrete cracked, no jacking apparent
Casing Ht. Above Ground: 2.4 (FT.) PVC Diameter: 2 in.
Well Depth: 8.06 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 2.24 ft. BTOC
Casing (C) = X Well ____ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 3 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer Subm. Pump Ded. Pump Suction Pump Purger (other)	1.5	1800	4.7	232	6.2	Dry	—	—

* TEMP. CORRECTED @ 25C

98 NEC 10 GW80Z

SAMPLE COLLECTION METHOD:
Method: Purge ✓ Bailer ✓ Appearance: No Sheen, no odor

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1800	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1800	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split ____ Dupl. ____ Trip Blank ____ Other ____
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by date
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

MW

SITE: **NORTHEAST CAPE** Sample ID #: 11-2 DATE: 9-13-98
SAMPLE TYPE: **GRAB** FIELD CREW: BGM/AD TIME: start 1120 end 1140
WEATHER: SKY: cldy PRECIP: Ø WIND: >10 mp
AIR TEMP: 35° F

GROUNDWATER SAMPLING X
Well Condition: Concrete cracked, minor jacking
Casing Ht. Above Ground: 6.56 (FT.) PVC Diameter: 2 in.
Well Depth: 12.0 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 6.74 ft. BTOC
Casing (C) = X Well ______ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 3 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer	1.0	1125	2.4	101	7.07	—	—	
Subm. Pump	1.5	1130	2.4	101		DRY		
Ded. Pump								
Suction Pump								
Purge (other)								

* TEMP. CORRECTED @ 25C

N ← OxO O 98NEC11 GW801

SAMPLE COLLECTION METHOD:
Method: Purge ✓ Bailer ✓ Appearance: no odor, no sheen

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1130	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1130	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split______ Dupl.______ Trip Blank______ Other______
PHOTO TAKEN: YES NO
Calibration/Standard: pH 4/7 EC DO CO2
Decon completed: by date
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

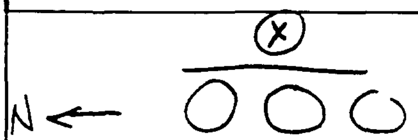
SITE: **NORTHEAST CAPE** Sample ID #: 11-3 DATE: 9-13-98
SAMPLE TYPE: **GRAB** FIELD CREW: Begon TIME: start 1140 end 1200
WEATHER: SKY: Cldy PRECIP: Ø WIND: 20 mph
AIR TEMP: 37 °F

GROUNDWATER SAMPLING X

Well Condition: Apparent jacking
Casing Ht. Above Ground: 2.41 (FT.) Diameter: 2 in.
Well Depth: 20.11 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 8.69 ft. BTOC
Casing (C) = X Well ____ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 5.7 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer	1.0	1148	1.7	167	6.4	—	—	
Subm. Pump	5.0	1155	2.0	133	6.5	—	—	
Ded. Pump	7.0	1200	2.1	147	6.4	—	—	6.?
Suction Pump								mg/l
Purger (other)								

* TEMP. CORRECTED @ 25C



98 NEC 11 GW 802

SAMPLE COLLECTION METHOD:
Method: Purge ✓ Bailer ✓ Appearance: no sheen Diesel odor

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1200	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1200	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split____ Dupl.____ Trip Blank____ Other____
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by Degon date 9-13
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: WP14-01 DATE: 9-11-98
SAMPLE TYPE: **GRAB** FIELD CREW: Bgm/DQ TIME: start 1520 end 1645
WEATHER: SKY: Cldy PRECIP: fog WIND: 5-10 km
AIR TEMP: 36

GROUNDWATER SAMPLING X
Well Condition: 1¼" SS 3' screen WELL pt.
Casing Ht. Above Ground: 3.7 (FT.) Diameter: 1.25 in.
Well Depth: 14.13 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 11.2c ft. BTOC
Casing (C) = X Well N/A ~~Outside Protective~~ N/A
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)=______ gal.

N/A

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane
	1	1600	3.2	79	8.0	0	N/A
Bailer							
Subm. Pump							
Ded. Pump							
Suction Pump							
(other)							

* TEMP. CORRECTED @ 25C

redox -35.4

98 NEC ~~14~~ 00 GW 801

Ema 9 13 98

Ferrous - 2X Dilute <0
Iron, total 2X Dilute <0

SAMPLE COLLECTION METHOD:
Method: Purge ______ Bailer ✓ Appearance: ~~tannish~~ silty - no odor

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1600	Lead				
GRO AK101	1600	Manganese	✓			
DRO/RRO AAF ADEC		Sulfate	✓			
BETX	1600	NO3	✓			
VOC 8260		Alkalinity				
PAH	1600					
PCBs						
TOC						

COMMENTS: Split______ Dupl.______ Trip Blank______ Other______
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO HR CO2
Decon completed: by Bgm date 9-11-98
Remarks

Mg
DO
14

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: MW 13-1 DATE: 9-13-98
SAMPLE TYPE: **GRAB** FIELD CREW: Bgm / AD TIME: start 1615 end
WEATHER: SKY: cldy PRECIP: 0 WIND: 5-10 mph
AIR TEMP: 40°F

GROUNDWATER SAMPLING X
Well Condition: no app. jacking
Casing Ht. Above Ground: 2.82 (FT.) Diameter: 2 in.
Well Depth: 17.65 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 11.11 ft. BTOC
Casing (C) = X Well ___ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 3.25 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
	2	1620	2.3	214	7.30			
Bailer	5	1625	2.2	189	7.32			
Subm. Pump	7	1630	2.0	180	7.21			
Ded. Pump								
Suction Pump								
Purge (other)								

* TEMP. CORRECTED @ 25C

steel to grd
3.09'
98 NEC 13 GW 001

SAMPLE COLLECTION METHOD: sheen on water
Method: Purge ✓ Bailer ✓ Appearance: ~~diesel~~ odor

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1630	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1630	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split ___ Dupl. ___ Trip Blank ___ Other ___
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by Bgm date 9-13-98
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: 13-2 DATE: /
SAMPLE TYPE: GRAB FIELD CREW: BGM/AD TIME: start end
WEATHER: SKY: cloudy PRECIP: rain WIND: 20 mph
AIR TEMP: 35°

GROUNDWATER SAMPLING
Well Condition: no apparent tracking
Casing Ht. Above Ground: 2.42 (FT.) Diameter: 2 in.
Well Depth: 16.49 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 8.05 ft. BTOC
Casing (C) = X Well ____ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 4.2 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer								
Subm. Pump	10	5						
Ded. Pump								
Suction Pump								
(other)								

* TEMP. CORRECTED @ 25C

steel to grd.
2.75'

SAMPLE COLLECTION METHOD:
Method: Purge ____ Bailer ____ Appearance: diesel odor

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103		Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX		NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split ____ Dupl. ____ Trip Blank ____ Other ____
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by date
Remarks

Power

4

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: MW 15-1 DATE: 9-13-98
SAMPLE TYPE: **GRAB** FIELD CREW: Bgm / AD TIME: start 1605 end 1630
WEATHER: SKY: Cldy PRECIP: Ø WIND: <5 mph
AIR TEMP: 38 °F

GROUNDWATER SAMPLING X

Well Condition: no app jacking
Casing Ht. Above Ground: 2.99 (FT.) PVC Diameter: 2 in.
Well Depth: 16.52 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 6.90 ft. BTOC
Casing (C) = X Well ______ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 5 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
	2	1615	3.3	164	6.0	Dry		
Bailer	3.	1625	3.4	166	5.8			
Subm. Pump								
Ded. Pump								
Suction Pump								
(other)								

* TEMP. CORRECTED @ 25C

Betx 98 NEC 15 801 @ 1630
QC 98 NEC 15 201 @ 1620
QA 98 NEC 15 301 @ 1625

3.10' Steel to Grd

SAMPLE COLLECTION METHOD: Dry @ 2 gals high Turb. Brown
Method: Purge ✓ Bailer ✓ Appearance: diesel odor, Sheen

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1630	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX QA/QC	1630	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split X Dupl. X only Betx Trip Blank 1900 Other
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by date
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: MW 19-1 DATE: 9-13-98
SAMPLE TYPE: GRAB FIELD CREW: Bgm HD TIME: start 1205 end 1245
WEATHER: SKY: cldy PRECIP: 0 WIND: <5 mph
AIR TEMP: 40°F

GROUNDWATER SAMPLING X
Well Condition: good
Casing Ht. Above Ground: 2.92 (FT.) PVC Diameter: 2 in.
Well Depth: 20.10 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 6.50 ft. BTOC
Casing (C) = X Well ______ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 7 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
	1	1210	3.4	175		—	—	
	4	1215	3.4	164		—	—	
Bailer	8	1220						
Subm. Pump								
Ded. Pump								
Suction Pump								
Purger (other)								

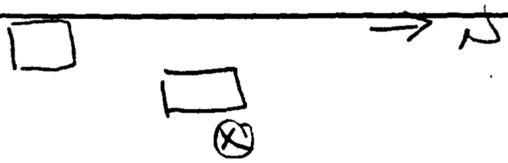
* TEMP. CORRECTED @ 25C

Prim. 98 NEC 19 GW801 MS/MSD
QC 98 NEC 19 GW201 @ 1240 MS/MSD
3.10 Steel to Gr. QA 98 NEC 19 GW301 @ 1235 MS/MSD

SAMPLE COLLECTION METHOD:
Method: Purge ✓ Bailer ✓ Appearance: light solvent oder light sheen

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1230	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1230	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split ✓ Dupl. ✓ Trip Blank ______ Other ______
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by date
Remarks



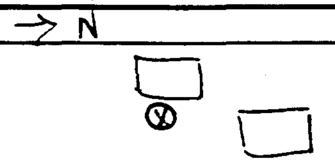
GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: MW 19.2 DATE: 9-13-98
SAMPLE TYPE: **GRAB** FIELD CREW: Bgm TIME: start 1400 end 1440
WEATHER: SKY: Cldy PRECIP: CD WIND: 10-15 mph
AIR TEMP: 35°F

GROUNDWATER SAMPLING X
Well Condition: Outside casing jacked .2
Casing Ht. Above Ground: 2.95 (FT.) Diameter: 2 in.
Well Depth: 35.51 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 25.96 ft. BTOC
Casing (C) = X Well ______ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 5 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (μmhos/cm)*	pH*	Fe (II)	Methane	DO
	3	1410	2.9	103	6.4		—	
	7	1420	2.6	100	6.2		—	
Bailer	10	1430	2.7	101	6.1		—	
Subm. Pump								
Ded. Pump								
Suction Pump								
Purger (other)								

* TEMP. CORRECTED @ 25C



98 NEC 19GW802

SAMPLE COLLECTION METHOD: Clear
Method: Purge ✓ Bailer ✓ Appearance: odor, no sheen

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1430	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1430	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split ______ Dupl. ______ Trip Blank ______ Other ______
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by Bgm date 4-13-98
Remarks

GROUNDWATER SAMPLING
FIELD NOTE FORM

MW

SITE: **NORTHEAST CAPE** Sample ID #: 27-1 DATE: 9-15-98
SAMPLE TYPE: **GRAB** FIELD CREW: [illegible] TIME: start 1545 end 1610
WEATHER: SKY: cldy PRECIP: Ø WIND: 10-15 mph
AIR TEMP: 35°F

GROUNDWATER SAMPLING X
Well Condition: Slight cracking of PVC
Casing Ht. Above Ground: 2.22 (FT.) Diameter: 2 in.
Well Depth: 20.19 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 2.53 ft. BTOC
Casing (C) = X Well ______ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 9 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
	3	1550	1.8	188	6.1			
Bailer	7	1555	1.3	188	5.9			
Subm. Pump	10	1558	0.8	189	6.0			
Ded. Pump	15	1603	0.8	193	5.9			
Suction Pump								
Purger (other)								

* TEMP. CORRECTED @ 25C

98NEC27GW001

2.27' Steel to Grnd

SAMPLE COLLECTION METHOD: grey Tub. -
Method: Purge ✓ Bailer ✓ Appearance: slight fuel smell

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103	1600	Lead				
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX	1600	NO3				
VOC 8260		Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split______ Dupl.______ Trip Blank______ Other______
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by 9-13-98 date [illegible]
Remarks Seep from S forms sm pond and then drains under road into DB - No sheen or odor observed
heavy algae growth

GROUNDWATER SAMPLING
FIELD NOTE FORM

SITE: **NORTHEAST CAPE** Sample ID #: 16-1
DATE: 9-13-98
SAMPLE TYPE: GRAB FIELD CREW: [illegible] / AO
TIME: start 1440 end 1502
WEATHER: SKY: Cl dy PRECIP: 0
WIND: 10-15 mph
AIR TEMP: 35°F

GROUNDWATER SAMPLING X
Well Condition: no jacking apparent
Casing Ht. Above Ground: 2.96 (FT.) PVC Diameter: 2 in.
Well Depth: 16.84 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 10.92 ft. BTOC
Casing (C) = X Well Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 3 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
Bailer	4	1450	3.8	196	7.0	X	X	
Subm. Pump	6	1455	3.6	202	7.2	X	X	
Ded. Pump	10	1505	3.6	201	7.4			
Suction Pump					e 5.2			
Purger (other)								

* TEMP. CORRECTED @ 25C

Ck. list NO QA/QC NO QC

Pb MS/MSD Prim 98 NEC 16 GW 801
VOC QC Dupe 98 NEC 16 GW 201 @ 1510
VOA Lead QA Split 98 NEC 16 GW 301 @ 1505

SAMPLE COLLECTION METHOD: Grey Turb., slight sheen
Method: Purge ✓ Bailer ✓ Appearance: Paint Thinner odor

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103		Lead ✓	1500			
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX		NO3				
VOC 8260 ✓	1504	Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split ✓ Dupl. ✓ Trip Blank VOC @ 1900 Other
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by Bam date 9-13-98
Remarks

N ← [ ] + paint dye

GROUNDWATER SAMPLING
FIELD NOTE FORM

MW

SITE: **NORTHEAST CAPE** Sample ID #: 16-3 DATE: 9-13-98
SAMPLE TYPE: **GRAB** FIELD CREW: Bgm TIME: start 1505 end 1515
WEATHER: SKY: Cldy PRECIP: ∅ WIND: 10-15 mph
AIR TEMP: 35° F

GROUNDWATER SAMPLING X

Well Condition: no jacking apparent
Casing Ht. Above Ground: 2.58 (FT.) PVC Diameter: 2 in.
Well Depth: 17.28 ft. BTOC (Meas./~~Rec.~~) Static Water Level: 11.17 ft. BTOC
Casing (C) = X Well ______ Outside Protective
ONE PURGE VOLUME: 3 x 7.48 x (dia./24)^2 x 3.14 x (Depth-W. L.)= 2.5 gal.

PURGING: METHOD	Gallons	Time	Temperature °C	E.C. (µmhos/cm)*	pH*	Fe (II)	Methane	DO
	5	1510	3.0	186	7.1			
Bailer	10	1513	2.5	189	7.1			
Subm. Pump								
Ded. Pump								
Suction Pump								
Purger (other)								

* TEMP. CORRECTED @ 25C

steel 2grd.
2.84'

N ←

paint dope

98 NEC 16 GW 802

SAMPLE COLLECTION METHOD:
Method: Purge ✓ Bailer ✓ Appearance: Slight turn. odor, no sheen

Analyte	Time	Analyte	Time			
DRO/RRO AK102/103		Lead ✓	1515			
GRO AK101		Manganese				
DRO/RRO AAF ADEC		Sulfate				
BETX		NO3				
VOC 8260 ✓	1515	Alkalinity				
PAH						
PCBs						
TOC						

COMMENTS: Split______ Dupl.______ Trip Blank______ Other______
PHOTO TAKEN: YES NO
Calibration/Standard: pH EC DO CO2
Decon completed: by Bgm date 9-13-98
Remarks

Paint Dope

Army Corps of Engineers

Northeast Cape, Alaska

1998 Chain-of-Custody

MONTGOMERY WATSON

MONTGOMERY WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maus

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, Ak 99518
907-265-8128
907-265-8263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape
Comments:
98NEC001
COC # ______

Sampler's Signature: F. McLean

SOIL: (1) DRO/RRO - AK 102/103, 8 oz amber glass; (2) AAF/DRO & RRO - ADEC 18 ACC 75; (3) BTEX - EPA 8021A, 4 oz amber glass w/MeOH; (4) PAHs - EPA 8270 SIM, 8 oz amber glass; (5) PCBs - EPA 8082, 8 oz amber glass; (6) Dioxin - EPA 8290, 8 oz amber glass; (7) TOC - SW 9060, 4 oz jar; (8) Bulk Density - ASTM D-2937; (9) Moisture Content - ASTM D-2216; (10) Sieve Analysis - ASTM D-2487

WATER: (11) DRO/RRO - AK 102/103, 2-1 L amber w/HCl; (12) AAF/DRO & RRO - ADEC 18 ACC 75, 2-1 L amber w/HCl (m 9/12/98); (13) GRO - AK 101, 2-40 mL vials w/HCl; (14) BTEX - EPA 8021A, 3-40 ml vials w/HCl; (15) VOC - EPA 8260, 3-40 ml vials w/HCl; (16) PAHs - EPA 8270 SIM, 2-1L amber glass w/HCl; (17) PCBs - EPA 8082, 2-1L amber glass; (18) TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4; (19) Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3; (20) Sulfate - EPA 300.0, 125 mL high density polyethylene; (21) Nitrate - EPA 353.3, 250 mL high density polyethylene; (22) Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene

					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22			
9/11	1730	98NE C03GW801	W	2												X													DRO only
9/11	1800	98NE C04GW801	W	2												X													DRO only
9/11	1600	98NE C00GW801	W	2											X														DRO/RRO
		98 NE																											
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Relinquished by: F. McLean / [signature]	Date 9/12/98 Time 1300	Hand Delivered Y N (N)	Shipped Via goldstreak	Airbill Number: 1151 1065
Received for Laboratory by:	Date Time	Cooler Temperature upon arrival °C	Laboratory Notified Faxed	Date Time

9/9/98 11:46 AM

MONTGOMERY WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maus

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, Ak 99518
907-265-8128
907-265-8263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC002

COC #

Sampler's Signature: PGM

					SOIL: DRO/RRO - AK 102/103 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 AAC 75	SOIL: BTEX - EPA 8021A 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM 8 oz amber glass	SOIL: PCBs - EPA 8082 8 oz amber glass	SOIL: Dioxin - EPA 8290 8 oz amber glass	SOIL: TOC - SW 9060 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103 2 - 1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 AAC 75 2 - 1 L amber w/HCl	WATER: GRO - AK 101 2 - 40 mL vials w/HCl	WATER: BTEX - EPA 8021A 3 - 40 mL vials w/HCl	WATER: VOC - EPA 8260 3 - 40 mL vials w/HCl	WATER: PAHs - EPA 8270 SIM 2-1L amber ~~glass w/HCl~~ (9/12)	WATER: PCBs - EPA 8082 2 - 1L amber glass	WATER: TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421 ~~manganese SW 6010~~ 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene		
9/11	[illegible]	98 NE [illegible] GW01	W	5														X		X								
9/11	1500	98 NE [illegible]	W	5														X		X								
9/11	1600	98 NE [illegible] GW01	W	9													X	X		X			X					
9/11	1500	98 NE TBC01	W	2													X	X										
		98 NE																										
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Relinquished by: BGM/EMaus

Date 9/11/98 Time 1500

Hand Delivered Y (N)

Shipped Via Goldstreak

Airbill Number: 0214 4660

Date 9/13/98 Time 1500

Received for Laboratory by:

Date

Time

Cooler Temperature upon arrival °C

Laboratory Notified

Faxed

9/9/98 11:46 AM

MONTGOMERY WATSON

8021A

OK LAB

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maus

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, Ak 99518
907-265-8128
907-265-8263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC003

COC # ________

Sampler's Signature: [signature]

		Sample ID			SOIL: DRO/RRO - AK 102/103 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM 8 oz amber glass	SOIL: PCBs - EPA 8082 8 oz amber glass	SOIL: Dioxins - EPA 8290 8 oz amber glass	SOIL: TOC - SW 9060 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103 2 - 1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75 2 - 1 L amber w/HCl	WATER: GRO - AK 101 2 - 40 mL vials w/HCl	WATER: BTEX - EPA 8021A 3 - 40 ml vials w/HCl	WATER: [illegible] 3 - 40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM 2-1L amber glass w/HCl	WATER: PCBs - EPA 8082 2 - 1L amber glass	WATER: TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene	
9/12	1215	98 NEC07GW801	W	5											X				X								DRO
9/12	1500	98 NEC09GW801	W	5											X				X								DRO
9/12	1600	98 NEC07GW802	W	5											X				X								DRO
9/12	1630	98 NEC09GW803	W	5											X				X								DRO
9/12	1900	98 NECTB002	W	2															X								
		98 NE																									
		98 NE																									
		98 NE																									
		98 NE																									
		98 NE																									
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Relinquished by: [signature]	Date 9/13/98 Time 1500	Hand Delivered Y N X	Shipped Via Goldstreak	Airbill Number 0214 4671	Date 9/13/98 Time 1500
Received for Laboratory by:	Date Time	Cooler Temperature upon arrival °C		Laboratory Notified Faxed	

MONTGOME... WATSON

Montgomery Watson 4100 Spenard Road Anchorage AK 99517 (907)248-8883 Fax (907) 248-8884 ATTN: Eileen Maus	Laboratory: Quanterra Inc. 5761 Silverado Way Suite N Anchorage, Ak 99518 907-265-8128 907-265-8263 FAX Attn: Cindy LeFever **MW Job Number:** **1189098.050101** **30-DAY** **TURNAROUND**	U.S. Army Corps of Engineers - Northeast Cape Comments: 98NEC004 COC #

Sampler's Signature: B.G.Melcer

					SOIL: DRO/RRO - AK 102/103 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM 8 oz amber glass	SOIL: PCBs - EPA 8082 8 oz amber glass	SOIL: Dioxin - EPA 8290 8 oz amber glass	SOIL: TOC - SW 9060 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103 2-1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75 2-1 L amber w/HCl	WATER: GRO - AK 101 2-40 mL vials w/HCl	WATER: BTEX - EPA 8021A 3-40 ml vials w/HCl	WATER: VOC - EPA 8260 3-40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM 2-1L amber ~~glass w/HCl~~	WATER: PCBs - EPA 8082 2-1L amber glass	WATER: TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene			
9/12	1215	98 NE C07GW801	W	2																\									
9/12	1500	98 NE C09GW801	W	2																X									
9/12	1600	98 NE C09GW802	W	2																X									
9/12	1630	98 NE C09GW803	W	2																X									
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Relinquished by: BGMelcer / EMaus	Date 9/12/98 Time 1500	Hand Delivered Y N	Shipped Via Goldstreak	Airbill Number: 0214 4682	Date 9/13/98 Time 1500
Received for Laboratory by:	Date Time	Cooler Temperature upon arrival °C		Laboratory Notified Faxed	

9/9/98 1... AM

MONTGOMERY WATSON

Montgomery Watson 4100 Spenard Road Anchorage AK 99517 (907)248-8883 Fax (907) 248-8884 ATTN: Eileen Maas	Laboratory: Quanterra Inc. 5761 Silverado Way Suite N Anchorage, Ak 99518 907-265-8128 907-265-8263 FAX Attn: Cindy LeFever **MW Job Number:** **1189098.050101** **30-DAY** **TURNAROUND**	U.S. Army Corps of Engineers - Northeast Cape Comments: 98NEC005 COC #

Sampler's Signature DGM

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SOIL: DRO/RRO - AK 102/103, 8 oz amber glass	AAF/DRO & RRO - ADEC 18 ACC 75	BTEX - EPA 8021A, 4 oz amber glass w/MeOH	PAHs - EPA 8270 SIM, 8 oz amber glass	PCBs - EPA 8082, 8 oz amber glass	Dioxin - EPA 8290, 8 oz amber glass	TOC - SW 9060, 4 oz jar	Bulk Density - ASTM D-2937	Moisture Content - ASTM D-2216	Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2 - 1 L amber w/HCl	AAF/DRO & RRO - ADEC 18 ACC 75, 2 - 1 L amber w/HCl	GRO - AK 101, 2 - 40 mL vials w/HCl	BTEX - EPA 8021A, 3 - 40 ml vials w/HCl	VOC - EPA 8260, 3 - 40 ml vials w/HCl	PAHs - EPA 8270 SIM, 2-1L amber glass w/HCl	PCBs - EPA 8082, 2 - 1L amber glass	TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3	Sulfate - EPA 300.0, 125 mL high density polyethylene	Nitrate - EPA 353.3, 250 mL high density polyethylene	Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene	Comments
9/12	1710	98 NE CDBSDF01	S	2	X	X	X	X																			
9/12	1730	98 NE CDBSD 802	S	3	X	X	X	X																			
9/12	1750	98 NE CDBSD 803	S	3	X	X	X																				[illegible]
9/12	740	98 NE CDBSS 803	S	1							X																
9/12	720	98 NE CDBSS 804	S	1							X																
9/12	700	98 NE CDBSS 805	S	1							X																
9/12	1440	98 NE CDBSS 806	S	2	X	X																					
9/12	1620	98 NE CDBSS 807	S	2	X	X																					
9/12	1840	98 NE CDBSS 808	S	2	X	X																					
9/12	1600	98 NE CDBSS 809	S	2	X	X																					
9/12	820	98 NE CDSS 801	S	3	X	X	X	X	X																		
9/12	1600	98 NE CDBSS 801	S	3	X	X	X	X	X																		

Relinquished by: DGM/EMaas	Date 9/14/98 Time 1200	Hand Delivered Y N	Shipped Via Goldstreak	Airbill Number 0214 4430	Date 9/14/98 Time 1200
Received for Laboratory by:	Date Time	Cooler Temperature upon arrival °C		Laboratory Notified Faxed	

MONTGOMERY WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8881
Fax (907) 248-88''
ATTN: Eileen Maus

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, Ak 99518
907-265-8128
907-265-8263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC006

COC # ________

Sampler's Signature: [illegible]

[illegible]	[illegible]	Sample ID	[illegible]	[illegible]	SOIL: DRO/RRO - AK 102/103, 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A, 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM, 8 oz amber glass	SOIL: PCBs - EPA 8082, 8 oz amber glass	SOIL: Dioxins - EPA 8290, 8 oz amber glass	SOIL: TOC - SW 9060, 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2-1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75, 2-1 L amber w/HCl	WATER: GRO - AK 101, 2-40 mL vials w/HCl	WATER: BTEX - EPA 8021A, 3-40 ml vials w/HCl	WATER: VOC - EPA 8260, 3-40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM, 2-1L amber glass w/HCl	WATER: PCBs - EPA 8082, 2-1L amber glass	WATER: TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0, 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3, 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene	[illegible]	[illegible]	[illegible]
7/12	1700	98 NE CRCSD805	3	2	X	X		X	X																				
7/12	1750	98 NE CRCSD806	3	2	X	X		X	X																				
		98 NE																											
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Relinquished by: [illegible]	Date: 11/11/?? Time: 1:00	Hand Delivered Y (N)	Shipped Via: Gold Streak	Airbill Number: ~~08144730~~	Date: 11/11/?? Time: 1:00
Received for Laboratory by:	Date: Time:	Cooler Temperature upon arrival °C		Laboratory Notified Faxed	

9/? ?6 AM

6

MONTG[illegible]RY WATSON

985211

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248 8883
Fax (907) 248-8884
ATTN: Eileen Maus

Laboratory:
Quanterra Inc.
5761 Silverado Way, Suite N
Anchorage, AK 99518
907 265 8128
907-265-8263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape
Comments:
98NEC 007

COC #

Sampler's Signature: Bruce Maher

					SOIL: DRO/RRO - AK 102/103, 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A, 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM, 8 oz amber glass	SOIL: PCBs - EPA 8082, 8 oz amber glass	SOIL: Dioxins - EPA 8290, 8 oz amber glass	SOIL: TOC - SW 9060, 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2 - 1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75, 2 - 1 L amber w/HCl	WATER: GRO - AK 101, 2 - 40 mL vials w/HCl	WATER: BTEX - EPA 8021A, 3 - 40 ml vials w/HCl	WATER: VOC - EPA 8260, 3 - 40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM, 2-1L amber glass w/HCl	WATER: PCBs - EPA 8082, 2 - 1L amber glass	WATER: TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0, 125 mL high density polyethylene	WATER: Nitrate - EPA 353.2, 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene	[illegible]	[illegible]	[illegible]
1	9/13/98	1800	98 NE C00GW801	W	1																				X	X	X			
			98 NE																											
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Relinquished by: Bruce Maher
Date: 9/14/98
Time:
Hand Delivered Y (N)
Shipped Via: AK Airlines GS
Airbill Number: 0214 5006
Date: 9/14/98
Time:

Received for Laboratory by: Tara McDowell
Date: 9/14/98
Time: 1520
Cooler Temperature upon arrival °C
Laboratory Notified
Faxed

9/9/98 11:16 AM

7

MONTG[illegible] WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maes

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, AK 99518
907-265-8128
907-265-8263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC008

COC # ______

Sampler's Signature: BGM

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SOIL: DRO/RRO - AK 102/103 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM 8 oz amber glass	SOIL: PCBs - EPA 8082 8 oz amber glass	SOIL: Dioxin - EPA 8290 8 oz amber glass	SOIL: TOC - SW 9060 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103 2 - 1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75 2 - 1 L amber w/HCl	WATER: GRO - AK 101 2 - 40 mL vials w/HCl	WATER: BTEX - EPA 8021A 3 - 40 ml vials w/HCl	WATER: VOC - EPA 8260 3 - 40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM 2-1L amber glass w/HCl	WATER: PCBs - EPA 8082 2 - 1L amber glass	WATER: TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene	[illegible]	[illegible]	[illegible]
9/12/98	1720	98 NE C10GW801	W	5											X			X											
9/12/98	1740	98 NE C10GW201	W	5											X			X											
9/12/98	1800	98 NE C10GW802	W	5											X			X											
9/12/98	1900	98 NE CTB002	W	3														X											
		98 NE																											
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Relinquished by: BGM / E Maes	Date 9/14/98 Time 1500	Hand Delivered Y N	Shipped Via	Airbill Number:	Date Time
Received for Laboratory by:	Date Time	Cooler Temperature upon arrival °C		Laboratory Notified Faxed	

MONTGOMERY WATSON

Need to call Lab

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maas

Analytica

~~Laboratory~~
~~Quanterra Inc.~~
~~5761 Silverado Way, Suite N~~
~~Anchorage, AK 99518~~
~~907-563-9130~~
~~907-563-9263 FAX~~
~~Attn: Cindy LeFever~~

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC009

COC #

Sampler's Signature: BSM

					SOIL										WATER											
					DRO/RRO - AK 102/103 8 oz amber glass	AAF/DRO & RRO - ADEC 18 ACC 75	BTEX - EPA 8021A 4 oz amber glass w/MeOH	PAHs - EPA 8270 SIM 8 oz amber glass	PCBs - EPA 8082 8 oz amber glass	Dioxin - EPA 8290 8 oz amber glass	TOC - SW 9060 4 oz jar	Bulk Density - ASTM D-2937	Moisture Content - ASTM D-2216	Sieve Analysis - ASTM D-2487	DRO/RRO - AK 102/103 2 - 1 L amber w/HCl	AAF/DRO & RRO - ADEC 18 ACC 75 2 - 1 L amber w/HCl	GRO - AK 101 2 - 40 mL vials w/HCl	BTEX - EPA 8021A 3 - 40 ml vials w/HCl	VOC - EPA 8260 3 - 40 ml vials w/HCl	PAHs - EPA 8270 SIM 2-1L amber glass w/HCl	PCBs - EPA 8082 2 - 1L amber glass	TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	Lead EPA 7421/Manganese SW 6010 500 ml polyethylene w/HNO_3	Sulfate - EPA 300.0 125 mL high density polyethylene	Nitrate - EPA 353.3 250 mL high density polyethylene	Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene
9/12	1745	98 NE C10GW301	W	5	X		X																			
9/12	1900	98 NE CTB004	W	3			X																			
		98 NE																								
		98 NE																								
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Relinquished by: BSM / E Maas
Date: 9/14/98
Time: 1500
Hand Delivered Y (N)
Shipped Via: Goldstreak
Airbill Number: 08232943
Date: 9/14/98
Time: 1500

Received for Laboratory by:
Date:
Time:
Cooler Temperature upon arrival °C
Laboratory Notified
Faxed

9/9/98 11:46 AM

9

MONTGOMERY WATSON

NEED TO CALL LAB

PW mdf

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maus

Analytica

Laboratory:
~~Quanterra Inc.~~
~~5761 Silverado Way, Suite N~~
~~Anchorage, AK 99518~~
~~907-563-9128~~
~~907-561-6341 FAX~~
~~Ann Cmdy/Ph/Fax~~

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

~~98NEC00 EMW~~ 9/14/98
98NEC010
1 of 2

COC #

Sampler's Signature: BGM/DQ

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SOIL: DRO/RRO - AK 102/103, 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A, 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM, 8 oz amber glass	SOIL: PCBs - EPA 8082, 8 oz amber glass	SOIL: Dioxin - EPA 8290, 8 oz amber glass	SOIL: TOC - SW 9060, 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2- 1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75, 2- 1 L amber w/HCl	WATER: GRO - AK 101, 2 - 40 mL vials w/HCl	WATER: BTEX - EPA 8021A, 3- 40 ml vials w/HCl	WATER: VOC - EPA 8260, 3- 40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM, 2-1L amber glass w/HCl	WATER: PCBs - EPA 8082, 2 - 1L amber glass	WATER: TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0, 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3, 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene	[illegible]	[illegible]	[illegible]
9/13	1625	98 NE C15GW301	W	3														X											
9/13	1505	98 NE C16GW301	W	4															X				X						
9/13	1235	98 NE C19GW301	W	10											X			X											MS/MSD
9/13	1900	98 NE CTB005	W	3															X										
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											

Relinquished by: BGM/DQ/EMaus	Date 9/14/98 Time 1500	Hand Delivered Y (N)	Shipped Via GoldStreak	Airbill Number 08232943	Date 9/14/98 Time 1500
Received for Laboratory by:	Date Time	Cooler Temperature upon arrival °C		Laboratory Notified Faxed	

MONTGOMERY WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maus

Analytica
811 W. 8th AVE
Anchorage, AK 99501
~~Laboratory~~
~~5761 Silverado Way Suite N~~
~~Anchorage, AK 99518~~
~~907-563-3134~~
~~907-563-6363 FAX~~
~~Attn: Cindy LaFevre~~ DP

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

Sampler's Signature: [signature]

SOIL / WATER

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC010

2 of 2

COC #

					SOIL: DRO/RRO - AK 102/103, 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A, 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM, 8 oz amber glass	SOIL: PCBs - EPA 8082, 8 oz amber glass	SOIL: Dioxin - EPA 8290, 8 oz amber glass	SOIL: TOC - SW 9060, 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2-1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75, 2-1 L amber w/HCl	WATER: GRO - AK 101, 2-40 mL vials w/HCl	WATER: BTEX - EPA 8021A, 3-40 ml vials w/HCl	WATER: VOC - EPA 8260, 3-40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM, 2-1L amber glass ~~w/HCl~~ Emm 9/14	WATER: PCBs - EPA 8082, 2-1L amber glass	WATER: TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0, 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3, 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene		
9-13	1810	98 NE CRC301 (38)	S	4	X	X	X	X	X																			
9-13	1610	98 NE CRC302 (230)	S	3	X	X	X	X	X																			
		~~98 NE CRC30e~~																										
9-13	1546	98 NE CRCSW302	W												X	X				X	X	Revised					9-14-98 DP	
		98 NE																										
		98 NE																										
		98 NE																										
		98 NE																										
		98 NE																										
		98 NE																										
		98 NE																										
		98 NE																										

Relinquished by: [signature] | Date 9/14/98 | Time | Hand Delivered Y (N) | Shipped Via AK Airlines Gold Streak | Airbill Number 0823 2943 | Date 9/14/98 | Time

Received for Laboratory by: | Date | Time | Cooler Temperature upon arrival °C | Laboratory Notified | Faxed

9/2/98 11:36 AM

FAX

MONTGOMERY WATSON

4100 Spenard Road
Anchorage, Alaska 99517

Tel: (907) 248-8883
Fax: (907) 248-8884

Date:

To: Analytica ~~Angie Caudell~~

Fax No: 907 258 6634

From: Eileen Maus

Reference: Northeast Cape

Subject: COC# 98NEC010 page 2

No. of Pages: 2 (including cover)

Please see revision in COC# 98 NEC010 page 2

Sample # 98NECRCSW302W

Parameters:

DRO/RRO AK 102/103 1

AAF DRO/RRO ~~AB~~ 1

~~PAH~~, PAHs unpreserved 1

PCB unpreserved 1

Thank You, Elen

If you do not receive all pages, or if there are any problems with this transmission, please call Angela King at 907-248-8883.

MONTGOMERY WATSON

Need to chg to Pb only

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maus

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, AK 99518
907-265-8125
907-265-8263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC011

1 of 4

COC # ________

Sampler's Signature: BGM/DQ

					SOIL									WATER												Comments
					DRO/RRO - AK 102/103 8 oz amber glass	AAF/DRO & RRO - ADEC 18 AAC 78	BTEX - EPA 8021A 4 oz amber glass w/MeOH	PAHs - EPA 8270 SIM 8 oz amber glass	PCBs - EPA 8082 8 oz amber glass	Dioxin - EPA 8290 8 oz amber glass	TOC - SW 9060 4 oz jar	Bulk Density - ASTM D-2937	Moisture Content - ASTM D-2216	Sieve Analysis - ASTM D-2487	DRO/RRO - AK 102/103 2 - 1 L amber w/HCl	AAF/DRO & RRO - ADEC 18 AAC 78 2 - 1 L amber w/HCl	GRO - AK 101 2 - 40 mL vials w/HCl	BTEX - EPA 8021A 3 - 40 ml vials w/HCl	VOC - EPA 8260 3 - 40 ml vials w/HCl	PAHs - EPA 8270 SIM 2-1L amber glass w/HCl	PCBs - EPA 8082 2 - 1L amber glass	TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	Lead EPA 7421/~~[illegible] SW 6010~~ 500 ml polyethylene w/HNO_3	Sulfate - EPA 300.0 125 mL high density polyethylene	Nitrate - EPA 353.3 250 mL high density polyethylene	Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene	
9/13	1130	98 NE C11GW801	W	5											X			X									
9/13	1200	98 NE C11GW802	W	5											X			X									
9/13	1630	98 NE C13GW001	W	5											X			X									
9/13	1630	98 NE C15GW801	W	5											X			X									
9/13	1620	98 NE C15GW201	W	5														X									
9/13	1500	98 NE C16GW801	W	7															X				X				MS/MSD
9/13	1510	98 NE C16GW201	W	7															X				X				
9/13	1515	98 NE C16GW802	W	4															X				X				
9/13	1230	98 NE C19GW801	W	10											X			X									MS/MSD
9/13	1240	98 NE C19GW201	W	10											X			X									MS/MSD
9/13	1430	98 NE C19GW802	W	5											X			X									
9/13	1600	98 NE C27GW001	W	5											X			X									

Relinquished by: BGM/DQ Emea	Date 9/14/98 Time 1500	Hand Delivered Y Q	Shipped Via Goldstreak	Airbill Number: 0214 4741	Date 9/14/98 Time 1500
Received for Laboratory by:	Date Time	Cooler Temperature upon arrival °C		Laboratory Notified Faxed	

9/9/98 11:46 AM

12

MONTGOMERY WATSON

Montgomery Watson 4100 Spenard Road Anchorage AK 99517 (907)248-8883 Fax (907) 248-8884 ATTN: Eileen Mass	Laboratory: Quanterra Inc. 5761 Silverado Way, Suite N Anchorage, AK 99518 907-563-8128 907-563-8263 FAX Attn: Cindy LeFever **MW Job Number:** **1189098.050101** **30-DAY** **TURNAROUND**	U.S. Army Corps of Engineers - Northeast Cape Comments: 98NEC011 2 of 4 COC #

Sampler's Signature: BSM/DG

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SOIL: DRO/RRO - AK 102/103, 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 78	SOIL: BTEX - EPA 8021A, 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM, 8 oz amber glass	SOIL: PCBs - EPA 8082, 8 oz amber glass	SOIL: Dioxin - EPA 8290, 8 oz amber glass	SOIL: TOC - SW 9060, 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2 - 1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 78, 2 - 1 L amber w/HCl	WATER: GRO - AK 101, 2 - 40 mL vials w/HCl	WATER: BTEX - EPA 8021A, 3 - 40 ml vials w/HCl	WATER: VOC - EPA 8260, 3 - 40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM, 2-1L amber glass w/HCl	WATER: PCBs - EPA 8082, 2 - 1L amber glass	WATER: TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0, 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3, 250 mL high density polyethylene	WATER: Alkalinity (Bicarbonate) - EPA 310.1, 1 L polyethylene	[illegible]	[illegible]	[illegible]
9/13	1100	98 NE CTB006	W	3															X										
		98 NE																											
		98 NE																											
		98 NE																											
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Relinquished by: BSM/DG/Emers	Date 9/14/98 Time 1500	Hand Delivered Y (N)	Shipped Via Goldstreak	Airbill Number 0214 4741	Date 9/14/98 Time 1500
Received for Laboratory by:	Date Time	Cooler Temperature upon arrival °C		Laboratory Notified Faxed	

13

MONTGOMERY WATSON

98NEC011

3 of 4

Montgomery Watson
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Laboratory:
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Anchorage, AK 99518
907-365-8128
907-365-8263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

COC #

Sampler's Signature: [signature]

Date	Time	Sample ID	Matrix	No.	SOIL: DRO/RRO - AK 102/103, 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 AAC 75	SOIL: BTEX - EPA 8021A, 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM, 8 oz amber glass	SOIL: PCBs - EPA 8082, 8 oz amber glass	SOIL: Dioxin - EPA 8290, 8 oz amber glass	SOIL: TOC - SW 9060, 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2 - 1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 AAC 75, 2 - 1 L amber w/HCl	WATER: GRO - AK 101, 2 - 40 mL vials w/HCl	WATER: BTEX - EPA 8021A, 3- 40 ml vials w/HCl	WATER: VOC - EPA 8260, 3- 40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM, 2-1L amber glass w/HCl	WATER: PCBs - EPA 8082, 2 - 1L amber glass	WATER: TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 375.x, 125 mL high density polyethylene	WATER: Nitrate - EPA 353.2, 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene	[illegible]	[illegible]	[illegible]
9-13	1000	98 NEC25SS801	S	1						X																			
9-13	1415	98 NECRCSD 804	S	3	X	X	X	X	X																		50	25	
9-13	1445	98 NECRCSD 803	S	3	X	X	X	X	X																		50	25	
9-13	1600	98 NECRCSD 802	S	5	X	X	X	X	X																		50	25	ms/msd
9-13	1605	98 NECRCSD 202	S	3	X	X	X	X	X																		50	25	
9-13	1800	98 NECRCSD 801	S	3	X	X	X	X	X																		50	25	
9-13	1805	98 NECRCSD 201	S	3	X	X	X	X	X																		50	25	
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											

Relinquished by: [signature]
Date 9/14/98
Time
Hand Delivered Y (N)
Shipped Via Air Airlines Goldstreak
Airbill Number: 0214 4741
Date 9/14/98
Time

Received for Laboratory by:
Date
Time
Cooler Temperature upon arrival °C
Laboratory Notified
Faxed

14

9/?/98 11:46 AM

MONTGOMERY WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
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ATTN: Eileen Mans

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, AK 99518
907-563-9128
907-563-9263 FAX
Attn: Cindy LaFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape
Comments:
98NEC011
4 of 4

COC # ______

Sampler's Signature: [signature]

					SOIL										WATER														
					DRO/RRO - AK 102/103 8 oz amber glass	AAF/DRO & RRO - ADEC 18 ACC 78	BTEX - EPA 8021A 4 oz amber glass w/MeOH	PAHs - EPA 8270 SIM 8 oz amber glass	PCBs - EPA 8082 8 oz amber glass	Dioxin - EPA 8290 8 oz amber glass	TOC - SW 9060 4 oz jar	Bulk Density - ASTM D-2937	Moisture Content - ASTM D-2216	Sieve Analysis - ASTM D-2487	DRO/RRO - AK 102/103 2- 1 L amber w/HCl	AAF/DRO & RRO - ADEC 18 ACC 78 2- 1 L amber w/HCl	GRO - AK 101 2 - 40 mL vials w/HCl	BTEX - EPA 8021A 3 - 40 ml vials w/HCl	VOC - EPA 8260 3 - 40 ml vials w/HCl	PAHs - EPA 8270 SIM 2-1L amber glass w/HCl	PCBs - EPA 8082 2 - 1L amber glass	TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	Lead EPA 7421/Manganese 6W 6010 500 ml polyethylene w/HNO_3	Sulfate - EPA 300.0 125 mL high density polyethylene	Nitrate - EPA 353.2 250 mL high density polyethylene	Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene			
9/13	1245	98 NE CRCSW806	W	10											X	X	X	X		X	X								
9/13	1330	98 NE CRCSW805	W	10											X	X	X	X		X	X								
9/13	1400	98 NE CRCSW804	W	10											X	X	X	X		X	X								
9/13	1430	98 NE CRCSW803	W	10											X	X	X	X		X	X								
9/13	1530	98 NE CRCSW802	W	18											X	X	X	X		X	X								ms/msd
9/13	1535	98 NE CRCSW202	W	9											X	X	X	X		X	X								
9/13	1755	98 NE CRCSW801	W	10											X	X	X	X		X	X								
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											
		98 NE																											

added 9/16/98 cmm

Relinquished by: [signature]
Date 9/14/98
Time
Hand Delivered Y N
Shipped Via AK Airlines Goldstreak
Airbill Number: 0214 4741
Date 9/14/98
Time

Received for Laboratory by:
Date
Time
Cooler Temperature upon arrival °C
Laboratory Notified
Faxed

9/9/?? AM

MONTGOMERY WATSON

Montgomery Watson
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(907)248-8883
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Laboratory:
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Attn: Cindy LeFevre

MW Job Number:
1189098.050101
14-DAY TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

COC# 98NEC012

COC # ________

Sampler's Signature: BSM/AD

					SOIL: DRO/RRO - AK 102/103 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM 8 oz amber glass	SOIL: PCBs - EPA 8082 8 oz amber glass	SOIL: Dioxin - EPA 8290 8 oz amber glass	SOIL: TOC - SW 9060 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103 2-1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75 2-1 L amber w/HCl	WATER: GRO - AK 101 2-40 mL vials w/HCl	WATER: BTEX - EPA 8021A 3-40 ml vials w/HCl	WATER: VOC - EPA 8260 3-40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM 2-1L amber glass	WATER: PCBs - EPA 8082 2-1L amber glass	WATER: TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0 125 mL high density polyethylene	WATER: Nitrate - EPA 353.3 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene	Comments
9/14	1600	98 NE C02SS801	S	3	X		X	X											←	MS		MSD			DRO	RRO	DRO/RRO BTEX
9/14	1615	98 NE C02SS802	S	2	X		X																				DRO only + BT
9/14	1615	98 NE C02SS201	S	1	X																						
9/14	1330	98 NE C14SS801	S	1					X																		
9/14	1345	98 NE C14SS802	S		X	X	X				X																
9/14	1200	98 NE C13SS801	S	1					X																		
9/14	1230	98 NE C13SS802	S	1					X																		
9/14	1245	98 NE C13SS803	S	1					X																		
9/14	1200	98 NE C00SS801	S		X	X	X				X																
		98 NE																									
		98 NE																									
		98 NE																									

Relinquished by: BSM/AD
For LAB 9/16/98 1400 Wayne A Smith

Date 9/15/98
Time 1500

Hand Delivered (Y) N

Shipped Via

Airbill Number:

Date
Time

Received for laboratory by: Eileen Maus

Date 9/16/98
Time 1200

Cooler Temperature upon arrival 5.6 °C

Laboratory Notified

Faxed

9/16/98 10:37 AM

MONTGO.   WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maus

Analytica

Laboratory
~~Quanterra Inc.~~
~~5761 Silverado Way, Suite N~~
~~Anchorage, Ak 99518~~
~~907 265 8128~~
~~907-265-8263 FAX~~
~~Attn: Cindy LeFebre~~

MW Job Number:
1189098.050101
14-DAY
TURNAROUND

U.S. Army Corps of Engineers / Northeast Cape

Comments:

98NEC013

COC #

Sampler's Signature: BCm / AD

SOIL

1. DRO/RRO - AK 102/103, 8 oz amber glass
2. AAF/DRO & RRO - ADEC 18 ACC 75
3. BTEX - EPA 8021A, 4 oz amber glass w/MeOH
4. PAHs - EPA 8270 SIM, 8 oz amber glass
5. PCBs - EPA 8082, 8 oz amber glass
6. Dioxin - EPA 8290, 8 oz amber glass
7. TOC - SW 9060, 4 oz jar
8. Bulk Density - ASTM D-2937
9. Moisture Content - ASTM D-2216
10. Sieve Analysis - ASTM D-2487

WATER

11. DRO/RRO - AK 102/103, 2 - 1 L amber w/HCl
12. AAF/DRO & RRO - ADEC 18 ACC 75, 2 - 1 L amber w/HCl
13. GRO - AK 101, 2 - 40 mL vials w/HCl
14. BTEX - EPA 8021A, 3 - 40 ml vials w/HCl
15. VOC - EPA 8260, 3 - 40 ml vials w/HCl
16. PAHs - EPA 8270 SIM, 2 - 1L amber glass
17. PCBs - EPA 8082, 2 - 1L amber glass
18. TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4
19. Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3
20. Sulfate - EPA 300.0, 125 mL high density polyethylene
21. Nitrate - EPA 353.3, 250 mL high density polyethylene
22. Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene

Date	Time	Sample ID	Matrix	Containers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Comments
9/14	1610	98 NE C02SS301	S		X																						
		98 NE																									
		98 NE																									
		98 NE																									
		98 NE																									
		98 NE																									
		98 NE																									
		98 NE																									
		98 NE																									
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		98 NE																									

Relinquished By: BCm/AD	Date 9/15/98 Time 1500	Hand Delivered (Y) N	Shipped Via: Hand delivered by Eileen Maus
Rec'd: [illegible]			Date 9/16/98 Time 1307
Received for Laboratory by: Eileen Maus	Date 9/15/98 Time 1300	Cooler Temperature upon arrival: 4.9°C Ø Seals	Laboratory Notified Faxed

17

MONTGOMERY WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Mans

CTE

~~Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, AK 99518
907-563-9120
907-563-9363 FAX
Attn: Cindy LaPoint~~

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC8014

COC # ____________

Sampler's Signature

					SOIL: DRO/RRO - AK 102/103, 1 oz amber glass	SOIL: AAF/DRO & RRO - AMEC 18 AAC 75	SOIL: BTEX - EPA 8021A, 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM, 8 oz amber glass	SOIL: PCBs - EPA 8082, 8 oz amber glass	SOIL: Dioxin - EPA 8290, 8 oz amber glass	SOIL: TOC - SW 9060, 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2-1 L amber w/HCl	WATER: AAF/DRO & RRO - AMEC 18 AAC 75, 2-1 L amber w/HCl	WATER: GRO - AK 101, 2-40 mL vials w/HCl	WATER: BTEX - EPA 8021A, 3-40 ml vials w/HCl	WATER: VOC - EPA 8260, 3-40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM, 2-1L amber glass w/HCl Q [illegible]	WATER: PCBs - EPA 8082, 2-1L amber glass	WATER: TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	WATER: Lead EPA 7421/Manganese SW 6010, 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0, 125 mL high density polyethylene	WATER: Nitrate - EPA 353.2, 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene
~~9/15~~		~~98 NE [illegible] 801~~ (87)	~~W~~	~~2~~																				~~X~~	~~X~~	~~X~~
9/15		98 NE C27AN801	W	2																				X	X	X
		98 NE																								
		98 NE																								
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Date
Time
Hand Delivered Y N
Shipped Via
Airbill Number:
Date
Time

Received for Laboratory by:
Date
Time
Cooler Temperature upon arrival °C
Laboratory Notified
Found

MONTGOME[illegible] [illegible]ATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maas

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, AK 99518
907-563-9128
907-563-9263 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC015
1of2

COC #

Date	Time	Sample ID	Matrix	Containers	SOIL: DRO/RRO - AK 102/103, 8 oz amber glass	SOIL: AAF/DRO & RRO - ADEC 18 ACC 75	SOIL: BTEX - EPA 8021A, 4 oz amber glass w/MeOH	SOIL: PAHs - EPA 8270 SIM, 8 oz amber glass	SOIL: PCBs - EPA 8082, 8 oz amber glass	SOIL: Dioxin - EPA 8290, 8 oz amber glass	SOIL: TOC - SW 9060, 4 oz jar	SOIL: Bulk Density - ASTM D-2937	SOIL: Moisture Content - ASTM D-2216	SOIL: Sieve Analysis - ASTM D-2487	WATER: DRO/RRO - AK 102/103, 2 - 1 L amber w/HCl	WATER: AAF/DRO & RRO - ADEC 18 ACC 75, 2 - 1 L amber w/HCl	WATER: GRO - AK 101, 2 - 40 mL vials w/HCl	WATER: BTEX - EPA 8021A, 3 - 40 ml vials w/HCl	WATER: VOC - EPA 8260, 3 - 40 ml vials w/HCl	WATER: PAHs - EPA 8270 SIM, 2 - 1L amber glass ~~w/HCl~~ CJHM	WATER: PCBs - EPA 8082, 2 - 1L amber glass	WATER: TOC - EPA 415.1, 250 ml amber glass w/H_2SO_4	WATER: ~~Iron EPA 7000~~/Manganese SW 6010, 500 ml polyethylene w/HNO_3	WATER: Sulfate - EPA 300.0, 125 mL high density polyethylene	WATER: Nitrate - EPA 353.2, 250 mL high density polyethylene	WATER: Alkalinity (bicarbonate) - EPA 310.1, 1 L polyethylene	Comments
9/15	1030	98 NE CBKSW801	W	10											X	X		X		X		X					
9/15	1000	98 NE CBKSW802	W	10											X	X		X		X		X					
9/15	1730	98 NE C13GW802	W	5											X			X									
9/15	1700	98 NE C27GW801	W	4													X						X				
9/15	1700	98 NE C00GW801	W	1																						Methane	
9/15	1045	98 NE CBKSD801	SD	3	X	X	X	X			X																
9/15	1015	98 NE CBKSD802	SD	3	X	X	X	X			X																
9/15	1500	98 NE C06SS801	S		X		X				X	X	X														
9/15	1510	98 NE C06SS802	S	2	X																						
9/15	1520	98 NE C07SS802	S	1							X																
9/15	1540	98 NE C09SS801	S		X		X	X																			
9/15	1530	98 NE C09SS802	S								X																

TD EPA 9/18/98 am

D added 9/18/98 Emm [illegible] not [illegible] sample received [illegible] chain.

Relinquished by:	Date	Hand Delivered Y N	Shipped Via	Airbill Number	Date
	Time				Time
Received for Laboratory by:	Date	Cooler Temperature upon arrival		Laboratory Notified	
	Time			Faxed	

MERY WATSON

Montgomery Watson
4100 Spenard Road
Anchorage, AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eik. Mass

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, AK 99518
907-265-8128
907-265-8361 FAX
Attn: Cindy LeFever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

Sampler's Signature:

U.S. Army Corps of Engineers - Northeast Cape
Comments:

98NEC015
2 of 2

COC # ______

					SOIL										WATER															
					DRO/RRO - AK 102/103 8 oz amber glass	AAF/DRO & RRO - ADEC 18 ACC 78	BTEX - EPA 8021A 4 oz. amber glass w/MeOH	PAHs - EPA 8270 SIM 8 oz amber glass	PCBs - EPA 8082 8 oz amber glass	Dioxin - EPA 8290 8 oz amber glass	TOC - SW 9060 oz jar	Bulk Density - ASTM D-2937	Moisture Content - ASTM D-2216	Sieve Analysis - ASTM D-2487	DRO/RRO - AK 102/103 2 - 1 L amber w/HCl	AAF/DRO & RRO - ADEC 18 ACC 78 2 - 1 L amber w/HCl	GRO - AK 101 2 - 40 mL vials w/HCl	BTEX - EPA 8021A 3 - 40 ml vials w/HCl	VOC - EPA 8260 3 - 40 ml vials w/HCl	PAHs - EPA 8270 SIM 2 - 1L amber glass ~~w/HCl~~ Emg	PCBs - EPA 8082 2 - 1L amber glass	TOC - EPA 415.1 250 ml amber glass w/H_2SO_4	Lead EPA 7421/Manganese SW 6010 500 ml polyethylene w/HNO_3	Sulfate - EPA 300.0 125 mL high density polyethylene	Nitrate - EPA 353.3 250 mL high density polyethylene	Alkalinity (bicarbonate) - EPA 310.1 1 L polyethylene			
9/15	1550	98 NE C10 SS801	S	4	X	X	X				X																		
		98 NE																											
		98 NE																											
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Relinquished by:

Date
Time

Hand Delivered
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Shipped Via

Airbill Number:

Date
Time

Received for Laboratory by:

Date
Time

Cooler Temperature upon arrival °C

Laboratory Notified

Faxed

9/9/2011 1:46 AM

MONTGOMERY WATSON

Montgomery Watson
4100 Spenard Road
Anchorage AK 99517
(907)248-8883
Fax (907) 248-8884
ATTN: Eileen Maus

Laboratory:
Quanterra Inc.
5761 Silverado Way Suite N
Anchorage, AK 99518
907-563-9120
907-563-9263 FAX
Attn: Cindy LePever

MW Job Number:
1189098.050101
30-DAY
TURNAROUND

Sampler's Signature:

U.S. Army Corps of Engineers - Northeast Cape

Comments:

98NEC016

COC #

					SOIL										WATER														
					DRO/RRO - AK 102/103 4 oz amber glass	AAF/DRO & RRO - ADEC 18 AAC 75	BTEX - EPA 8021A 4 oz amber glass w/MeOH	PAHs - EPA 8270 SIM 8 oz amber glass	PCBs - EPA 8082 8 oz amber glass	Dioxins - EPA 8290 8 oz amber glass	TOC - SW 9060 4 oz jar	Bulk Density - ASTM D-2937	Moisture Content - ASTM D-2216	Sieve Analysis - ASTM D-2487	DRO/RRO - AK 102/103 2-1 L amber w/HCl	AAF/DRO & RRO - ADEC 18 AAC 75 2-1 L amber w/HCl	GRO - AK 101 2-40 mL vials w/HCl	BTEX - EPA 8021A 3-40 ml vials w/HCl	VOC - EPA 8260 3-40 ml vials w/HCl	PAHs - EPA 8270 SIM 2-1L amber glass w/HCl	PCBs - EPA 8082 2-1L amber glass	TOC - EPA 415.1 250 ml amber glass w/H₂SO₄	Lead EPA 7421/Manganese SW 6010 500 ml polyethylene w/HNO₃	Sulfate - EPA 300.0 125 mL high density polyethylene	Nitrate - EPA 353.3 250 mL high density polyethylene	Alkalinity - EPA 310.1 1 L polyethylene			
9/16	1600	98 NE C27SWS01	XW	9											X		X	X		X									
9/16	1900	98 NE CTB007	W	3													X	X											
		98 NE																											
		98 NE																											
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Received for Laboratory by: Kelly J. [illegible] | Date 9/17/98 | Time 1025 | Cooler Temperature upon arrival 2.7 °C | Laboratory Notified | Faxed

Temp

2

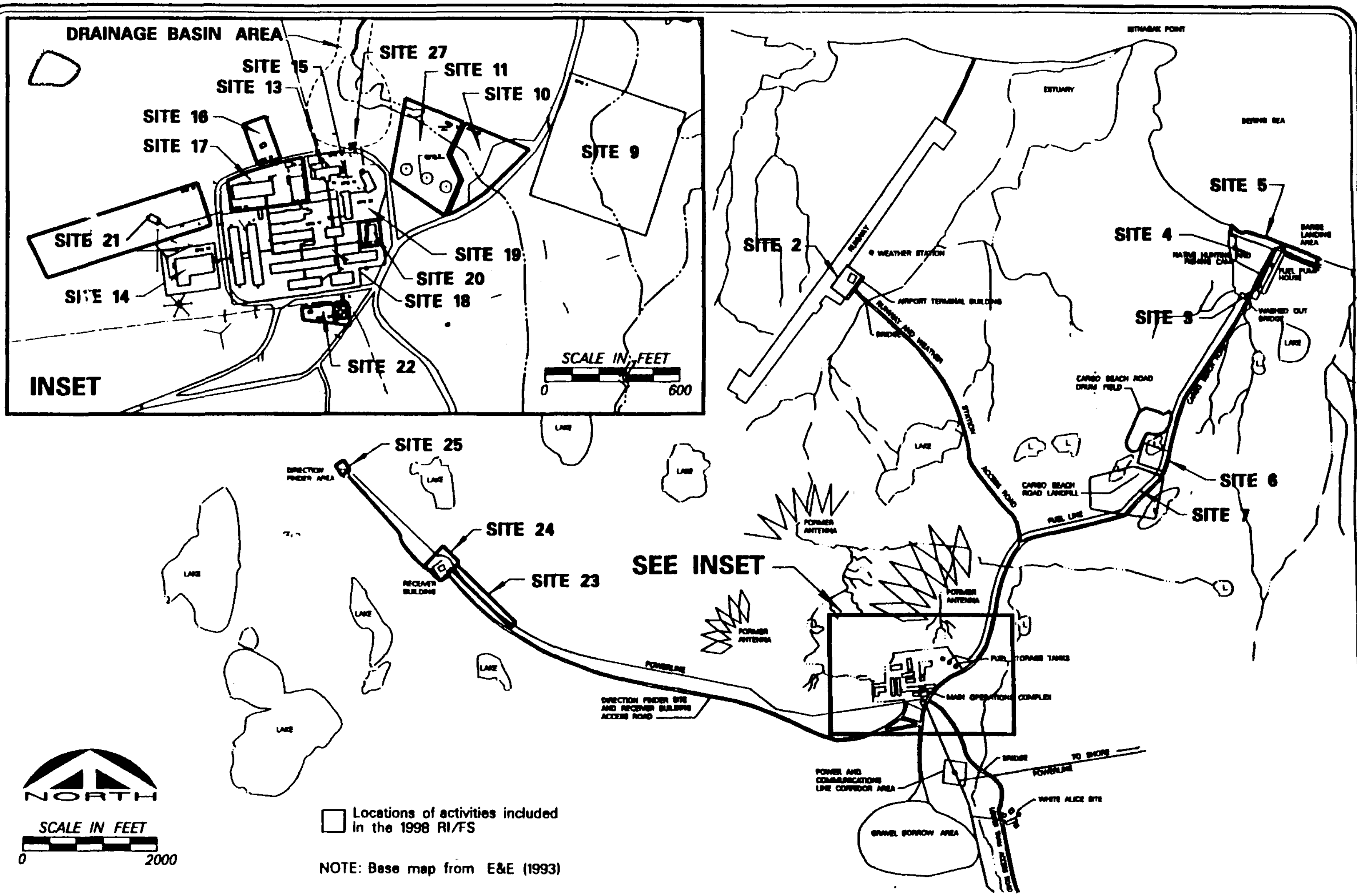
Army Corps of Engineers

Northeast Cape, Alaska

1998 Sample Location Maps

MONTGOMERY WATSON

JOB No. 88905. TIME: 24-AUG-1998 08:25 FILE: m:\cad\proj\corps\necape\ph2wkpln\98wp\fg1_3.dgn



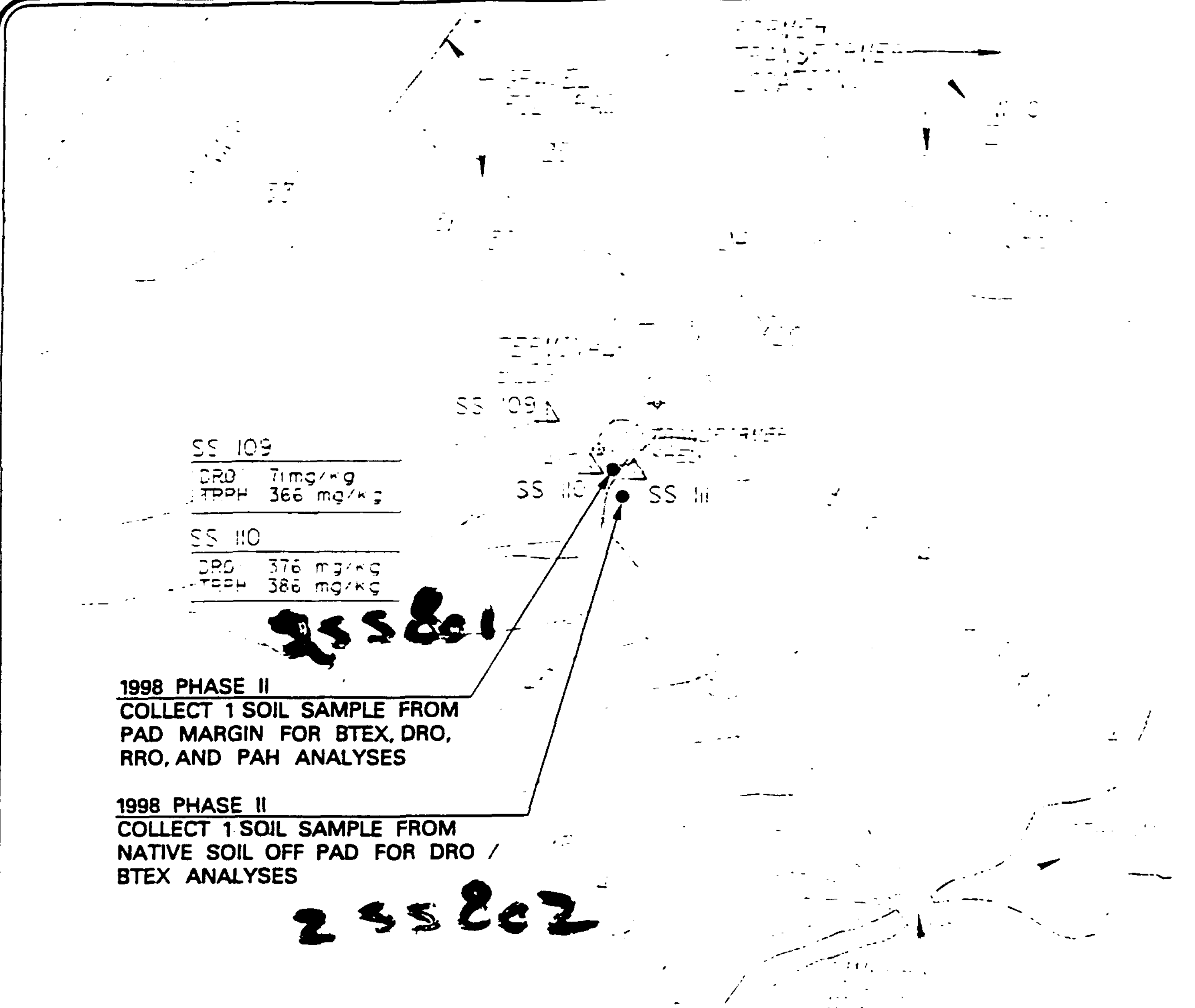
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 1-3

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITE MAP



LEGEND

- ● Proposed 1998 Phase II Soil Sample Location
- △ Phase I Surface Soil Sample (SS)
- DRO Diesel Range Organics
- BTEX Benzene, Toluene, Ethylbenzene, Xylenes
- PAH Polynuclear Aromatic Hydrocarbons
- RRO Residual Range Organics
- TRPH Total Recoverable Petroleum Hydrocarbons

NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers. (See Section 2.5)

MONTGOMERY WATSON

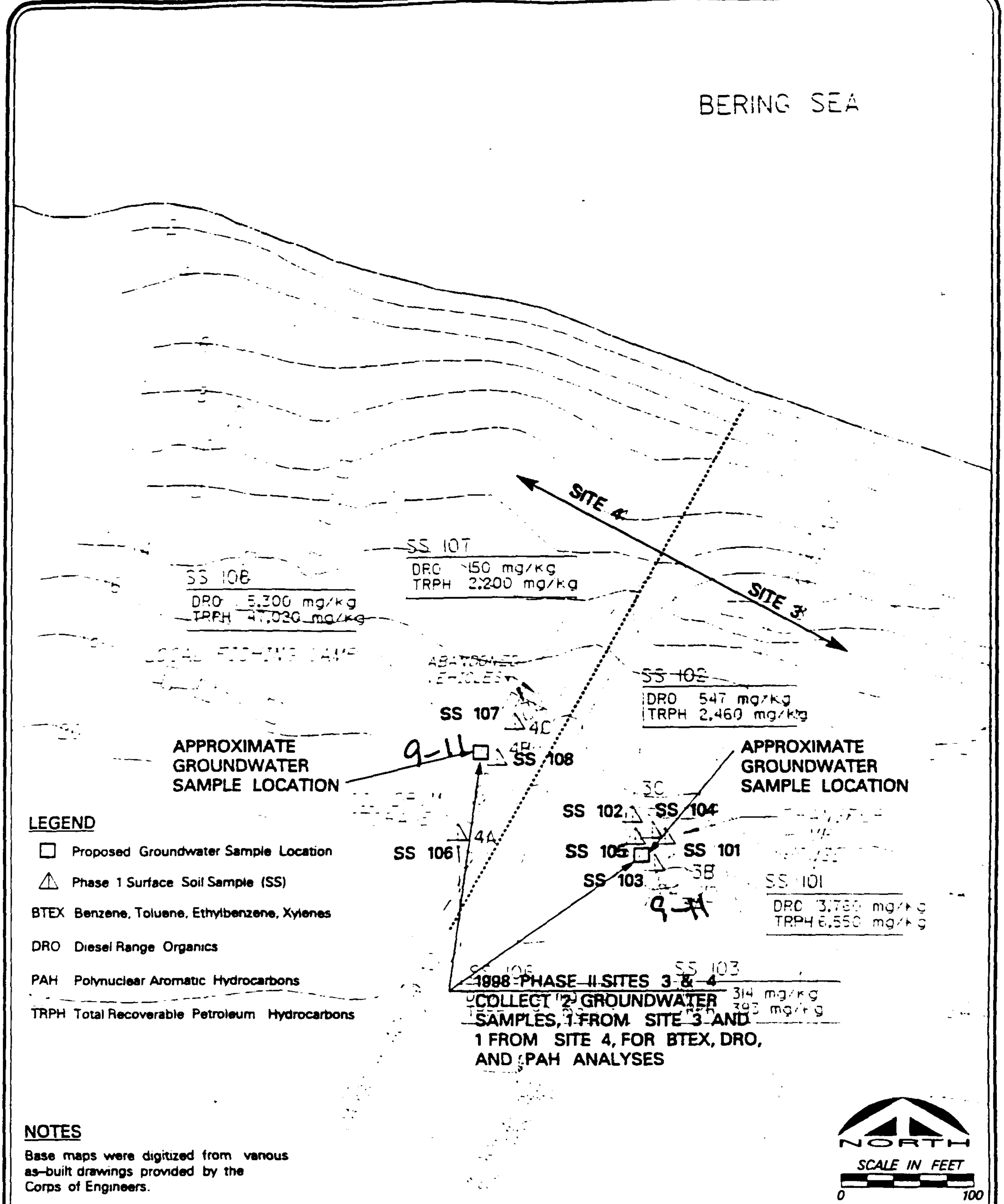
Anchorage, Alaska

FIGURE 2-1

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 2 SAMPLING LOCATIONS

JOB No. ...5010I TIME: 24-AUG-1998 08:32 FILE:



MONTGOMERY WATSON

Anchorage, Alaska

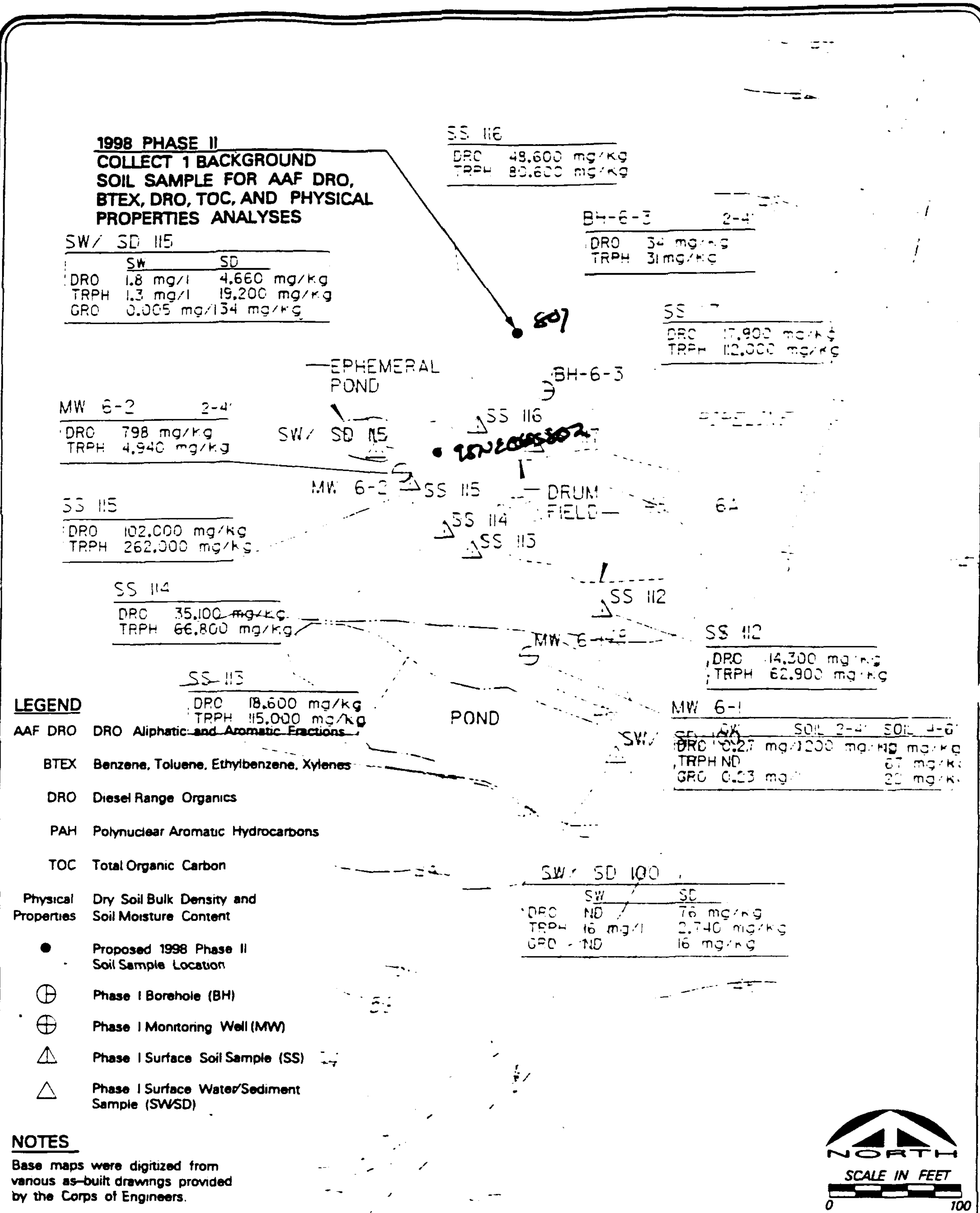
FIGURE 2-2

U.S. ARMY ENGINEER DISTRICT, ALASKA

N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITES 3 & 4 SAMPLING LOCATIONS

JOB No. ...50101 TIME: 24-AUG-1998 08:33 FILE: s:\cad\proj\corps\necape\ph2wkpn\98wp\fg2.2.dgn



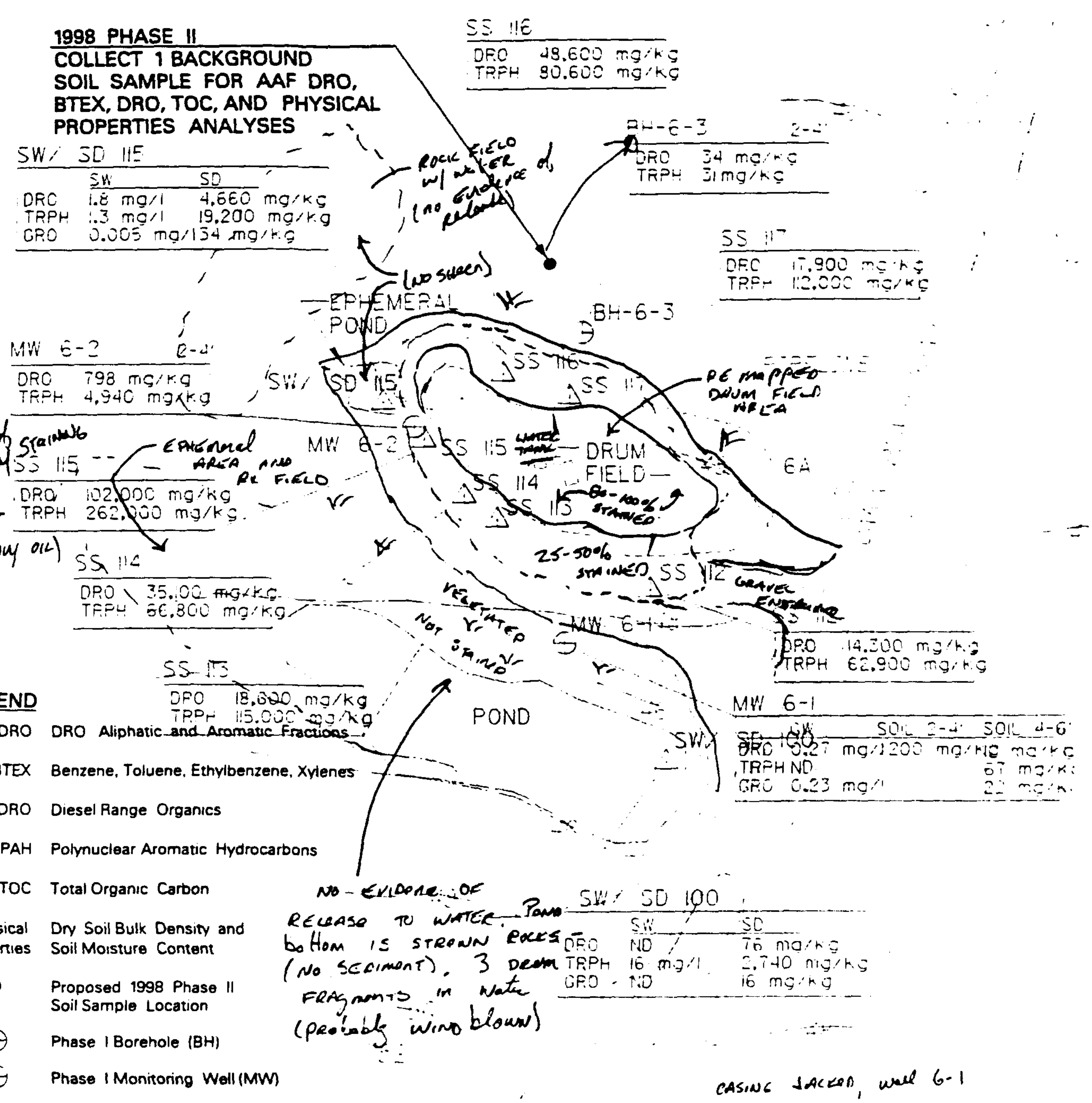
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-3

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 6 SAMPLING LOCATIONS



LEGEND

AAF DRO	DRO Aliphatic and Aromatic Fractions
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
DRO	Diesel Range Organics
PAH	Polynuclear Aromatic Hydrocarbons
TOC	Total Organic Carbon
Physical Properties	Dry Soil Bulk Density and Soil Moisture Content
●	Proposed 1998 Phase II Soil Sample Location
⊕	Phase I Borehole (BH)
⊕	Phase I Monitoring Well (MW)
△	Phase I Surface Soil Sample (SS)
△	Phase I Surface Water/Sediment Sample (SW/SD)

NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers.

NORTH

SCALE IN FEET

0 100

JOB No. ......50101 TIME: 24-AUG-1998 08:34 FILE: s:\cad\proj\corps\necape\ph2wkpln\98wp\fg2.3.dgn

MONTGOMERY WATSON

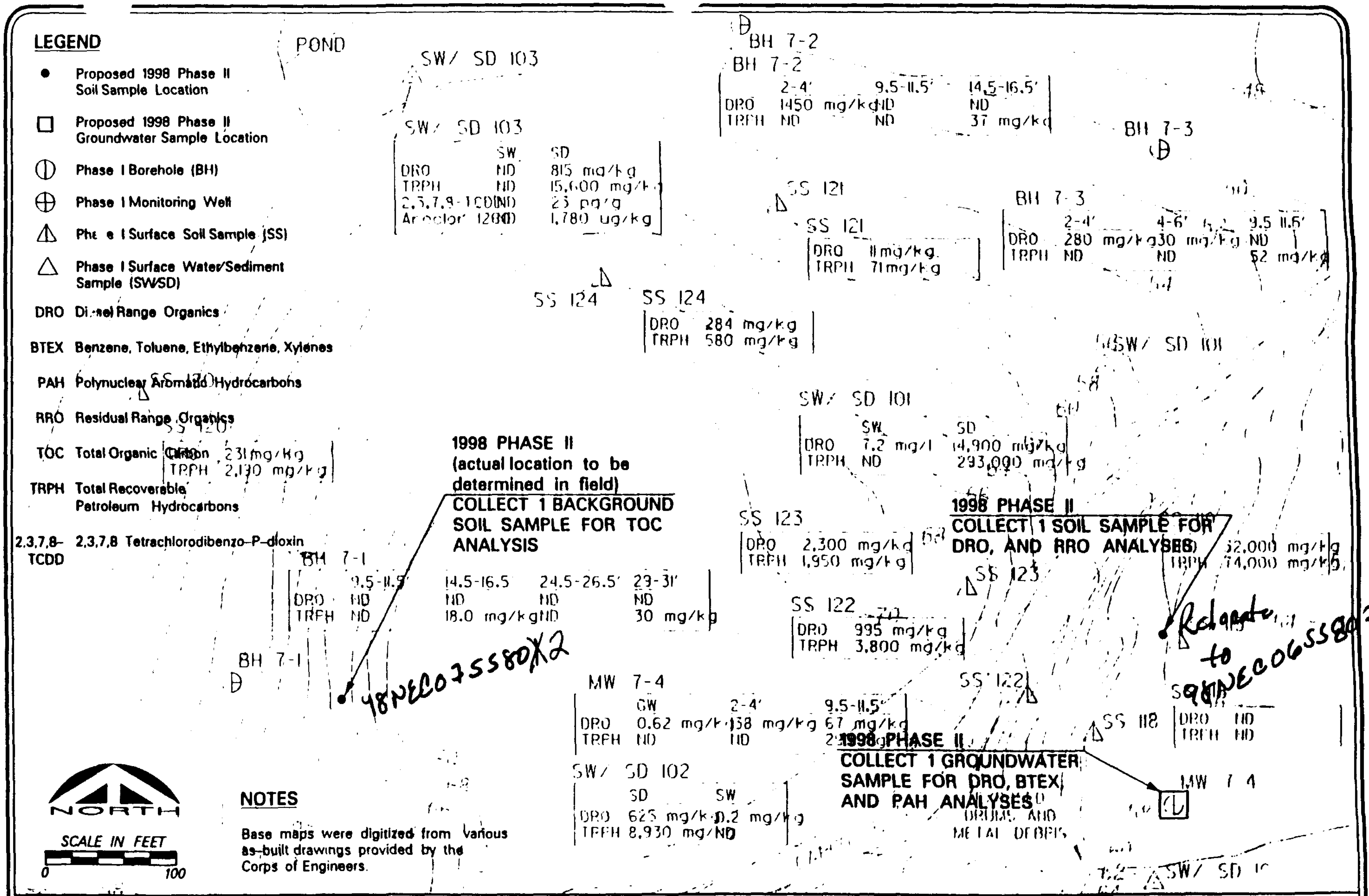
Anchorage, Alaska

FIGURE 2-3

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITE 6 SAMPLING LOCATIONS

JOB No. # 101 TIME: 24-AUG-1998 08:35 FILE: s:\cad\proj\corps\necape\ph2wkpln\98wp\fg2.4.dgn



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-4

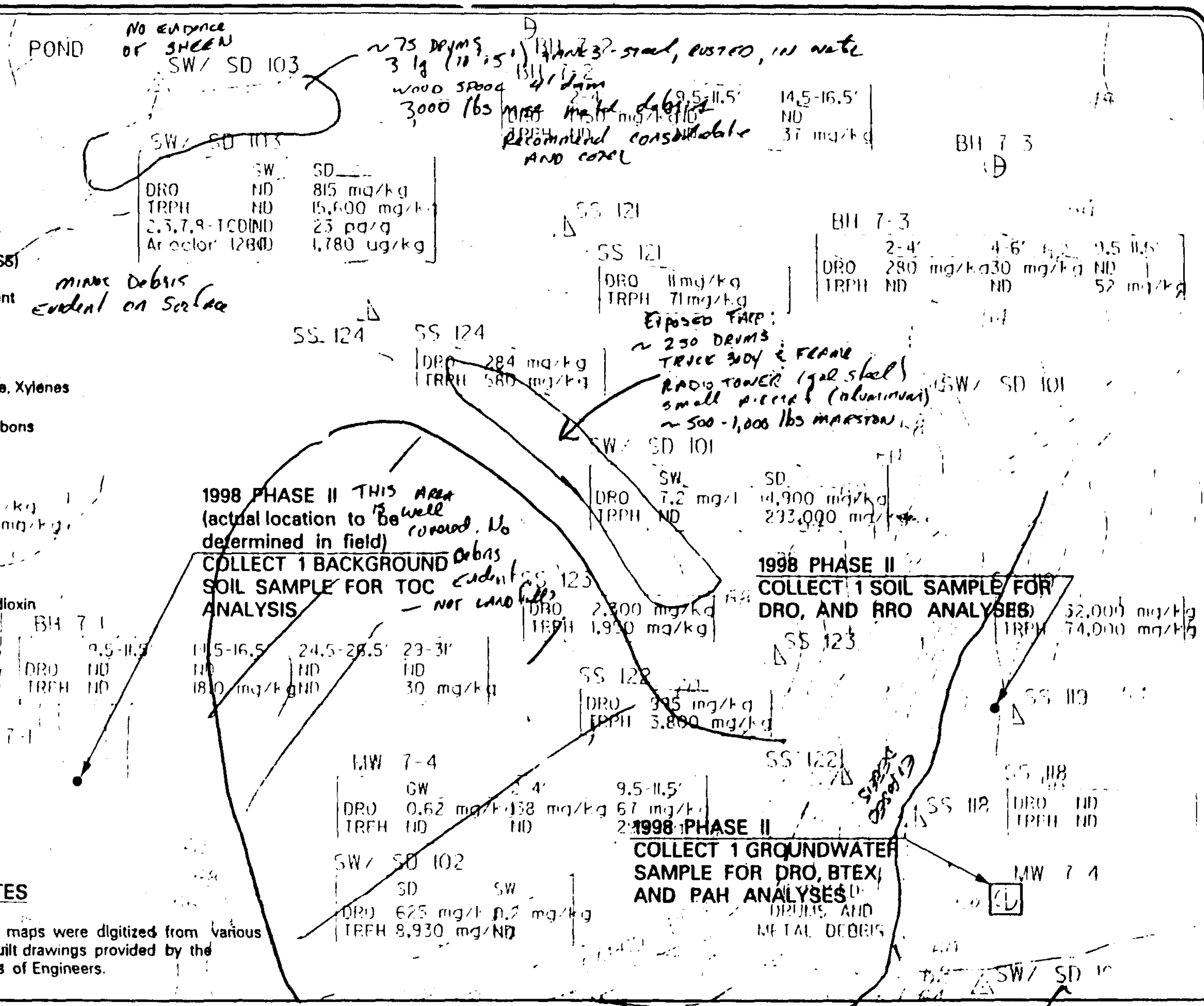
U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITE 7 SAMPLING LOCATIONS

JOB No. 889C.   DI TIME: 24-AUG-1998 08:35   FILE: s:\cad\proj\corps\necape\ph2wkpln\98wp\fg2_4.dgn

LEGEND

●	Proposed 1998 Phase II Soil Sample Location
□	Proposed 1998 Phase II Groundwater Sample Location
⦶	Phase I Borehole (BH)
⊕	Phase I Monitoring Well
⚠	Phase I Surface Soil Sample (SS)
△	Phase I Surface Water/Sediment Sample (SW/SD)
DRO	Diesel Range Organics
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
PAH	Polynuclear Aromatic Hydrocarbons
RRO	Residual Range Organics
TOC	Total Organic Carbon
TRPH	Total Recoverable Petroleum Hydrocarbons
2,3,7,8-TCDD	2,3,7,8 Tetrachlorodibenzo-P-dioxin



NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers.

MONTGOMERY WATSON

Anchorage, Alaska

Question: DID topo EXIST PRIOR? DID the only dump on face (north) — corps to ... . Top ... value

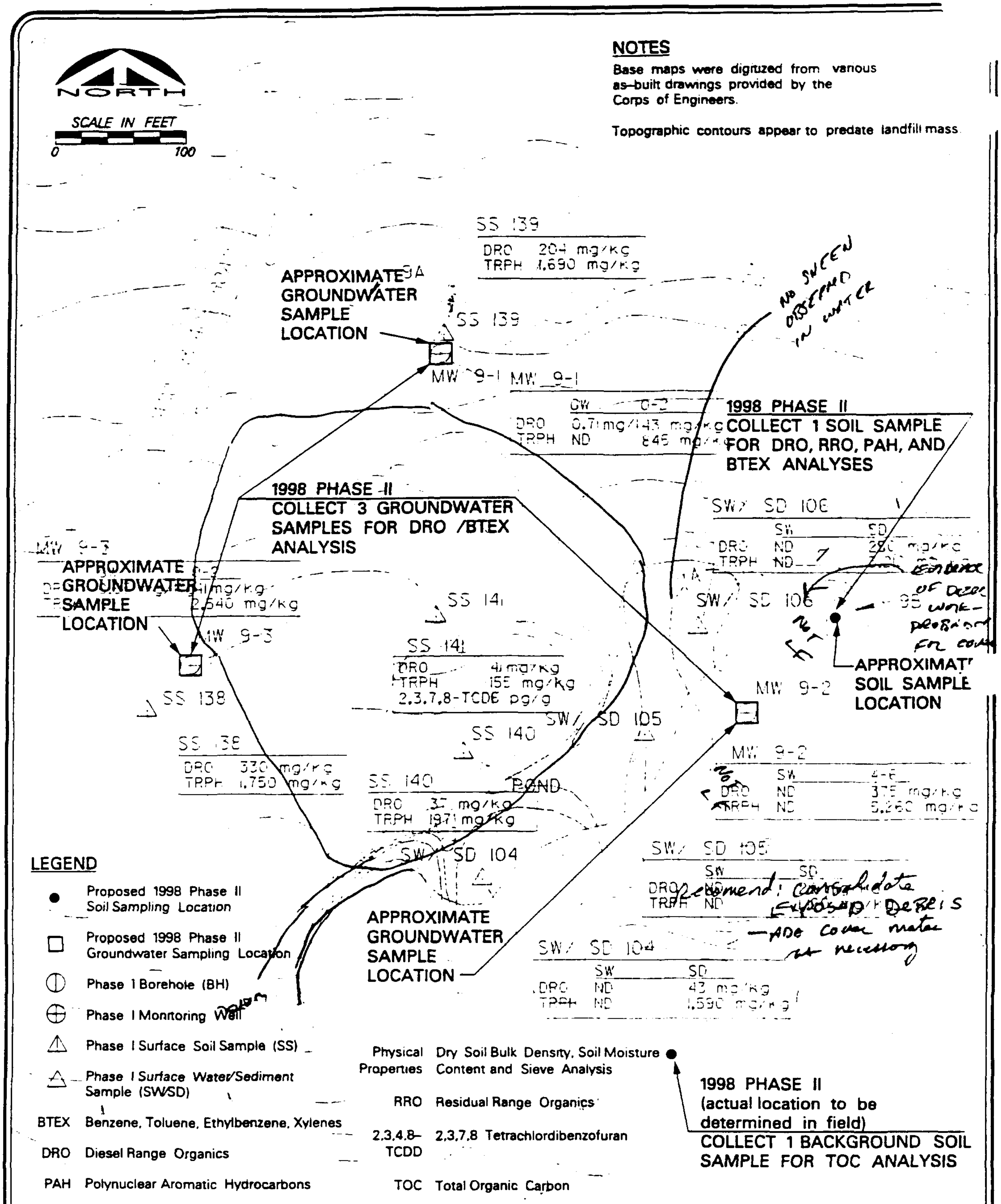
NO EVIDENCE of SHEEN

FIGURE 2-4

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITE 7 SAMPLING LOCATIONS

DID ROAD PRE-DATE LF?



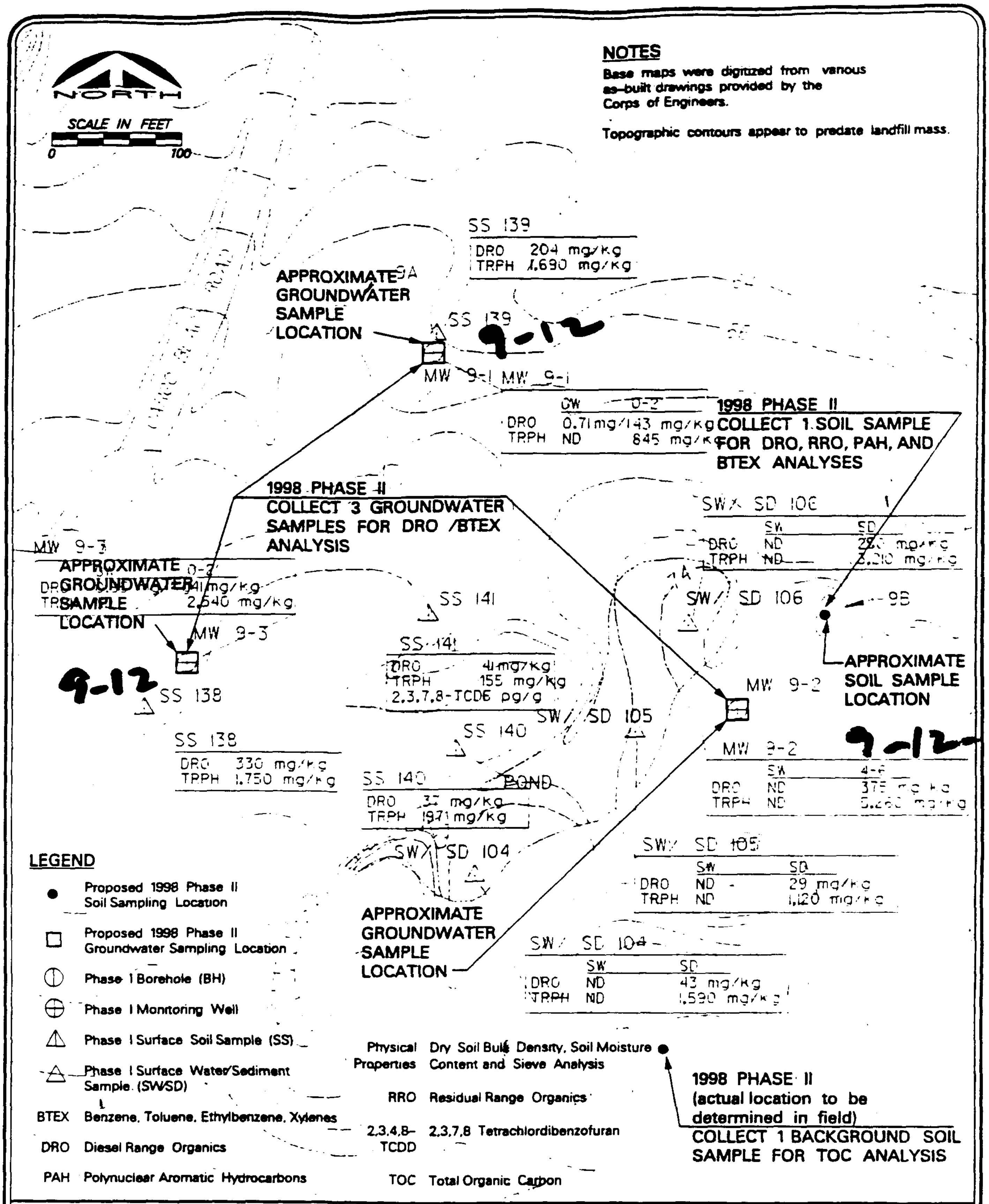
MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-5

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITE 9 SAMPLING LOCATIONS

JOB No. 8890.05010 TIME: 24-AUG-1998 08:36 FILE: s:\cad\proj\corps\necape\ph2wkpln\98wp\fg2.5.dgn



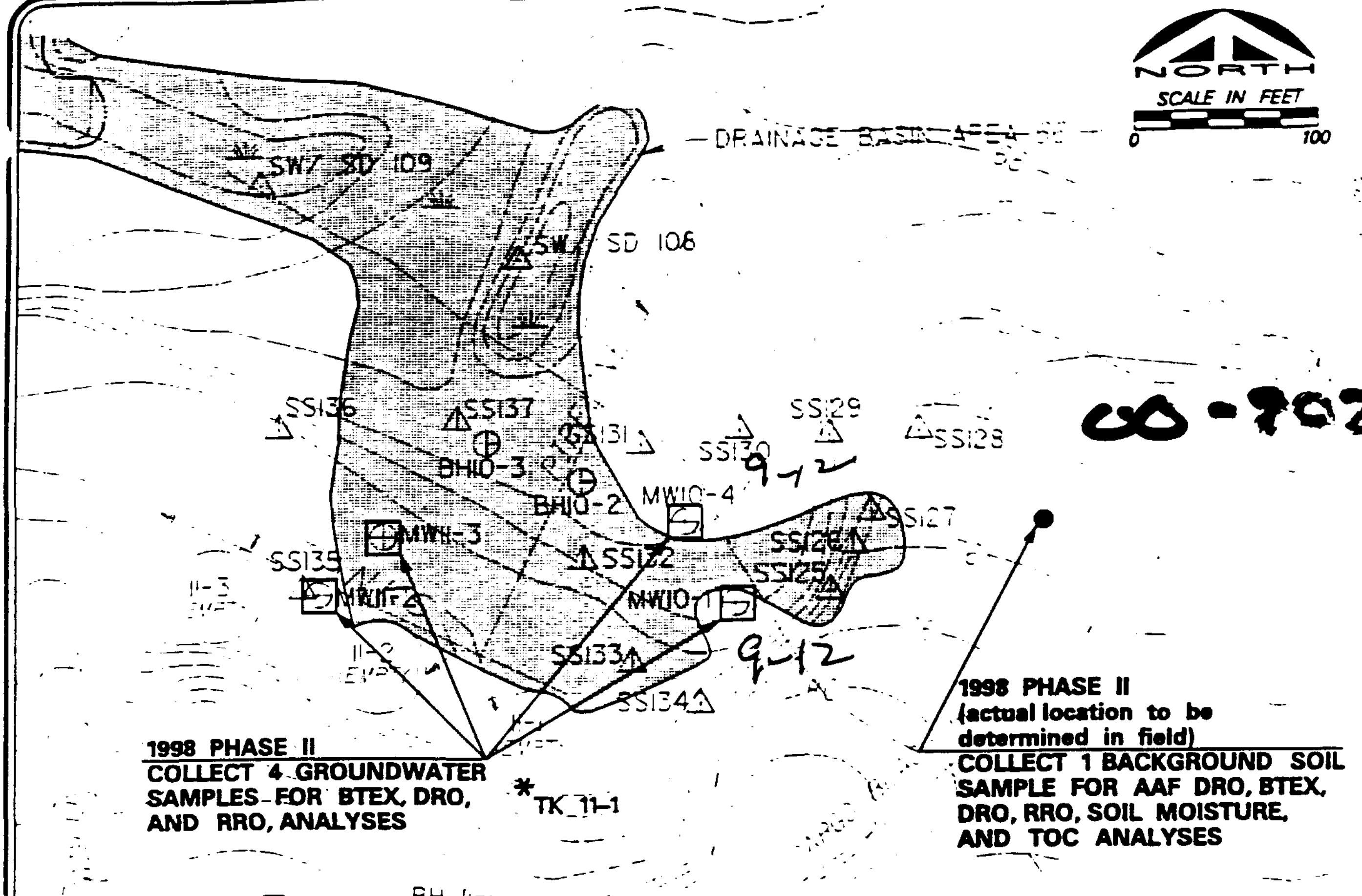
MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-5

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 9 SAMPLING LOCATIONS

JOB No. 8850 .0101 TIME: 24-AUG-1998 08:36 FILE: s:\cad\proj\corps\necape\ph2\wkpln\98wp\fg2.5.dgn



Sample/Depth	DRO (mg/kg or mg/l)	TRPH (mg/kg or mg/l)	GRO (mg/kg or mg/l)	Aroclor 1254 (ug/kg)
SS 125	22700	43700		
SS 126	26500	62300		
SS 127	24500	119000		
SS 128	2170	7910		
SS 129	1860	4850		
SS 130	348	2450		
SS 131	1260	5230		
SS 132	35800	24500		
SS 133	69100	32100		793
SS 134	379	416		
SS 135	902	2120		323
SS 136	195	464		
SS 137	22600	80400		979
MW 10-1 GW	0.49			
MW 10-1 0-2'	366	810		
MW 10-1 2-4'	7.9			
MW 10-1 4-6'		12		
MW 10-4 GW	3.2			
MW 10-4 0-2'	720	907	3.7	
BH 10-2 0-2'	104000	104000	166	2170
BH 10-3 0-2'	43000	83600		
MW 11-2 GW	3.2			
MW 11-2 0-2'	130	436		
MW 11-2 2-4'	358	168		
MW 11-3 GW	6.1	6.6	1.1	
MW 11-3 0-2'	27	182		
MW 11-3 2-4'	31	90		
MW 11-3 4-6'	11	76		
MW 11-3 9.5-11.5'	22000	29200	192	

LEGEND

- ☐ Proposed 1998 Phase II Groundwater Sampling Location
- ● Proposed 1998 Phase II Soil Sample Location
- ◐ Borehole (BH)
- ⊕ Monitoring Well (MW)
- △ Surface Soil Sample (SS)
- ▲ Surface Water/Sediment Sample (SW/SD)
- * HAZCAT Sample (TK)

AAF DRO DRO Aliphatic and Aromatic Fractions
BTEX Benzene, Toluene, Ethylbenzene, Xylenes
DRO Diesel Range Organics
RRO Redisual Range Organics
TOC Total Organic Carbon
TRPH Total Recoverable Petroleum Hydrocarbons

- Potential extent of POL contamination above benchmark criteria >100 mg/kg DRO or 1,000 mg/kg TRPH

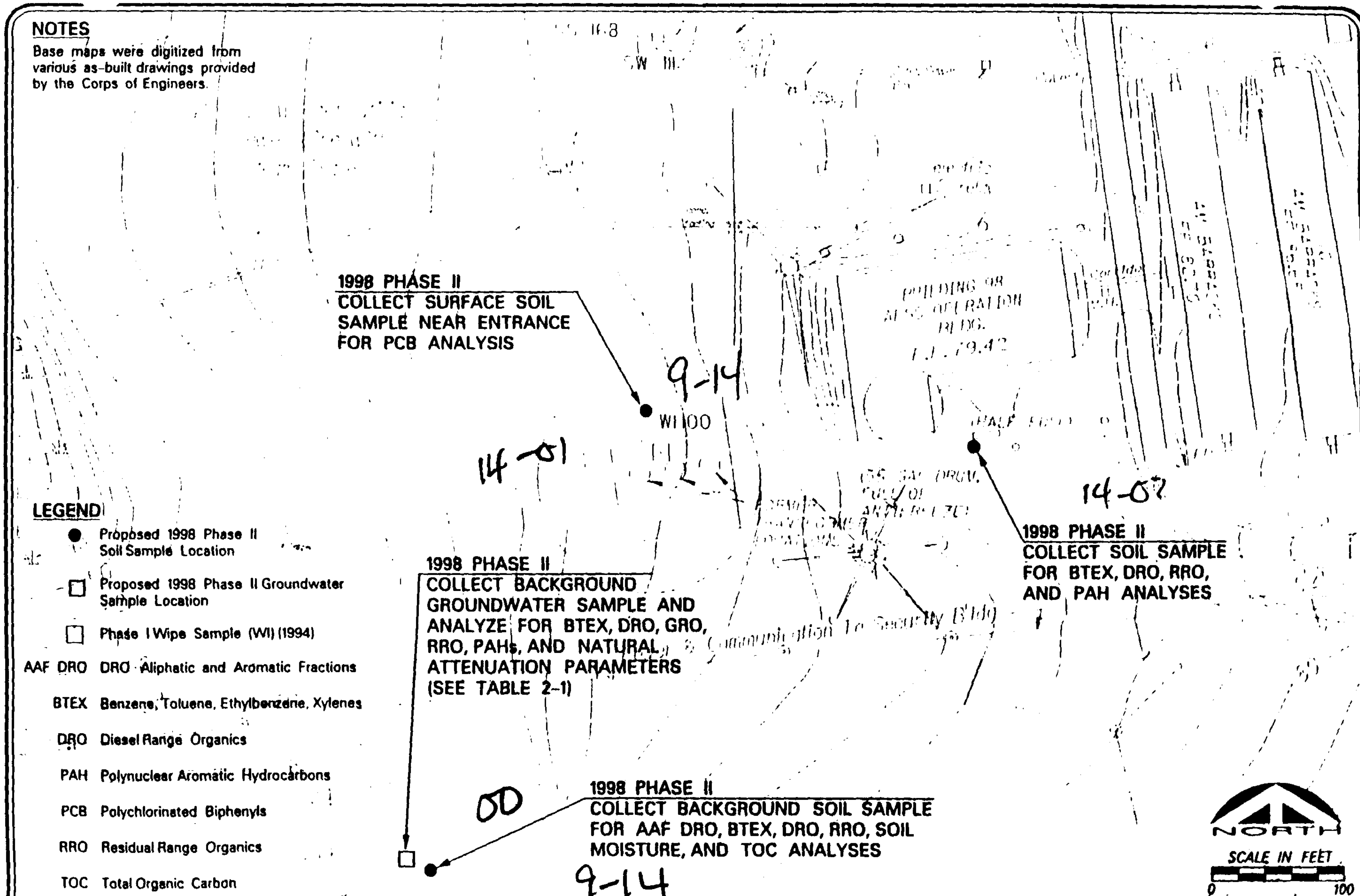
NOTE: Base maps were digitized from various as-built drawings provided by the Corps of Engineers.

MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-6
U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITES 10 & 11 SAMPLING LOCATIONS

JOB No. .01 TIME: 24-AUG-1998 08:48 FILE: e:\cad\proj\corps\necape\ph2wkpln\98wp\fg2.7.dgn



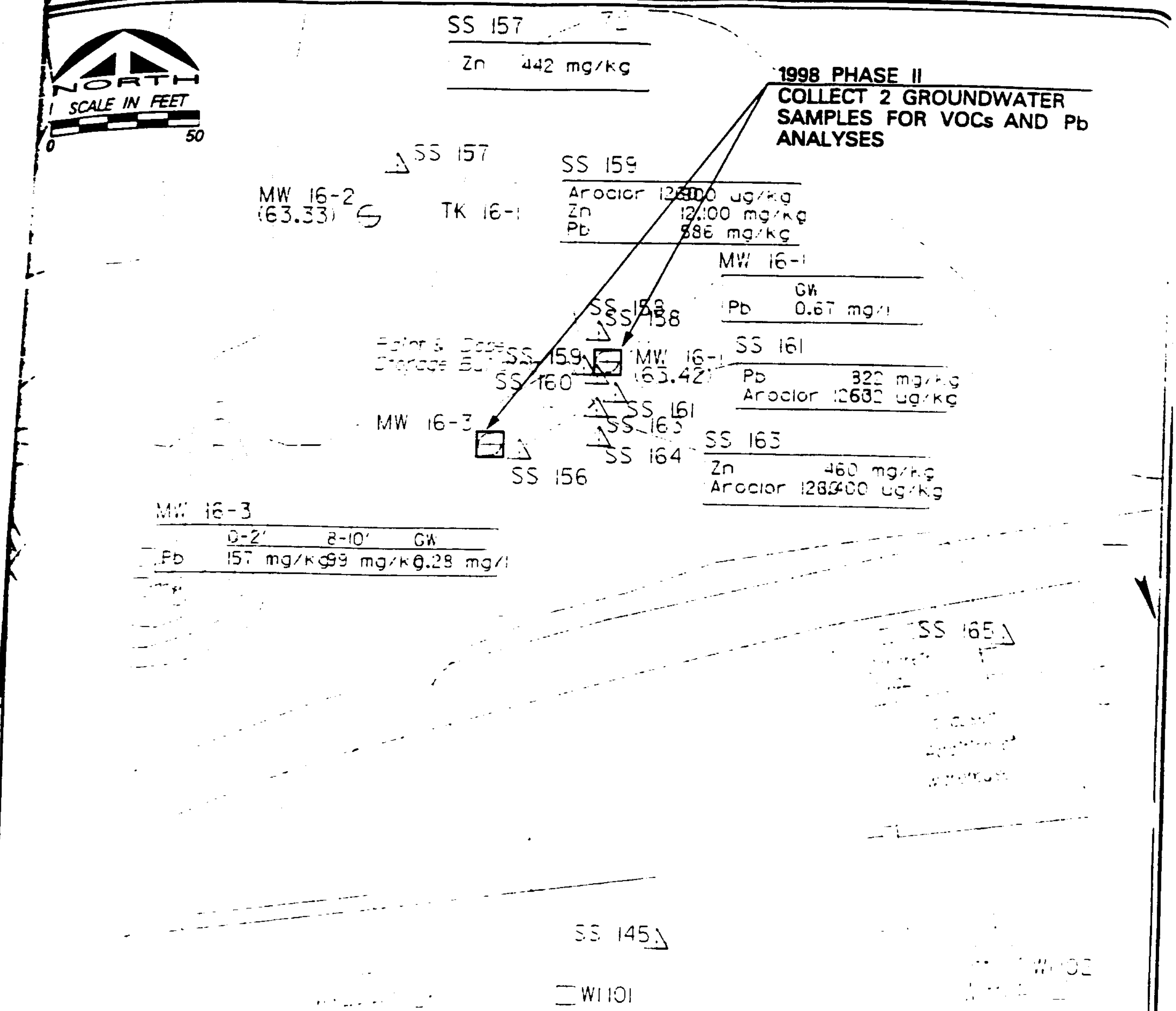
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-7

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITE 14 SAMPLING LOCATION



LEGEND

Proposed 1998 Phase II Groundwater Sample Location

Phase I Monitoring Well

Phase I Surface Soil Sample (SS)

Phase I Wipe Sample (WI)

Pb Lead

VOCs Volatile Organic Compounds

Zn Zinc

NOTES

These maps were digitized from various as-built drawings provided by the Corps of Engineers.

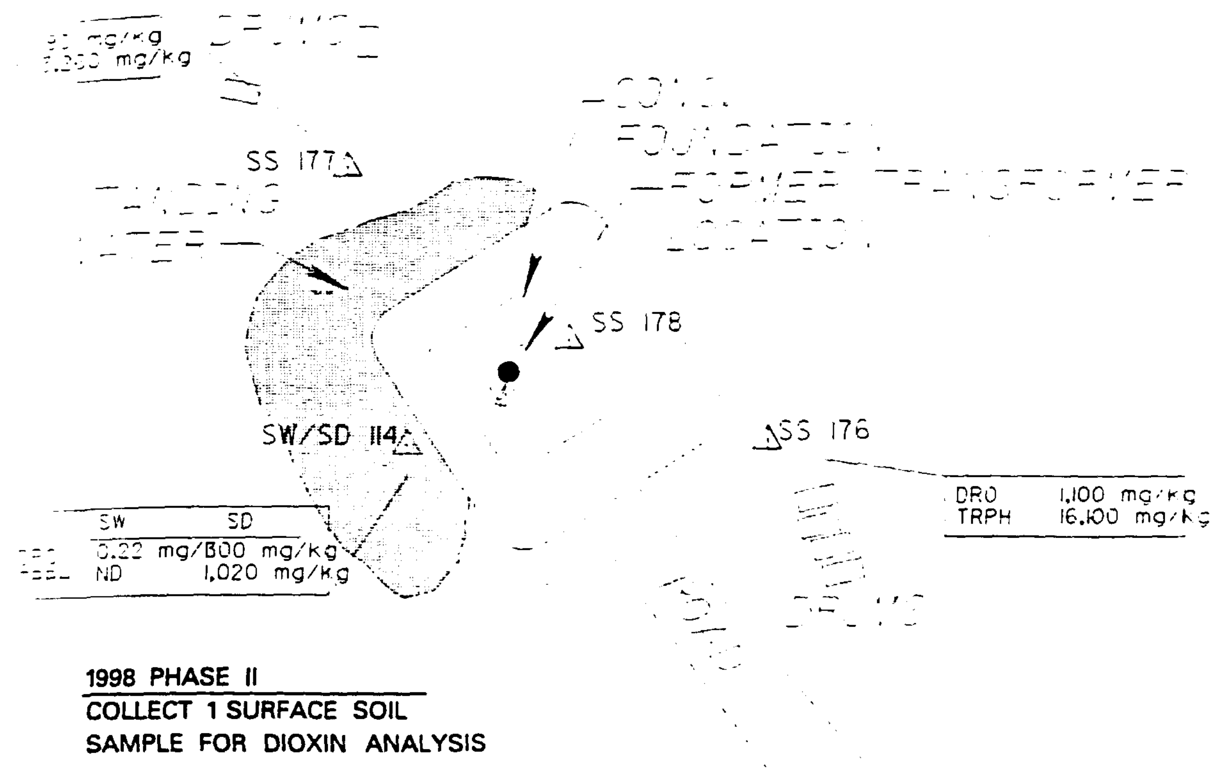
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-8

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 16 SAMPLING LOCATIONS



LEGEND

- Proposed 1998 Phase II Soil Sample Location
- Phase I Surface Soil Sample (SS)
- Phase I Surface Water/Sediment Sample (SW/SD)

TRPH Total Recoverable Petroleum Hydrocarbons

NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers.

NORTH

SCALE IN FEET

0 50

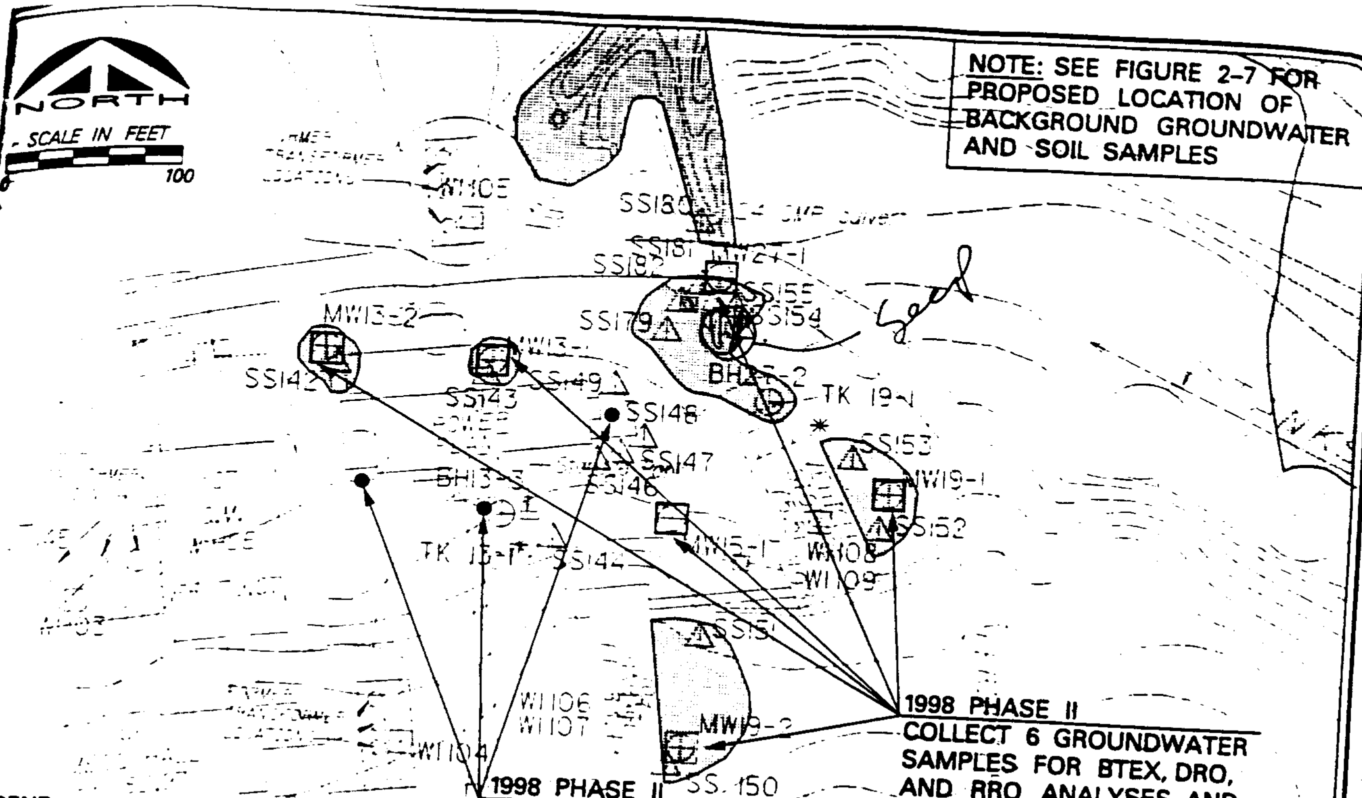
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-9

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

SITE 25 SAMPLING LOCATIONS



1998 PHASE II
COLLECT 3 SOIL SAMPLES FOR PCB ANALYSIS, 1 FROM NEAR EACH ENTRANCE TO POWER PLANT BUILDING

1998 PHASE II
COLLECT 6 GROUNDWATER SAMPLES FOR BTEX, DRO, AND RRO ANALYSES, AND ADDITIONALLY ANALYZE 1 SAMPLE FOR GRO, PAHs, AND NATURAL ATTENUATION PARAMETERS (TABLE 2-1)

LEGEND

- Proposed 1998 Phase II Soil Sample Location
- Proposed 1998 Phase II Groundwater Sample Location
- 1994 Borehole (BH)
- 1994 Monitoring Well w/Groundwater Elevation (MW)
- 1994 Surface Soil Sample (SS)
- 1994 Surface Water/Sediment Sample (SW/SD)
- 1994 Surface Water Elevations (ft., MSL)
- 1994 HAZCAT Sample (TK)
- AST
- Wipe Sample (WI)
- Stained Area
- Potential extent of POL contamination above benchmark criteria >100 mg/kg DRO or 1,000 mg/kg TRPH

BTEX Benzene, Toluene, Ethylbenzene, Xylenes
DRO Diesel Range Organics
GRO Gasoline Range Organics
PCB Polychlorinated Biphenyls
RRO Residual Range Organics
TRPH Total Recoverable Petroleum Hydrocarbons

NOTES

Base maps were digitized from various as-built drawings provided by the Corps of Engineers.

Sample				DRO	TRPH	GRO	Aroclor 1260 (ug/kg)
MW	13-1		GW	23	190	4	
MW	13-2		GW	22	24	3.6	
MW	13-2	4-6'		955	945	7	
BH	13-3	4-6'		546	1150	7.1	
BH	13-3	9.5-11.5'		10800	7880	225	
MW	15-1		GW	9.3	31		
MW	15-1	9.5-11.5'		2190	535		
MW	19-1		GW	13	9.7	6.1	
MW	19-1	0-2'		110	690		
MW	19-1	4-6'		971	28800	6650	
MW	19-1	9.5-11.5'		13300	16300	461	
MW	19-2		GW	34			
MW	19-2	14.5-16.5'		122	389		
MW	27-1		GW	3.2	2.1	1.4	
MW	27-1	0-2'		5710	18000	886	
MW	27-1	2-4		8470	29300	410	
MW	27-1	4-6'		569	1690	39	
MW	27-1	9.5-11.5'		19	181		
BH	27-2	0-2'		9230	32400	283	
BH	27-2	4-6'		52	535	2.3	
BH	27-2	9.5-11.5'		11	170		
SS	142			2610	2280		
SS	143			398	551		
SS	144			1530	6130		
SS	145						
SS	146			4660	20500		58300
SS	147			2840	12400		
SS	148			4860	24200		
SS	149			6580	36800		
SS	150			868	2000		
SS	151			328	680		
SS	152			1240	3150		
SS	153			43	413		
SS	154			9460	16600	9.1	
SS	155			35700	12800	89	
SS	179			27500	53700	370	
SS	180			37900	44700	7	
SS	181			33600	66400	370	
SS	182			9850	41800		

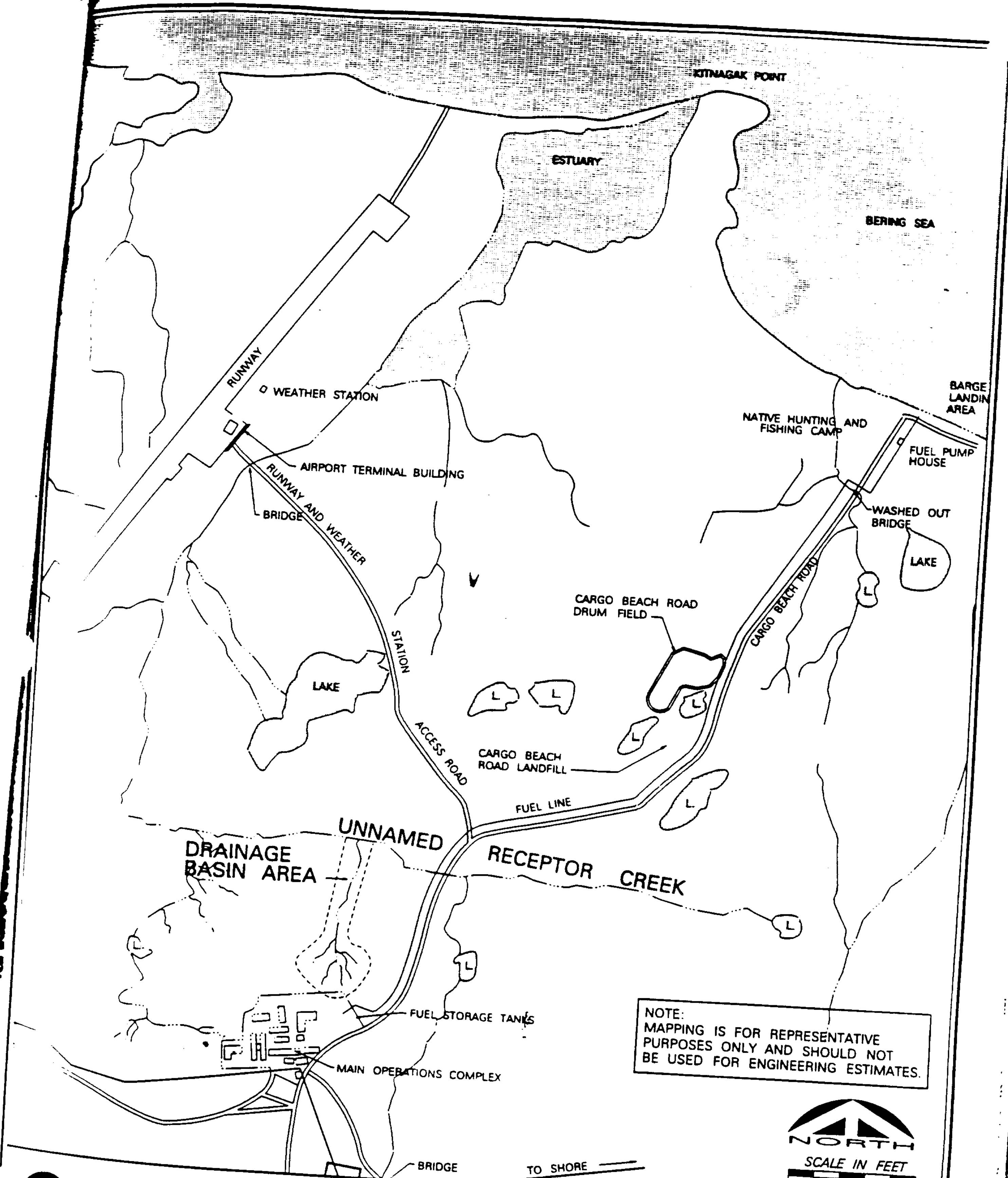
NOTE: Units for (mg/kg) for concentration in soil; (mg/l) for concentration in water
2-4' indicates depth of soil sample
GW indicates groundwater sample

MONTGOMERY WATSON
Anchorage, Alaska

FIGURE 2-10

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE ISLAND, ALASKA

SITES 13, 15, 19 & 27 SAMPLING LOCATIONS



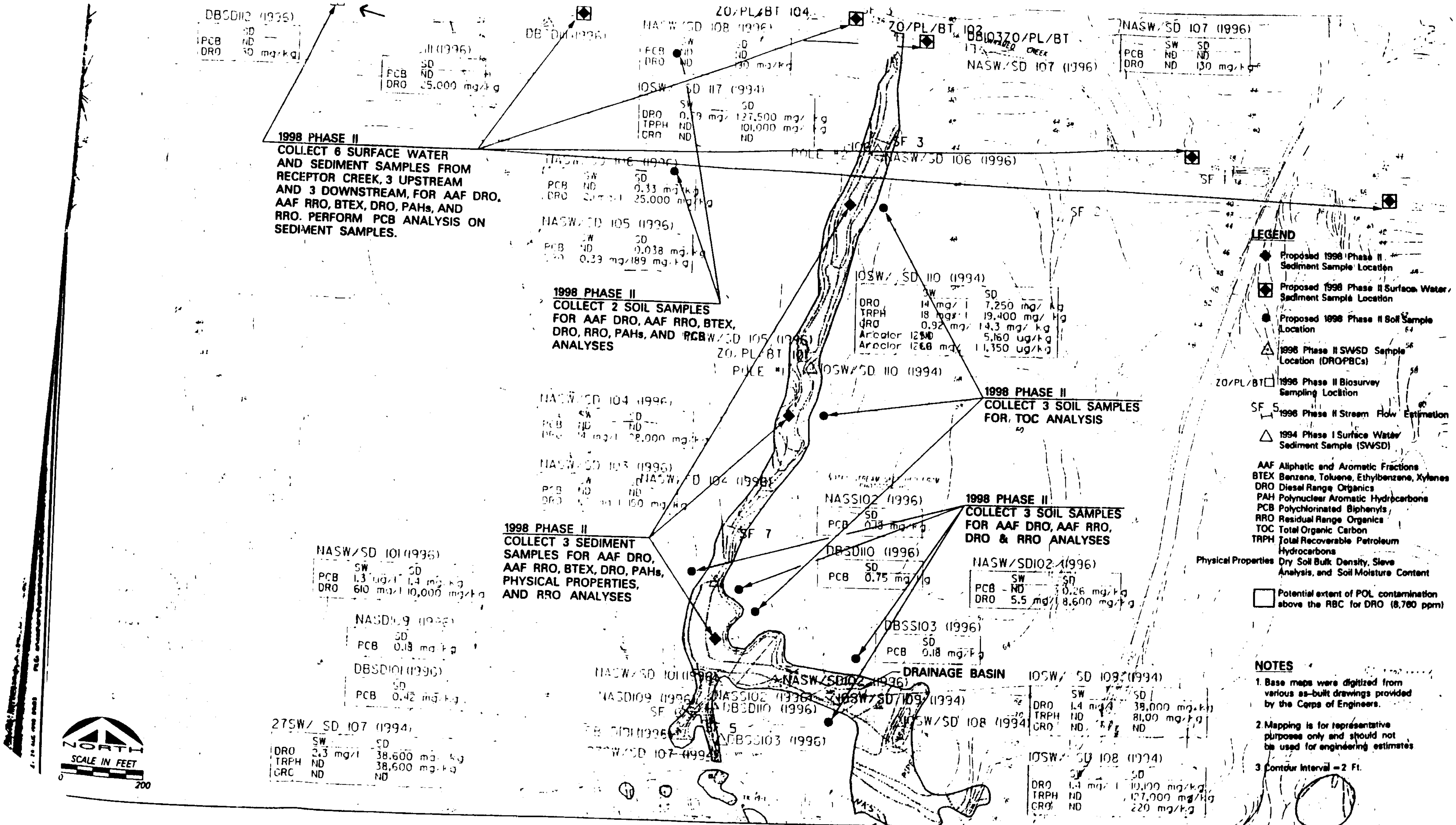
MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2–11

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE – ST. LAWRENCE ISLAND, ALASKA

DRAINAGE BASIN LOCATION



MONTGOMERY WATSON

Anchorage, Alaska

FIGURE 2-12

U.S. ARMY ENGINEER DISTRICT, ALASKA
N.E. CAPE - ST. LAWRENCE INSLAND, ALASKA

DRAINAGE BASIN AREA SAMPLING LOCATIONS

Army Corps of Engineers

Northeast Cape, Alaska

1998 Miscellaneous (Summary of DERP-FUDS Eligible Debris and Physical Hazards)

MONTGOMERY WATSON

Table 2
Summary of DERP-FUDS Eligible Debris and Physical Hazards
Northeast Cape, St. Lawrence Island, Alaska

Site Location	Building or Debris	FUDS Categorization/ Eligibility	Evaluation of Physical Hazard	Estimated Quantity	Units	Comments
Site 1	Burn Site Southeast of Landing Strip					
	No visible sources of BD/DR				N/A	
Site 2	Airport Terminal and Landing Strip					
	Airport Terminal with Tower	BD/DR	Structural hazard: unprotected openings > 8" x 8" in roof and tower wall, missing front stairs and railings; Climbing hazard: tower readily climbable from main floor; Other: numerous exposed nails, broken timbers,	1600	square feet	Estimate 25 x 75 + 15' x 15' tower, Downed Radio tower ADD: Boiler 4' x 4' cylinder, steel 8' x 15' 2" steel dead frame for runway ... w/ 25' steel tow... CABLE - 2-strand 3/4" rubber + 3/8 wire rope to main op... Hoist ... 10' tall ... 8' wide Assembly 1 sled - 10' long 3' wide (pipe frame)
	Power lines/Poles	BD/DR	Collision and entanglement hazard for snow machine traffic	9	each	
	Tractor	BD/DR	Collision hazard for snow machine traffic	1	each	Could be under jurisdiction of SHPO
	Above-ground storage tank; 1,000	CON/HTW	N/A	1	each	
	Drum(s)	CON/HTW	N/A	5	each	Poor condition
	Transformer Shed	CON/HTW	N/A	1	each	
Site 3	Fuel Line Corridor and Pumphouse					
	Bldg 119 - Fuel Pumphouse	BD/DR	Structural: opening west end > 8" x 8"	448	square feet	Will need to be removed for contaminated soil removal - HAS CONC FOUND & TANK PAD
	Debris; metal	BD/DR	Other: sharp metal edges protruding, Collision hazard from fish camp housing to	~~2000~~ 500	pounds	- S END of pumphouse
	Above-ground storage tank; 500	CON/HTW	N/A	2	each	1) D = 3.15' L = 5.9' (cylindrical), 2) D = 3.8' L = 6'
	Batteries	CON/HTW	N/A	1	N/A	
	Fuel Line	CON/HTW	N/A RUBBER (20' sections)	x 3	each	6" diameter
	Paint container	CON/HTW	N/A	1	gallon	
	Piping; 4-inch steel fuel pipeline	CON/HTW	N/A	8000	linear feet	+ 300' to ADD: 15 RUSTED DRUMS
Site 4	Native Fishing and Hunting Camp					
	Vehicles; abandoned	BD/DR	Collision and entanglement hazard for snow machine traffic	2	each	Could be under jurisdiction of SHPO - totally RUINED
	Drum(s)	CON/HTW	N/A	250	each	
	Tank; abandoned 10,000 gallon	CON/HTW	N/A STEEL	1	each	D = 10' L = 26.7' STEEL PLATE, EMPTY
	Tank; abandoned 250 gallon	CON/HTW	N/A ALUMINUM (prob water)	1	each	D = 3.3 L = 5.5 (Aluminum) - water only
Site 5	Cargo Beach					
	Bull-dozer parts D-8	BD/DR	Collision hazard for snow machine traffic	1	each	Could be under jurisdiction of SHPO - TOTALLY RUSTED AND DESTROYED
	Cable; 2-inch diameter	BD/DR	Collision and entanglement hazard for snow machine traffic	1000	linear feet	
	Marston mats and aluminum siding	BD/DR	Other: protruding sharp metal edges collision hazard for snow machine	265/1000	each/linear feet	
	Drum(s)	CON/HTW	N/A	275	each	
Site 6	Cargo Beach Road Drum Field					
	Debris; metal (small mats)	BD/DR	Other: protruding sharp metal edges collision hazard for snow machine	200	cubic yards	Estimated 500lbs
	Battery	CON/HTW	N/A	1	each	
	Drum(s)	CON/HTW	N/A	1500	each	Estimated quantity
	Tank; 500 gallon NO	CON/HTW	N/A	1	each	Empty tank - originally contained water (Trailer mounted)
Site 7	Cargo Beach Road Landfill					
	Boiler	BD/DR	Collision hazard for snow machine traffic	1	each	Located in pond, contains ACM liner
	Cable on spools	BD/DR	Collision hazard for snow machine traffic	3	each	ALSO: TWO ALUM RADIO TOWERS, 1 on NE, SE SIDE
	Caterpillar cab	BD/DR	Collision hazard for snow machine traffic	1	each	
	Batteries	CON/HTW	N/A	7 est.	each	

Table 2
Summary of DERP-FUDS Eligible Debris and Physical Hazards
Northeast Cape, St. Lawrence Island, Alaska

Site Location	Building or Debris	FUDS Categorization/ Eligibility	Evaluation of Physical Hazard	Estimated Quantity	Units	Comments
	Drum(s)	CON/HTW	N/A	2300	each	Estimated quantity ALSO: EST 10,000 lbs MISC metal debris
Site 8 - POL Spill Site						
	No visible sources of BD/DR ✓					Except for POL pipe
Site 9 - Housing and Operations Landfill						
	Aluminum and truck frame	BD/DR	Other: protruding sharp metal edges collision hazard for snow machine traffic	< 40/ 1	linear feet/ each	
	Cable; steel	BD/DR	Other: collision and entanglement hazard for snow machine traffic	100-500	linear feet	ADD 1 battery
	Containerized chemical; powder 2 quart-size	CON/HTW	N/A	1	each	
	Drum(s); POL	CON/HTW	N/A	50 est.	~~N/A~~ each	
Site 10 - Buried Drum Field						
	No visible sources of BD/DR ✓					
	Drum(s); surface	CON/HTW	N/A ✓	10	each	OK
Site 11 - Fuel Storage Tank Area						
	No visible sources of BD/DR ✓					misc valves, piping, rails, and 1,000 lbs
	Tanks; fuel storage tanks	CON/HTW	N/A ✓	3	each	26' high - get Ø from map
Site 12 - Gasoline Tank Area						
	No visible sources of BD/DR ✓					
	Tanks; gasoline fuel storage tanks	CON/HTW	N/A	2	each	1) 30'L x 8' diameter 2) 42'L x 11' Diameter + 500 lbs assoc valves piping
Site 13 - Heat and Electrical Power Building						
	Bldg. 110 - Heat and Electrical Power	BD/DR	Structural hazard: unprotected openings > 8" x 8" in roof and tower wall, missing front stairs and railings; Climbing hazard 2nd floor readily climbable from main floor. Other: numerous exposed nails, broken	7400	square feet	4 CUMMINS DIESEL GENERATORS 3.5 wide x 12' long x 6' high
	Tank; water storage tank	BD/DR	Climbing hazard, tank is >8' from ground, the rack allows the tank readily climbable	1	each	Recycle possibility
	Above-ground storage tank; estimated 1,000 gallon	CON/HTW	N/A	1	each	Recycle possibility
	Tank; pressure tank 500 gallon ~~one~~	~~CON/HTW~~	N/A	~~1~~ 2	each	AIR-CONDITIONER BD/DR
	UST; estimated 20,000 gallon	CON/HTW	N/A ✓	1	each	Recommend filling in-place
	UST; estimated 5,000 gallon	CON/HTW	N/A ✓	1	each	Recommend filling in-place
Site 14 - Emergency Power Operations Building						
	Bldg. 98 - Emergency Power Operations	BD/DR	Other: roof, floor, and ceilings are collapsing from weathering. Drowning hazard: the basement is full of water > 8'	16250	square feet	Aluminum roofing recycle possibility(?) mostly blown off. Note - this bldg has ~6" conc ext walls AND STEEL GIRDER ROOF
	Debris, miscellaneous building	BD/DR	protruding debris	2 est.	cubic yards	SO SIDE: 2 wood spools of cable steel drum STEEL STUD/WIRE mesh [illegible]
	Power lines/ Power poles	BD/DR	Other: entanglement hazard for ATV and snow machine traffic	4 ~~unknown~~	ea. N/A	
	Above-ground storage tank; 5,000 gallon fuel storage	CON/HTW	N/A	1	each	14-1 6' diam x 24' long + 200' loose 3-wire cable
	Containers; military grease	CON/HTW	N/A	5	each	
	Drum(s)	CON/HTW	N/A	1	each	Antifreeze drum; outside (SO SIDE)
Site 15 - Buried Fuel Line Spill Area						
	No visible sources of BD/DR ✓					
	UST; 20,000 gallon ✓	CON/HTW	N/A	1	each	Connects storage tanks

Table 2
Summary of DERP-FUDS Eligible Debris and Physical Hazards
Northeast Cape, St. Lawrence Island, Alaska

Site Location	Building or Debris	FUDS Categorization/ Eligibility	Evaluation of Physical Hazard	Estimated Quantity	Units	Comments
Site 16 [illegible]						
	Bldg. 112 - Paint and Dope Building	BD/DR	Climbing hazard: exterior provides easy access to roof > 10' above ground	N/A	N/A	ON SHELL 2 15 gal MARKED 16-5, 16-6 PAINT 3 8 gal MARKED 16-2 16-3 16-4
	Drum(s); rollers	BD/DR	machine traffic	2	each	3.5' diam x 4' long for compaction
	Solvents, paints, POLs, dielectric fluids, cleaners and other liquids	CON/HTW	N/A	150	gallons	STEEL girders 2,000 pounds mostly mat 500 lbs
	Tank, steel	CON/HTW	N/A	1	each	Possibly an oil tank. . Cylindrical steel 4'x8' - probably water tank
Site 17 - General Supply Warehouse and Mess Hall Warehouse						
	Bldg. 111 - General Supply Warehouse	BD/DR	Structural hazard: roof, floor, and ceiling are collapsing from weathering.	9900	square feet	4 crates 2' TALL x 4 x 4, w/ SILICA sand 200 lbs gel solvent mat'l
	Bldg. 107 - Mess Hall Warehouse Building	BD/DR	Structural hazard: roof, floor, and ceiling are collapsing from weathering.	10200	square feet	
	Containers; miscellaneous liquids, cleaners, solvents, etc.	CON/HTW	N/A	25 est.	each	FREON cylinder - NORTH WEST side BLG 117
	Containers; miscellaneous liquids, cleaners, solvents, etc	CON/HTW	N/A	20 est	each	
	Drum(s)	CON/HTW	N/A	8	each	compressed gas cylinders (BLDG 111)
	Drum(s)	CON/HTW	N/A	1	each	UNKNOWN CONTENTS
Site 18 - Housing Facilities and Squad Headquarters [illegible]						
	Bldg. 99 - Recreation Building	BD/DR	Structural hazard: roof, floor, and ceilings are collapsing from weathering, numerous openings > 8"x8 Climbing hazard: 2nd floor readily climbable from interior and	72050[a]	square feet (NE 18)	Unpainted steel building; recycle possibility. No roof. Laminated 6-inch hardwood floor.
	Bldg. 100 - NCO Quarters - N&S buildings	BD/DR	Structural hazard: roof, floor, ceilings, and load-bearing walls are collapsing from weathering, numerous openings > 8"x8" Climbing hazard: 2nd floor readily	72050[a]	square feet (NE 18)	Debris near all buildings at Site 18
	Bldg. 101 - Dormitory E&W	BD/DR	Structural hazard: roof, floor, ceilings, and load-bearing walls are collapsing from weathering. Drowning hazard: the basement	72050[a]	square feet (NE 18)	Building lumber; recycle possibility compressed gas cylinder north half of BUILDING 101 WEST
	Antennas	BD/DR	Other: entanglement hazard for ATV and snow machine traffic	unknown	N/A	
	Bldg. 102 - BOQ	BD/DR	Structural hazard: roof is sagging and floors are collapsing, and weakening load-bearing walls are from weathering	72050[a]	square feet (NE 18)	ACM; too dangerous to abate
	Cables, and power lines	BD/DR	Other: entanglement hazard for ATV and snow machine traffic	unknown	N/A	
	Utility Corridor	BD/DR	Cave-in hazard: deteriorating wooden covers and wall linings are producing open	unknown	N/A	Located throughout facility
	Bldg. 104 - Administration	BD/DR	Structural hazard: roof is sagging, floors, ceilings, and weakening load-bearing walls are collapsing from weathering.	72050[a]	square feet (NE 18)	
	Bldg. 105 - Theater	BD/DR	Structural hazard: roof is sagging, floors, ceilings, and weakening load-bearing walls are collapsing from weathering.	72050[a]	square feet (NE 18)	Stainless-steel inside building; recycle possibility
	Bldg. 106 - Mess Hall	BD/DR	Structural hazard: roof is sagging, floors, ceilings, and weakening load-bearing walls are collapsing from weathering.	72050[a]	square feet (NE 18)	
	Tanks, water	BD/DR	Climbing hazard: the tank rack allows	2	each	Temporary building - collapsed
	Bldg. 125 - Pre-fab Building	BD/DR	Collapsed, total ruin	unknown	N/A	

Table 2
Summary of DERP-FUDS Eligible Debris and Physical Hazards
Northeast Cape, St. Lawrence Island, Alaska

Site Location	Building or Debris	FUDS Categorization/ Eligibility	Evaluation of Physical Hazard	Estimated Quantity	Units	Comments
	Bldg. 130 - Hobby Shop	BD/DR	Structural hazard: roof is sagging, floors, ceilings, and weakening load-bearing walls are collapsing from weathering.	unknown	N/A	1 cylinder compressed gas in "Air" Barracks
	Containers; 5 gallon, DS2	CON/HTW	N/A	5	each	STB/DS2 decontaminant for chemical warfare; explosive hazard in Bldg. 100 west ← update
	Containers; boxes, cans, buckets, STB powder	CON/HTW	N/A	9	each	Estimated quantity
	Containerized fluids or cleaners	CON/HTW	N/A	10	each	Located in Mess Hall
	Incinerator	CON/HTW	N/A	1	each	PCB liquid(?)
	Electrical panels with switches	CON/HTW	N/A	unknown	N/A	in rec. bldg.
19 - Auto Maintenance and Storage Facilities						
	Bldg. 109 - Garage	BD/DR	Structural hazard: roof, floor, ceilings, and load-bearing walls are collapsing from weathering, numerous openings > 8"x8". Climbing hazard: 2nd floor readily	unknown	N/A	SO SIDE IS 2-STORY
	Bldg. 108 - Vehicle Storage	BD/DR	Structure hazard: roof is sagging and load-bearing walls are strained from weathering	unknown	N/A	STANDING generator 2' WIDE & 4' TALL & 6' long - W TRAILER 2 FLAT RACKS, 2½ x 6' cylindrical AIR Comp TANK
	Containers; 5-gallon, foaming liquid type-5	CON/HTW	N/A	39	each	Empty
	Smudge pots	CON/HTW	N/A	24	each	Drain liquid(?) - PROBABLY WATER
	Suspected grease pit drainage area	BD/DR CON/HTW	Falling and Drowning hazard: open work pit > 5' deep, accessible to rain and snow melt	unknown	N/A	Unknown if any Hazardous Waste may be involved in work pit. ← correct w/ '96 work
	Tank; antifreeze 50 gallon	CON/HTW	N/A	1	each	RUSTED, EMPTY - CONSIDERED DEBRIS 19-1 ¼ full
20 - Aircraft Control and Warning Building						
	Bldg. 103 - Aircraft Control and Warning	BD/DR	Structural hazard: walls and ceilings have collapsed, remaining load-bearing walls are sagging are deteriorated due to weathering.	3358	square feet	~~4~~6 6 v. Batteries. 1 compressed gas cylinder from 22" ~ 25' lead-shielded 1-inch cable
21 - Wastewater Treatment Facility						
	Wastewater Treatment Facility Tanks	BD/DR	Falling and Drowning hazard: open cistern filled with water	2	each	Wastewater treatment facility - 1 large tank & w/ smaller 3' x 4' cistern
	Piping; influent/effluent (8-inch)	CON/HTW	N/A	~~400~~ 500	linear feet	

500 (plus other piping) same length of 1¼ steam piping

Table 2
Summary of DERP-FUDS Eligible Debris and Physical Hazards
Northeast Cape, St. Lawrence Island, Alaska

Site Location	Building or Debris	FUDS Categorization/ Eligibility	Evaluation of Physical Hazard	Estimated Quantity	Units	Comments
Site 22 - Water Wells and Water Supply Building						
	Bld. 113 - Water Supply Building	BD/DR	Structural hazard: roof and walls collapsing Falling hazard: subsurface floor is >6 and concrete lined thus resulting in a Drowning	28	feet high	4 EA Collapsed building
	Well #4 pumphouse	BD/DR	Structural hazard: openings > 8"x8", roof sagging, and load-bearing walls deteriorated due to weathering			Abandon WELL!
	Bldg. 114 - Pump Station	CON/HTW	generator in place	unknown	N/A	Bldg.. will need to be removed.
	Containerized ACM cement	CON/HTW	N/A	150	gallons	
	Containers; paints	CON/HTW	N/A	1	cubic yard	Fire paint containers
Site [illegible] - Power and Communication Line Corridors						
	Antennas and cables	BD/DR	Other: entanglement hazard for ATV and snow machine traffic	unknown	N/A	
	Drum(s)	CON/HTW	N/A	140	each	Estimate length of 6 cables based on map (linear feet)
Site [illegible] - Receiver Building Area						
	Antennas, poles and cables	BD/DR	Other: entanglement hazard for ATV and snow machine traffic	unknown	N/A	
	Drum(s)	CON/HTW	N/A	1450	each	
Site 15 - Direction Finder Area						
	Antennas, poles and cables	BD/DR	Other: entanglement hazard for ATV and snow machine traffic	unknown	N/A	
	Transformer casing	CON/HTW	N/A	1	each	Now removed (NES, 1999)
Site 16 - Former Construction Camp Area						Disposition of animal carcasses located around the site?
	No visible sources of BD/DR	N/A	N/A	N/A	N/A	
Site 27 - Diesel Fuel Pump Area						
	Building; small	CON/HTW	Needs to be removed to provide access to fuel lines	unknown	N/A	Concrete sump 3x3' w/ piping [illegible] Building noted during 1995 BD/DR field work.
	Pipeline; buried and fuel pump	CON/HTW	N/A	1	each	

KEY:

ACM - asbestos-containing material
BD/DR - building demolition/debris removal
CON/HTW - containerized hazardous or toxic waste
DERP - Defense Environmental Restoration Program
FUDS - Formerly Used Defense Site
N/A - not applicable
PCB - polychlorinated biphenyls
NE - Northeast Cape
POL - petroleum hydrocarbons
SHPO - State Historic Preservation Office
TCLP - toxic characteristic leaching procedure
UST - underground storage tank

NOTE:

(a) - Combined estimated quantity of building material at Site NE 18.

Tailgate Safety Meeting Form

Date: 9-11-98 Time: 1110 Job Number: 1189098.050101

Client: USACOE Site Location: Northeast Cape

Scope of Work:

Soil and groundwater sampling, well pt. installation

Safety Topics Presented

Protective Clothing/Equipment: Steel toed boots, ear and eye protection, inter and chemical protective gloves, or leather gloves, Tyvek, rain gear or cold weather gear as needed

Chemical Hazards: Diesel fuels, gasoline, Hexane

Physical Hazards: ATV transportation, tripping, falling, muscle strain, jack hammer w/

Special Equipment: generator

Other:

Emergency Procedures: Contact ~~Gambell Health Clinic(near P.O.) at 985-5012~~

Phone - 911

CB ch. 29

Hospital: Norton Sound Regional, Nome Phone: 1-907-443-3311

Air Ambulance Phone: LifeGuard Alaska 1-800-478-LIFE (5433)

Hospital Address and Route: N/A

ATTENDEES

USCOE ALASKA

TAILGATE SAFETY MEETING

NAME PRINTED	SIGNATURE
Douglas Quist	[signature]
Victor HARRIS	[signature]

Meeting Conducted By: ______________________ ______________________
Name Printed Signature

Projected Safety Officer: ____________________ Project Manager: ____________________

Tailgate Safety Meeting Form

Date: 9-12-98 Time: 1020 Job Number: 1189098.050101

Client: USACOE Site Location: Northeast Cape

Scope of Work:

Soil and groundwater sampling. , sediment sampling

Safety Topics Presented

Protective Clothing/Equipment: Steel toed boots, ear and eye protection, inter and chemical protective gloves, or leather gloves, Tyvek, rain gear or cold weather gear as needed , cold weather

Chemical Hazards: Diesel fuels, gasoline, Hexane

Physical Hazards: ATV transportation, tripping, falling, muscle strain , Raids Guard, foxs, bears, terrain, wet & cold

Special Equipment:

Other:

Emergency Procedures: Contact ~~Gambell Health Clinic (near P.O.) at 985-5012.~~

Hospital: Norton Sound Regional, Nome Phone: 1-907-443-3311

Air Ambulance Phone: LifeGuard Alaska 1-800-478-LIFE (5433)

Hospital Address and Route: N/A

ATTENDEES

USCOE ALASKA

TAILGATE SAFETY MEETING

NAME PRINTED	SIGNATURE
Victor Harris	
Douglas Quist	
Amanda Dreyer	

Meeting Conducted By: B McLean (Name Printed) ______ (Signature)

Projected Safety Officer: ____________ Project Manager: D. Lugen

Tailgate Safety Meeting Form

Date: 9-13-98 Time: 1015 Job Number: 1189098.050101

Client: USACOE Site Location: Northeast Cape

Scope of Work:

Soil and groundwater sampling, sediment sampling

Safety Topics Presented

Protective Clothing/Equipment: Steel toed boots, ear and eye protection, inter and chemical protective gloves, or leather gloves, Tyvek, rain gear or cold weather gear as needed

Chemical Hazards: Diesel fuels, gasoline, Hexane

Physical Hazards: ATV transportation, tripping, falling, muscle strain, nails, fox, wire

Special Equipment:

Other:

Emergency Procedures: Contact ~~Gambell Health Clinic (near P.O.) at 985-5012.~~ See posted instructions
Phone: 1.2.3.4 Dial
CB ch. 29/19 Marine 19
air 122.7

Hospital: Norton Sound Regional, Nome Phone: 1-907-443-3311
Air Ambulance Phone: LifeGuard Alaska 1-800-478-LIFE (5433)

Hospital Address and Route: N/A

ATTENDEES

USCOE ALASKA

TAILGATE SAFETY MEETING

NAME PRINTED	SIGNATURE
Amanda Dreyer	Amanda Dreyer
VICTOR HARRIS	[signature]
Douglas Quist	[signature]

Meeting Conducted By: B. McLean (Name Printed) [signature] (Signature)

Projected Safety Officer: ____________________ Project Manager: D. Lyer

Tailgate Safety Meeting Form

Date: 9-14-98 Time: ~~1000~~ 1030 Job Number: 1189098.050101

Client: USACOE Site Location: Northeast Cape

Scope of Work:

Soil and groundwater sampling.

Safety Topics Presented

Protective Clothing/Equipment: Steel toed boots, ear and eye protection, inter and chemical protective gloves, or leather gloves, Tyvek, rain gear or cold weather gear as needed, hard hats, helmets

Chemical Hazards: Diesel fuels, gasoline, Hexane

Physical Hazards: ATV transportation, tripping, falling, muscle strain, nails, wire, ACM fox

Special Equipment:

Other:

Emergency Procedures: ~~Contact Gambell Health Clinic(near P.O.) at 985-5012~~

Marine Ch 19
CB ch 29
air 122.7

Hospital: Norton Sound Regional, Nome Phone: 1-907-443-3311
Air Ambulance Phone: LifeGuard Alaska 1-800-478-LIFE (5433)

Hospital Address and Route: N/A

ATTENDEES

USCOE ALASKA

TAILGATE SAFETY MEETING

NAME PRINTED	SIGNATURE
Harold L. Brown	Harold L. Brown
RICHARD G JACKSON	[illegible]
DEIRDRE M. GINTER	Deirdre M. Ginter
VICTOR HARRIS	[illegible]
Amanda Dreyer	Amanda Dreyer

Meeting Conducted By: B McLean (Name Printed) [illegible] (Signature)

Projected Safety Officer: ____________ Project Manager: ____________

Tailgate Safety Meeting Form

Date: 9-15-98 Time: 1105/1300 Job Number: 1189098.050101

Client: USACOE Site Location: Northeast Cape

Scope of Work:

Soil and groundwater sampling, remove & package STB/DS2

Safety Topics Presented

Protective Clothing/Equipment: Steel toed boots, ear and eye protection, inter and chemical protective gloves, or leather gloves, ~~Tyvek~~, rain gear or cold weather gear as needed. respirator w/ cl HPAR, organic + HEPA filter, Saranex

Chemical Hazards: Diesel fuels, gasoline, Hexane STB, DS2

Physical Hazards: ATV transportation, tripping, falling, muscle strain, nails, back strain

Special Equipment: spark less shovel, trailer w/ strapping tie downs,

Other:

Emergency Procedures: Contact ~~Gambell Health Clinic(near~~ P.O.) at 985-5012

Hospital: Norton Sound Regional, Nome Phone: 1-907-443-3311
Air Ambulance Phone: LifeGuard Alaska 1-800-478-LIFE (5433)

Hospital Address and Route: N/A

ATTENDEES

USCOE ALASKA

TAILGATE SAFETY MEETING

NAME PRINTED	SIGNATURE
Amanda Preger	Amanda Preger
VICTOR HARRIS	Victor E. Harris
Douglas Point	Doug Point

Meeting Conducted By: B McLean (Name Printed) — B McLean (Signature)

Projected Safety Officer: ______________ Project Manager: ______________

Tailgate Safety Meeting Form

Date: 9-16-98 Time: 1100 Job Number: 1189098.050101

Client: USACOE Site Location: Northeast Cape

Scope of Work:

~~Soil and groundwater sampling.~~ Seep sample, mob out

Safety Topics Presented

Protective Clothing/Equipment: Steel toed boots, ear and eye protection, inter and chemical protective gloves, or leather gloves, Tyvek , rain gear or cold weather gear as needed

Chemical Hazards: Diesel fuels, gasoline, Hexane

Physical Hazards: ATV transportation, tripping, falling, muscle strain Flying, nails

Special Equipment:

Other:

Emergency Procedures: Con~~tact Gambell Health Clinic(near P.O.) at 985-5012~~

Report to standby plane

Hospital: Norton Sound Regional, Nome Phone: 1-907-443-3311
Air Ambulance Phone: LifeGuard Alaska 1-800-478-LIFE (5433)

Hospital Address and Route: N/A

ATTENDEES

USCOE ALASKA

TAILGATE SAFETY MEETING

NAME PRINTED	**SIGNATURE**

Meeting Conducted By: B mclean ______ Name Printed ______ Signature

Projected Safety Officer: ______ Project Manager: ______

FORTIER & MIKKO

A PROFESSIONAL CORPORATION

Attorneys at Law

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*ALSO ADMITTED IN COLORADO AND CALIFORNIA

April 15, 1999

RECEIVED
APR 19 1999
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Mr. Jeff Brownlee
State of Alaska
Department of Environmental
Conservation
555 Cordova Street
Anchorage, Alaska 99501

Re: Northeast Cape

Dear Mr. Brownlee:

I am writing to let you know that I have sent a copy of the Corps' work plan for the Phase II Remedial Investigation to Dr. Ron Scrudato at the State University of New York, Oswego, for his evaluation of the plan. As you know, some concern has been expressed that the plan will not provide the information necessary to adequately characterize the contamination issues and will therefore result in a flawed long-range remediation plan.

We have not spoken in some time, and I am not quite certain what the State's permitting or regulatory activities are at this moment. I am providing Dr. Scrudato's overview. When I receive his fuller review, I shall provide you with a copy.

For your information, I am also enclosing a copy of Dr. Scrudato's curriculum vitae.

Very truly yours,

FORTIER & MIKKO, P.C.

Jerald M. Reichlin

kc/Enclosures

RECEIVED
APR 19 1999
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Lynn

From: Ronald J. Scrudato <scrudato@Oswego.EDU>
To: <fortmikk@aonline.com>
Sent: Wednesday, April 14, 1999 2:43 PM
Subject: St. Lawrence Island DERP

Dear Mr. Reichlin:
I received the package of information you forwarded on the proposed sampling program for the DERP for St. Lawrence Island and although I have not thoroughly reviewed the document at this time, I have note a few things about the proposed sampling and analytical protocols that I wanted to get before you before final decisions are made by the Corps of Engineers. Recognize that my comments are made with little understanding of the sites and with no experience with the area of St. Lawrence Island. However, let me mention a few matters that come immediately to mind after review of the documents including:

1. Whenever sediments or soils are to be sampled, it is critically important to characterize the sampled material including the particle size distribution, organic carbon content, and possibly the mineralogy of the collected sample particularly if the material is comprised primarily of clay particles. This is important because the concentration of a organic or inorganic contaminant is often directly related to the above referenced parameters. Usually, the finer grained and more organic soils and sediments will be enriched in contaminants because of the larger surface area of the finer material and also enriched int he more organic fractions because the contaminants will sorb (adsorb and absorb) to the organics, much like they adsorb to activated carbon used to remove contaminants. To collect samples without characterizing the basic parameters of the samples is comparing unlike samples or the proverbial apples to figs, or whatever.

2. Regarding groundwater samples to be collected, the protocols should include the screened intervals of the wells to be sampled and relationships to groundwater flow. How frequent will the samples be collected and what will be the relationship to the water table(assuming unconfined flow)?? The groundwater geochemistry and flow of contaminants can vary appreciably seasonally and also fluctuate with precipitation and infiltration.

Sampling of fish. What kind of fish and the time the fish have spent inthe contaminated reaches of a water body are very important. It is inadequate to go out and simply sample "fish". Fish may be very mobile and although sampled in the area of interest, they may have been in an entirely different environment, perhaps miles away from the contaminated area, yesterday. If the fish just entered the area of interest and spent most of its life elsewhere, it is unlikely to be reflective of the area being assessed.

Additionally, it is extremely important that the tissues to be analyzed be stipulated. Many contaminants are concentrated in the fatty tissues. If only non-fatty fillets are sampled, concentrations of select contaminants will be low, particularly for compounds like PCBs.

I found some of the descriptions to be too vague and uncertain. Page 2-7 of fish assessment-- "If possible" is not adequate. the suggested sampling approach is also far too loose. Mollusks should be collected throughout the potentially impacted areas since they are far less mobile than fish and will be far more reflective of local conditions.

What kind of macroinvertebrate assessment will be conducted (pg. 2-8) Again the use of the "if possible". What is it dependent on.?? If there are no macroinvertebrates in the impacted areas relative to the unaffected areas, that in itself suggests there are problems.

Will only "borrow material" be used for capping? If contaminated material is to be capped, how impermeable will the material be? Additionally, even in covering municipal solid waste (household garbage) a composite cap is required. shouldn't a composite cap be used to contain contaminated soils and other solids??

Regarding PCB analysis, they appear to be planning to conduct aroclor matching and this is now considered inadequate. PCB analysis should be congener specific and the differences should be reported as such. This is important because it is becoming increasingly evident that specific congeners have diffenent potential health effects and different congeners behave differently in the environment. Some specific congeners are far more mobile than others and unless congener specific analysis is conducted, it is difficult, to impossible, to gain an understanding of the potential distribution and effects of PCBs.

I was anxious to get these thoughts to you a soon as possible and I will be responding further later this week. Hopefully, these comments are helpful. Call or e-mail to discuss further and I will be in touch by Friday with additional thoughts and comments.

Ron Scrudato

REVIEW COMMENTS PROJECT: Northeast Cape Remedial Investigation DO 5

DOCUMENT: Remedial Investigation LOCATION: Northeast Cape, AK

U.S. ARMY CORPS OF ENGINEERS CENPA-EN-EE-TE	DATE: May 24, 1998 REVIEWER: D. M. Ginter PHONE: 753-2805	Action taken on comment by:________________

Item No.	Location	Comments	Review Conference A=Comment accepted W=Comment withdrawn (if neither, explain)	Design Office C=correction made (if not, explain)	Back Check By: (initials)
1	Page ES-4	Include a general discussion on background concentrations in this section.	A	Added.	
2	Table ES-2	The table title should note that it is contaminated media and debris above regulatory levels and background levels.	A	Revised	
		Also it appears that the criteria for chemicals to appear on the table is an exceedence of ADEC Method 1 levels, however in the narrative at some sites the comparison is made with ADEC Method 2 levels. Please adjust the table to reflect how the site is being evaluated. For example at Site 6, RRO is noted as being a contaminant. The narrative uses ADEC method 2 to evaluate the site. RRO is below the ADEC Method 2 criteria of 10,000 mg/Kg (RRO is listed in Appendix B as 4,900 mg/Kg which exceeds Method 1 of 2,000 mg/Kg.	A	Revised. Revisions made on page 5-12 to state that ADEC Method 1 was used for petroleum constituents.	
		Check The COCs listed for the sites in Table ES-2. It seems like lead and mercury were left off of the list for Site 7 (there were exceedences listed in Appendix B).	A	Revised	
		Site 10 PCBs and lead are listed as COCs, but Appendix B does not have there exceedence results. The 1994 report has the sample results for the lead and PCB hits. Is Appendix B supposed to contain all of the sample results? Check the COCs at Site 10 and the results reported in Appendix B against the 1994 report.	A	Revised	
		Site 15 - RRO is listed with a footnote. Match the footnote symbol with the footnote.	A	Revised	
		Site 17 - PCBs are listed for this site. In Appendix B, the sample with the PCBs is listed as 13145SS, isn't this the result for SS145 at Site 13? Please check and move the PCB results as appropriate.	A	As stated in Section 1.3.2, site boundaries were modified to reflect current knowledge on the source and extent of potential contamination and group areas for remediation. Some samples are now within the boundaries of a different site.	
		Site 28 - Check to see that you mean cadmium rather than chromium…it looks like it should be chromium.	A	Revised.	

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Item No.	Location	Comments	Review Conference A=Comment accepted W=Comment withdrawn (if neither, explain)	Design Office C=correction made (if not, explain)	Back Check By: (initials)
		I did not see a PAH exceedence for Site 29 in Appendix B. Verify if there is a PAH exceedence.	A	Revised - SW/SD804 (total PAH)	
3	Appendix B	Check the regulatory criteria for RRO in Appendix B. The 3000 appears to be based on the AA fraction rather than the total RRO criteria of 10,000 mg/Kg for ingestion. I really like the organization of Appendix B…easy to read.	A	Revised.	
4	Page 1-2, Section 1.2	5th bullet. Note that the water in the basement structure at Buildings 101 and 98 were removed.	A	Revised.	
5	Page 1-3, Section 1.3.2	2nd sentence. Remove bracket at the sentence beginning.	A	Revised.	
6	Page 1-12	1st bullet. Note that the ADEC matrix was the criteria for POLs in the past. 2nd bullet. Note that Method 2 sets up numerical data for POLs and other chemicals. Also note that Methods 2 and 3 require a cumulative risk calculation for chemicals detected at 1/10th of the cleanup tables.	A	Revised	
7	Page 1-12	Include in the PCB discussion the State regs for PCB contamination (1 mg/Kg for residential and 10 mg/Kg for commercial)	A	Revised. Text added on page 1-30 and Table 1-3 revised.	
8	Page 1-13	Cite the date of the EPA table since they are always being updated.	A	Revised	
9	Page 1-23	Matrix Item 4. If we classify water as non-potable, we may need to provide a justification as required in 18 AAC 75.350. We may be better off going with a score of 4 for Item 4. Consider.	A	Revised.	

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Item No.	Location	Comments	Review Conference A=Comment accepted W=Comment withdrawn (if neither, explain)	Design Office C=correction made (if not, explain)	Back Check By: (initials)
		Bottom of the matrix. Check the new regs for the matrix. I believe that you are referred to the Method 2 table for the individual BTEX compounds. Benzene is 0.02 mg/Kg and there is no more total BTEX.	A	Revised.	
10	Page 1-24	I like the incorporation of the limiting level in Table 1-3. These numbers should be used in the Appendix B table.	W		
11	Page 1-26	PCBs seem to be missing from the table.	A	Revised	
12	Page 1-26	Top paragraph. Check the use of hours instead of days.	A	Checked. It is hours.	
13	Page 1-30	Table 1-5. The State has stricter cleanup levels than TSCA. These need to be addressed. Paragraph under Table 1-5. Need to note that just because the waste may be below 50 ppm, that the landfill permit may not allow it to accept the PCBs. 2nd to last paragraph, last sentence. Scratch "if it becomes desirable".	A	Revised. State criteria added to Table 1-3.	
14	Page 1-31	Top sentence. Scratch the last sentence "The proposed site specific cleanup standard for lead…."	A	Revised	
15	Page 1-31	Paragraph *Tundra* - State who you spoke with at the ADEC and their authority for setting typical evaluation standards. I know that they are cited in the bibliography, but their authority is not there.	A	Revised to reflect comments by ADEC on this report.	
16	Page 1-33	Last paragraph. The well located at Site 26 used to noted as being located at Site 22 and an additional part of Site 22 was shown as an island in the middle of Site 26. Please keep the sites consistent between the reports or note the change in the report.	A	Noted change in Section 1.3.2. This will make remedial action more straight forward.	
17	Page 3-1	Table 3-1. Site 21. Is there a wastewater treatment building at Site 21? There is no building listed in the BD/DR inventory. Please clarify.	A	Revised. Building present.	
18	Page 3-3	Is there a well house at Site 12? It is not listed as BD/DR. Clarify.	A	Revised. Reassigned to Site 26.	

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19	Page 3-5	Include copies of the Certificates of disposal in the Appendix also.	A	Added.	
20	Page 4-7	Bottom table. Fuel ID is noted as 14,000 mg/Kg, but the table is in mg/L. Clarify. Ethylene Glycol. Detection limit is supposed to be in parenthesis, but this item lists units in parenthesis. Also the units are supposed to be in mg/L not mg/Kg.	A	Units were reported as mg/Kg.	
21	Table 4-14	Correct spelling of antennae. Antennae is for a bug.	A	Revised.	
22	Table 4-14	Throughout the table antenna quantities are listed as unknown, but at the end of the table there is a line item for antennas. Clarify if this line item catches all of the antennas listed as unknown. Also shade the last item listing antennas in the same manner as the other sites. Site 14 - state whether the water was still >8' deep during this last site visit. Site 21 - provide more detail on the 800 gallon wastewater treatment tank, such as: it is below the ground, etc.	A	Revised. Revisions to text on page 5-29. Table 4-14 revised also.	
23	Page 5-4	5th paragraph, 3rd to last sentence. It looks like the work "in" is missing. "...except for on soil sample in which chromium at 42 mg/Kg..."	A	Revised	
24	General	Specific site maps. Please note the location of the exceedences on the maps. Currently it lists the DRO, GRO, etc., but most do not list the metal exceedences. The maps are very helpful to get a feel for the site.	A	Revised.	
25	Page 5-4	5th paragraph. State how many samples were tested for chromium.	A	Revised.	
26	Page 5-7	2nd paragraph. Groundwater is not subject to Methods 1, 2 or 3. Groundwater is only subject to Table C.	A	Revised.	

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Item No.	Location	Comments	Review Conference A=Comment accepted W=Comment withdrawn (if neither, explain)	Design Office C=correction made (if not, explain)	Back Check By: (initials)
27	Section 5 - General	Throughout this section, there is reference to TRPH exceeding regulatory criteria. With the new ADEC regs, there is no longer criteria for TRPH so we should not evaluate it against old regulations. Please remove references to TRPH exceeding regulatory criteria. It may indicate RRO, but there is no longer any criteria against which to compare it.	A	Revised.	
28	Page 5-15	Top sentence. Check to see if VOCs were tested at this site.	A	Revised. Yes, they were tested.	
29	Page 5-23	Top paragraph. State what the fuel storage tanks held (diesel?)	A	Revised.	
30	Page 5-24	2nd paragraph. Include a discussion of the groundwater levels. If groundwater was high at the time of sampling then the results may look like a drop in contaminant concentration, when really it is just a high water event. This comment applies to other locations where the contaminants were dropped because of a low detection level during this sampling event. just make sure that the levels are not due to a high water event.	A	Revised	
31	Figure 5-10	SS145 appears to be missing	A	Revised	
32	Page 5-28	Discuss the lead based paint at the site and the sample results.	A	Added 2.4.2.3 and Table 2-7.	
33	Page 5-29	Top sentence. Give the concentration of the PCBs in the wipe samples.	A	Revised	
34	Page 5-29	Site 14. Note that the basement was pumped out and that it turned out to be a corridor. Also note if the water remained out during this last site visit.	A	Revised	
35	Page 5-56	Top paragraph. State what happened to the chrome sample.	A	Revised	

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36	Page 5-56	Middle paragraph. The paragraph states that Figure 5-17 shows where RRO, DRO, BTEX, metals, etc. were found. I do not see on the figure where BTEX, metals, etc. were found. Bottom table - Clarify where the PAH value came from.	A	Revised	
37	Table 5-50 and 5-51	This table is not listed on the table of contents. Also there is a Table 5-50 listed in the table of contents that does not match the Table 5-50 on Page 5-64.	A	Revised	
38	Table 6-1	If possible, provide a comparison of the water table levels.	A	Added Table.	

Revised: November 2, 1999

REVIEW COMMENTS PROJECT: Northeast Cape Remedial Investigation DO 5

DOCUMENT: Remedial Investigation LOCATION: Northeast Cape, AK

U.S. ARMY CORPS OF ENGINEERS CENPA-EN-EE-TE	DATE: May 24, 1999 REVIEWER: Pamela Miller PHONE:	Action taken on comment by:_______

Item No.	Location	Comments	Review Conference A=Comment accepted W=Comment withdrawn (if neither, explain)	Design Office C=correction made (if not, explain)	Back Check By: (initials)
1		The RI/Fs reveals a lack of basic understanding of the geological, hydrological, or ecological systems that influence the distribution of contaminants at NE Cape. The nature and extent of the contamination has not been characterized at any of the identified sites. Contamination plumes have not been delineated for either groundwater or surface waters because too few samples have been taken. Contamination is often assumed to be 'isolated" when this conclusion is based on disjointed and scanty evidence. In many cases, recommended remedial actions are based on very few surface soil samples (often only 1 or 2 samples).	A	The USACE is performing additional target sampling in 1999.	

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Item No.	Location	Comments	Review Conference A=Comment accepted W=Comment withdrawn (if neither, explain)	Design Office C=correction made (if not, explain)	Back Check By: (initials)
2		There are many untested assumptions drawn from mere speculation, especially concerning the hydrogeology of the area (Section 1.5.4). Some examples from the RI/FS that indicate poor understanding of the physical environment of the NE Cape that influences contaminant distribution; • "The depth to bedrock is unknown (p 1-33)." • "...the regional groundwater flow direction if *expected* to be from the mountainous recharge area south of the site..." (emphasis added)(p 1-33). • "the depth of permafrost at St. Lawrence Island is unknown (p 1-33)." The ecological discussion in the RI/FS also reveals a poor understanding of the ecological dynamics of the area—no systematic surveys of plant communities or wildlife have been made. Contractors visited the site on only 3 occasions for very short periods of time—the September visit would likely have been after migration. Assumptions of low habitat value (Section 1.5.7.2 for example) are not based on sound scientific data. The document does not fulfill obligations under the Endangered Species Act to consider the impacts of contamination and habitat damage to endangered species including Stellers sea lion, spectacled eider, Stellers eider, and the short-tailed albatross. "The prevalence of these with respect to the NE Cape Site is unknown (page 1-37)."	A	The USACE is performing additional investigation in 1999.	

U.S. ARMY CORPS OF ENGINEERS CENPA-EN-EE-TE	DATE: May 24, 1999 REVIEWER: Pamela Miller PHONE:	Action taken on comment by:_______

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3		Northeast Cape has been a very important subsistence harvesting, hunting, and fishing place for the people of Savoonga for generations. The military installation displaced and curtailed many of the traditional subsistence uses. Now, elders from the village (including Annie Alowa, Jimmie and Mabel Toolie) say that they believe that NE Cape is too contaminated for safe subsistence uses. The RI/FS assumes "low occupancy" criteria, stating that the area is "traversed infrequently by local residents during the time the ground is exposed (Section .1.4.2). Yet, in Section 1.5.6 the document acknowledges that there is a "small subsistence hunting and fishing village located at the site, inhabited primarily in the summer by residents of Savoonga. The Corps of Engineers must evaluate the importance of NE Cape for historical and present subsistence use and assess potential exposure pathways through subsistence foods (including vegetation, berries, fish, birds, terrestrial and marine mammals, including migratory animals). In order to accomplish this, the Corps must fully determine the nature and extent of the contamination, including the distribution of contamination within the watershed of NE Cape and a thorough biological sampling program that assesses contaminants in all levels of the food web, including vegetation, resident and non-resident species of macroinvertebrates, fish, birds, terrestrial and marine mammals. The assessment must develop protocols that evaluates genetic damage (for example, enzyme tests that measure damage from exposure to PAHs), as well as sampling to assess bioaccumulation in plant and animal tissues (not simply whole body sampling, but compartmentalization of contaminants in liver, kidney, muscle, and fatty tissues, for example). The federal government is liable for damaging the resources of NE	A	Subsistence use of the Northeast Cape Area is recognized and used to develop the investigation and remedial action strategies.	

U.S. ARMY CORPS OF ENGINEERS CENPA-EN-EE-TE	DATE: May 24, 1999 REVIEWER: Pamela Miller PHONE:	Action taken on comment by:________

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		Cape that have been traditionally used by the people of St. Lawrence Island for subsistence. The Corps must assume "high occupancy" for the purposes of establishing cleanup standards, based on the fact that people occupy the area for significant parts of the year (people used to live there year round according to Savoonga elder Annie Alowa). Special consideration must be given to assess the potential for contaminants to bioaccumulate in the lipid-based subsistence diets of Savoonga residents. The Corps must develop cleanup standards that aim to restore the ability of St. Lawrence Island people to safely harvest subsistence foods as they have done historically prior to military occupation. The Principles for Environmental Cleanup of Federal Facilities (Final Report of the Federal Facilities Environmental Restoration Dialogue Committee (FFERDC), April 1996) state: "The federal government has caused or permitted environmental contamination. Therefore, it has not only a legal, but an ethical and moral obligation to clean up that contamination in a manner that, at a minimum, protects human health and the environment and minimizes burdens on future generations. In many instances, this environmental contamination has contributed to the degradation of human health, the environment, and economic vitality in local communities. The federal government must not only comply with the law; it should strive to be a leader in the field of environmental cleanup, which includes addressing public health concerns, ecological restoration, and waste management." Specifically, the Corps must consider "short-term and long-term ecological effects and environmental impacts in general, ***including damage to natural resources and lost use.***" Lost resources include			

REVIEW COMMENTS PROJECT: Northeast Cape Remedial Investigation DO 5

DOCUMENT: Remedial Investigation LOCATION: Northeast Cape, AK

U.S. ARMY CORPS OF ENGINEERS CENPA-EN-EE-TE	DATE: May 24, 1999 REVIEWER: Pamela Miller PHONE:	Action taken on comment by:______

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		large runs of anadromous fish that included sockeye and silver salmon (presumably damaged from the massive fuel spills that contaminated local streams and wetlands) and the ability of Savoonga people to safely harvest fish and wildlife from the area. In addition, the federal government has an obligation of environmental justice (through Executive Order 12898 and the FFERDC report), "to make special efforts to reduce adverse impacts of environmental contamination related to federal facility activities on affected communities that have historically lacked economic and political power, adequate health services and other resources."			
4		Radiological Survey The radiological survey was perfunctory and inconclusive. Specifications for the Victoreen Radiacmeter should be provided. The discussion (Section 2.5) leaves some important questions unanswered. Does the instrument measure a total radiation count or gamma count? What is the instrument's beta and alpha sensitivity? What is the instrument's detection range into the subsurface?	A	This information was added to the report.	
5		Has an archives search/interviews of former officers and others been done to assess the potential of radioactive materials at the site? Were RTGs used as power sources at NE Cape? and is it possible that the nuclear generator or radioactive waste from nuclear generator(s) has been disposed on site? What other potential radioactive materials/waste could have been used and/or disposed on the island or in surrounding waters? The radiological survey provides unjustified assurances to assuage community concern—a truly independent and scientific radiological survey must be conducted, in addition to an archives search to determine any historical uses of radioactive materials.	A	This information is addressed in other reports on Northeast Cape and was outside the scope of this investigation.	

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6		Section 1.4.2 provides no justification for choice of the "self-implementing disposal" option for PCB remediation or 'low occupancy scenario."	A	40 CFR 761 criteria is the source. Alaska State PCB cleanup criteria is more stringent and was added to page 1-30	
7		There is also no justification provided for choice of 'a combination of ADEC Methods 1,2,3 as cleanup criteria." The document uses criteria set for geographical zone, arctic that receives less than 40 inches of precipitation.	A	This report uses the "under 40 inches of rain" zone and criteria in 18 AAC 75.	
8		The document presents a confusing picture of precipitation, stating that the island receives 16 inches of precipitation, but 80 inches of snowfall. The selection of cleanup criteria must consider snowmelt.	A	Snow melt is considered. An inch of snowfall is converted to a quantity of water by the weather service and used to document precipitation.	
9		The document is unclear about the cleanup goal for dioxins and furans while citing EPA's National Dioxin Study. In establishing cleanup goals, the Corps must incorporate the latest EPA Dioxin Reassessment in order to provide the utmost protection to wildlife and human health. Reindeer should be considered 'livestock" in the definition of cleanup criteria. The measurements of dioxin/furan levels at NE Cape have been inadequate to fully ascertain the distribution of these contaminants and potential impacts on wildlife and human health. The "hits" of dioxin at various sites within NE Cape are alarming. Complete remediation of these dioxin and furan-contaminated sites must be done. Dioxin is a potent cancer-causing agent and causes reproductive, immune system, and developmental effects at very low doses. Site 1, the Burn Site SE of the Landing Strip and other incinerator/ash disposal areas, was not properly evaluated and should not be given a recommendation for "no further action."	A	This report follows current ADEC policy on dioxin cleanup criteria.	

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10		The document is unclear about many aspects of prior investigations, including the following: Where are the results of the 1996 biological sampling program?	A	Sampling results are provided in Appendix D.	
11		Unwarranted conclusions are made on the basis of qualitative assessments and visual observations. The document admits that 'in many instances the field team was unable to access areas of the buildings and drum debris piles (p 4-11)." The document also concludes: "Much of the area has not been subject to subsurface investigation." The inventory is grossly incomplete, especially for landfills and drum disposal areas.	A	The USACE is performing additional investigation in 1999.	
12		What did the 1996/1998 site reconnaissance entail?	A	Visual inspection.	
13		What is the potential for chemical warfare materials (including CAIS) to be present, possibly buried at the site given that chemical decontamination agents were found?	A	Chemical decontamination agents were routinely issued to military bases so they would be prepared in case of chemical warfare.	
14		The statement that the cleanup standard for lead at 400 mg/Kg is conservative for the site is irresponsible given the latest scientific evidence of neurological effects of lead at much lower levels, especially for children. Lead sampling was sporadic and did not include areas around buildings and maintenance facilities where lead contamination is likely.	A	The cleanup criteria adheres to current ADEC policy.	
15		It is a mistake to conclude that Montgomery Watson performed an "independent" QA/QC (p 2-13).	A	Montgomery Watson's QA/QC function was to evaluate the analytical laboratory's data use and calculation.	
16		The site investigation is severely compromised due to the lack of comprehensive sampling for solvents and other volatile organic compounds, PCBs, dioxins, furans, heavy metals, pesticides.	Noted	The USACE is performing additional investigation in 1999.	

Revised: November 2, 1999

Comments on the Draft 1999 Phase II Remedial Investigation (January 2000)
Formerly Used Defense Site at Northeast Cape, Saint Lawrence Island, Alaska
Provided to the Department of the Army U.S. Corps of Engineer District, Alaska
March 30, 2000

Prepared by Pamela Miller, Biologist and Program Director of Alaska Community Action on Toxics and Saint Lawrence Island Restoration Advisory Board (RAB) Member

Please consider the following comments for the record.

1 **Conclusion: Findings presented in this report indicate that the Northeast Cape FUDs site should be designated a National Priority Site (NPL) Superfund site. Contaminant levels in fish and the potential for human exposure through subsistence foods are high enough to warrant a designation of "no consumption recommended" (PCBs and PAHs). These new data should prompt EPA to prioritize the thorough cleanup of this site to prevent damage to wildlife and human health. Given the levels of contamination in the fish analyzed in the ENRI study, it is necessary that fish advisories and warning signs be posted in an appropriate manner developed in consultation with the community.**

2 The information provided in this document does not resolve significant data gaps remaining from the prior Phase II RI work conducted in 1996 and 1998. The Corps has not determined the nature and lateral/vertical extent of contamination of soils, sediments, groundwater, surface waters, and biota of the Northeast Cape area. The Corps has not adequately characterized most of the 30 sites nor evaluated the potential for cross-site contamination. Without complete information, the Corps and its contractors cannot formulate an effective remedial design that will protect human health and the environment. The data are seriously lacking for a human health assessment. Sources of PCB contamination to the Sugtughneq River basin have not been determined. Sources of PCB and other contamination must be fully characterized and removed in order to prevent continuing damage. The Corps has not determined the extent of groundwater contamination at Northeast Cape and potential impacts to surface waters, ecological and human health.

3 Soil and sediment contamination data within and across sites cannot be compared because there are no analyses of types of soils/sediments. Contaminant concentrations of soils/sediments are directly affected by particle size distribution, percent organic material, mineralogy, associated contaminants and other qualities. Interpretations and comparisons cannot be made without proper classification of soils/sediments. The assumptions made in the report that high levels of TRPH and DRO in samples can be attributed to background organics are without substantiation—analyses should be made for VOCs, PAHs, and BTEX.

Specific comments:

4 **Page 2-1**: Site 7: The contractor does not provide enough information on sampling methods for the reviewer to evaluate whether the sample is "representative."

(5) Page 2-5 and 3-5: The composite sampling of three buildings is inadequate to characterize or draw conclusions about the extent of PCB contamination of NE Cape buildings.

(6) Page 2-9: the contractor does not provide justification for selection of the sites for background samples.

(7) Pages 2-9 and 3-8: Buried Drum Field: Previous investigations indicated that contamination of soils and surface waters exceeded state standards for TRPH and DRO; and DRO, PCB, and lead, respectively. Metal locators have insufficient detection range to depth for characterization purposes. Test pits were too limited in size and depth. Preliminary work suggests that contamination increases with depth. The Corps must conduct additional sampling to delineate the lateral and vertical extent of contamination and identify the source(s) of the fuel and PCB contamination in the vicinity and potential migration of contaminants. Sources of contamination must be removed.

(8) Pages 2-13 and 3-9: Site 18: The contractor presents no data to substantiate "neutralization" of the chemical residuals or the amount of material treated. What were the chemical processes and products of the "neutralization?" The material should be removed to a hazardous waste facility off-island prior to building excavation and removal. The presence of STB and DS-2 could indicate that chemical warfare agents were also stored or tested at the base. The NE Cape sites should be fully evaluated for the presence of chemical warfare agents in landfills or other disposal sites, including CAIS sets or other containerized materials. The Corps should conduct a complete review of archival records; interview former base personnel, and conduct further sampling. For example, recent investigations at Fort Richardson and Adak NAS revealed the presence and disposal of CWM.

(9) Pages 2-17,18, 3-12, 4-5 and Appendix D: This section is inconsistent with the findings presented by ENRI in Appendix D. Since fish in this watershed are anadromous, the potential for people to consume contaminated fish is high whether or not people take fish directly from the Suqitughneq River. PCB levels in Dolly Varden and blackfish are exceeding EPA standards for consumption, warranting the "***no consumption recommended***" risk category. The Corps should follow the recommendations of ENRI biologists for further fisheries assessment (Trip Report and Conclusions of ENRI in Appendix D) to determine the range of contaminated fish and potential for adverse health effects in wildlife and humans. This is an urgent matter that requires immediate comprehensive investigation and measures to prevent wildlife and human exposures. The Corps must sponsor full investigations of the extent of contamination in the marine environment, marine fish and wildlife used for subsistence. Given the levels of contamination in the fish analyzed in the ENRI study, it is necessary that fish advisories and warning signs be posted in an appropriate manner developed in consultation with the community.

(10) Page 2-18: The report states: "Analyses of water and sediment conducted by Montgomery-Watson (1996) suggested that the diesel spill at the site in 1969 released toxic contamination to the Suqitughneq River within the drainage basin... The spill may have mobilized PCB contaminants from another source." Further comprehensive investigations must identify and remove sources of PCB and other contamination sources to prevent further harm to fish, wildlife and humans.

(11) Page 3-1: Site 7: The one primary sample analyzed for this site does not provide adequate characterization of the contamination from the landfill, assessment of the lateral and vertical extent of contamination, or migration/cross-contamination from the site into surface and groundwater. Further, only DRO and RRO were analyzed in this sample. The characterization, both areal extent and range of contaminants, must be comprehensive for this site.

(12) Page 3-2: Table 3-1: The report does not indicate if the chromium (exceeding regulatory standards) is hexavalent or another form of the heavy metal. What is the source of this contamination and its extent?

(13) Page 3-4: Table 3-2: One sample was not adequately representative of the sludge contamination (may vary with depth, location within the wastewater treatment facility). The report does not indicate when the sludge will be removed and transported to a permitted hazardous waste disposal facility.

(14) Page 3-8: Given the range of lead contamination (up to 140,000 mg/kg), safety measures must be instituted to prevent exposure of workers and residents. The report does not indicate where these contaminated materials will be disposed.

(15) Page 3-11 and Appendix D: The contractors do not provide references from the literature for comparing relative TU units for toxicity. This limits the value of the data for reviewers. Values should be compared with the scientific investigations in the published literature

(16) Appendix H page 10: Ethix indicates "minor data quality deficiencies were found, which had a significant impact to PCBs data usability." These deficiencies and implications for the report must be explained.

(17) Appendix H page D-5: Data Quality Summary is from Cape Romanzof?!

Copies to: Saint Lawrence Island RAB members
Michelle Brown, Commissioner, ADEC
Chuck Clarke, Regional Administrator, EPA

COMMENTS TO
DRAFT 1999 PHASE II REMEDIAL INVESTIGATION
NORTHEAST CAPE, ALASKA

January 2000

In addition to the comments made at the March 26, 2000, Northeast Cape Restoration and Advisory Board meeting and those made under separate cover, the landowners, Sivuqaq, Inc. And Savoonga Native Corporation provide the following comments to the Draft 1999 Phase II Remedial Investigation:

	Section:	Comment:
1	1.2.3	References to the White Alice Site is no longer accurate and should be corrected. The White Alice Site is no longer under the Navy's Comprehensive Long Term Environmental Action Navy (CLEAN) Program.
2	2.1.7	Page 2.9 - The surface water exceeded the criteria for DRO, PCB, and Lead, total and dissolved. But, soil analytical results exceeded the soil cleanup standards for TRPH and DRO. What explanation could account for PCB in the surface water of the site but not in the soil?
3	3.1	Page 3.2 at Table 3-1 highlights chromium in the surface soil and arsenic in the surface soil as exceeding the ADEC regulatory criteria. What is the plan for dealing with it? Also, what evidence is there that the DRO, RRO, and TRPH (in 1994) are caused by naturally occurring organic compounds? Does this situation exist elsewhere on St. Lawrence Island to the same degree? To this extent in other places in Alaska?
4	3.6	Page 3.8 - High TRPH, "in samples collected from gravel pad areas may not be attributable to naturally occurring organic material. If more detail information is required for mediation decision, gravel pad sites showing high TRPH and low DRO concentrations may warrant further sampling and analysis for GRO, DRO, RRO, and TOC." The corps should agree that further sampling and analysis is warranted.

5	3.7	Page 3.8 - The inspection found a drum full of "a pale amber color low viscosity product with a faint POL odor." Further excavation of a test pit beneath the top debris layer was not attempted due to safety concerns about the full drum, other rusted debris and weak timbers collapsing." The engineer had no opportunity to determine the extent of potential contamination sources. But what she did find was alarming. A full drum and she wasn't able to go much further. This area should be uncovered. The heavy surface oil staining that increase with the depth of the excavation is cause for concern. The presence of surface water exceeding the criteria for DRO, PCB's (noted at 2.1.7 above) is cause for excavating this pile and eliminating it as a continuing source. [Eyewitness testimony at the 03/26/00 RAB meeting positively identified the presence of other full containers containing used fuel at Site 10]
6	4.1	Page 4.5 - This acknowledges that the 1999 data cannot be used to calculate background concentrations because not enough background samples were collected to constitute a statistically significant population. "Alternate cleanup levels for DRO and metals could be calculated if adequate background samples were collected . . . Alternate cleanup levels based on background concentrations have the potential to be markedly different then the cleanup levels currently proposed for Northeast Cape." Adequate additional background samples should be collected.
7	App. H	Page 10 - Chemical Data Quality Reviews, Overall assessment indicates problems. "Minor data quality deficiencies were found, which had a significantly impact polychlorinated biphenyl data useability. All data generated by this method, except where noted, should be considered usable as reported." If the minor data quality deficiencies had a significant impact to polychlorinated biphenyl data useability, what is the significance of these quality deficiencies and why is the data still considered usable?

General	8 The composite sampling and analysis conducted for buildings 110, 107, and 101 is inadequate to determine whether elevated PVC concentrations may exist at one or more of the sites, the character of the sampled material, associated organics and other sample material characteristics will significantly affect the analytical results. To select three buildings for composite sampling and derived deductions for all of the buildings at the various sites is highly presumptive and inadequate to effectively asses the extent of PCB contamination in Cape buildings. 9 On site 21, what the septic leach fields? Are releases from the septic systems impacting ground water? Other ecosystems? 10 The lateral and vertical extent of contamination is not been adequately addressed or defined at most sites. Within specific sites, sample comparisons are not possible. White Alice sites at other locations have been known to be contaminated with PCB's. Have representative samples been collected and analyzed at the While Alice Site to assess PCB impacts. Have the existing studies on the While Alice Site been reviewed and the impacts on the rest of the installation been considered? With what result?

Very truly yours,

FORTIER & MIKKO, P.C.

Jerald M. Reichlin

JMR/kdw
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