United States Air Force
611th Air Support Group/
Civil Engineering Squadron

Elmendorf AFB, Alaska

Final

Remedial Investigation and Feasibility Study

Bullen Point Radar Installation, Alaska

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18 MARCH 1996

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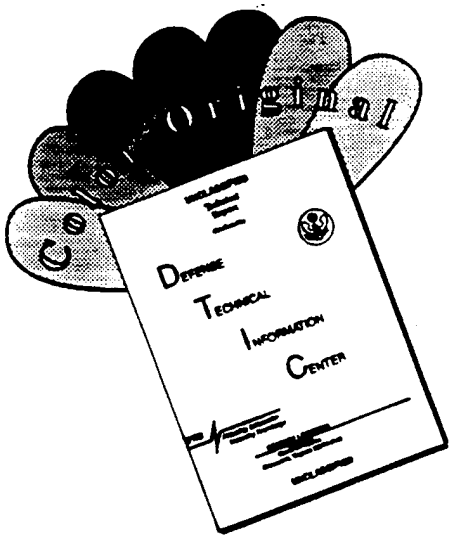
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PREFACE

This report presents the findings of Remedial Investigations and Feasibility Studies at sites located at the Bullen Point radar installation in northern Alaska. The sites were characterized based on sampling and analyses conducted during Remedial Investigation activities performed during August and September 1993. This report was prepared by ICF Technology Incorporated.

This report was prepared between May 1995 and March 1996. Mr. Samer Karmi of the Air Force Center for Environmental Excellence was the Alaska Restoration Team Chief for this task. Dr. Jerome Madden and Mr. Richard Borsetti of the 611th CES/CEVR were the Remedial Project Managers for the project.

Approved:

_____

Thomas McKinney
Program Director
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This report has been prepared for the United States Air Force (USAF) by ICF Technology Incorporated for the purpose of aiding in the implementation of final remedial actions under the Air Force Installation Restoration Program (IRP). As the report relates to actual or possible releases of potentially hazardous substances, its release prior to an Air Force final decision on remedial action may be in the public's interest. The limited objectives of this report and the ongoing nature of the IRP, along with the evolving knowledge of site conditions and chemical effects on the environment and health, must be considered when evaluating this report, since subsequent facts may become known which may make this report premature or inaccurate. Acceptance does not mean that the United States Air Force adopts the conclusions, recommendations or other views expressed herein, which are those of the contractor only and do not necessarily reflect the official position of the United States Air Force.

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EXECUTIVE SUMMARY

BACKGROUND

The United States Air Force (Air Force) has prepared this Remedial Investigation/Feasibility Study (RI/FS) report as part of the Installation Restoration Program (IRP) to present results of RI/FS activities at five sites at the Bullen Point radar installation. The IRP provides for investigating, quantifying, and remediating environmental contamination from past waste management activities at Air Force installations throughout the United States. The IRP is a four-phase program that approximates the remedial investigation and corrective action program used by the U.S. Environmental Protection Agency (EPA) for addressing contaminated sites that may pose a risk to human health or the environment.

The Air Force initiated IRP activities at the Bullen Point radar installation in 1980 in response to the Department of Defense's (DODs) commitment to identify past waste disposal sites and eliminate hazards to public health. The initial Phase I conducted by the Air Force concluded that past waste management activities at the installation may have resulted in adverse environmental impacts at several sites (CH2M Hill 1981).

In 1986, the Air Force initiated Phase II activities designed to confirm and quantify the nature and extent of environmental impairment identified during Phase I. Phase II activities involved limited field investigations of specific sites that were identified in the Phase I Installation Assessment/Record Search activities (Dames and Moore 1987).

By 1988, the Air Force had replaced the phased approach with an approach similar to the RI/FS activities of EPA. The Air Force conducted RI/FS Stage 3 activities for five sites at the Bullen Point installation in 1988 (Woodward-Clyde 1988). Activities included soil, surface water, and sediment sampling, possible removal actions, hydrologic assessment, a demographic survey, and endangerment assessment (health risk assessment), and a Feasibility Study (FS) for the remedial alternatives. The Stage 3 Final Report of September 1990 summarized the results of the remedial investigation (RI) and supported a no further action decision (Woodward-Clyde 1990b).

The Air Force's IRP Decision Document for Bullen Point of 1990 (Woodward-Clyde 1990) also concluded that no further action was needed at the five sites. However, correspondence from Alaska Department of Environmental Conservation (ADEC) personnel to Air Force personnel in November 1991 (ADEC 1991) disagreed with the no further action conclusion. The correspondence stated that further investigation was needed and that corrective action appeared necessary because of improper waste disposal practices and other issues.

In preparation for construction activities associated with unmanned short range radar system, an Air Force contractor conducted a hydrocarbon screening soil sampling program at Bullen Point (ENSR 1992). A total of 520 screening samples and 65 samples for laboratory analysis was collected from 22 areas at the installation. Petroleum products were detected in soil samples in several areas; complete results are described in the report. A letter indicated that petroleum contamination was discovered during short range radar (SRR) construction activities in 1992

(Matrix Construction 1992). Construction of the SRR system was initiated in 1992 and it is currently operational.

The Air Force initiated RI/FS activities at the Bullen Point radar installation in the summer of 1993. During the initial scoping activities, which included record searches, personnel interviews, and physical inspection of the installation, the Air Force and ADEC personnel concluded that five sites warranted investigation under the IRP. The five sites included several of the previously identified and investigated sites that were determined still to be of concern. This document is a detailed presentation of remedial investigation activities and provides conclusions and recommendations for addressing environmental conditions at the five Bullen Point sites. Remedial actions are recommended at three of the sites, and no further action is recommended at the remaining two sites.

INSTALLATION DESCRIPTION

The Bullen Point radar installation is located at 70°10'N, 146°50'W on Mikkelsen Bay (Figure 1-1, page 1-5); it occupies 620 acres. The maximum elevation on Bullen Point is 18 feet above mean sea level, and drainage is radially away from the high points.

Bullen Point radar installation, also known as POW-3, was constructed as an auxiliary station. Initially it consisted of one 25-module train, rotating radar, and support facilities. Facilities at the DEW Line station are the most prominent feature of the area. Original facilities include a radome, four 30-foot communications antennas, a group of ten buildings attached to the radome (the module train), two pumphouses, a warehouse, seven diesel oil tanks, a 200-foot tower, a 250,000-gallon water storage tank, two barge docks, and associated gravel roads and pads (Figure 1-2, page 1-7).

The SRR consists of a radar tower, technical services building, communication structures, and helicopter landing area.

Average daily low temperatures in July and January are 27°F and -31°F, respectively. Average daily high temperatures for the same months are approximately 50°F and -15°F (Walker et al. 1980). Precipitation at Bullen Point averages 5 to 11 inches per year; snowfall is about 25 inches per year. Permafrost at the installation area is up to 1,300 feet thick. Due to the permafrost, polygonal surface patterns are abundant.

The hydrology of the station is controlled by the relatively low topography and permafrost. Even with the low precipitation rates, the tundra is predominantly swampy. Small streams drain the several large and small lakes and swampy land occurring around the installation.

Bullen Point is predominantly covered by a thin tundra mat, beneath which is a layer of sand and loess (wind blown silt) approximately 2 to 3 feet thick. Underlying these deposits are lenses and layers of marine and alluvial clay, silt, sand and sandy gravel. Coastal erosion rates of 7.9 feet per year have been reported.

The vegetative habitat types at Bullen Point support a variety of wildlife. Areas in the vicinity of the installation provide habitat important to birds, mammals, and fish.

PROJECT ACTIVITIES

The Air Force conducted RI/FS field activities at five sites at the Bullen Point radar installation during 1993. The objectives of the Bullen Point RI/FS are to confirm the presence or absence of chemical contamination of the environment at the installation; define the extent and magnitude of confirmed chemical releases; gather adequate data to determine the magnitude of potential risks to human health and the environment; and gather adequate data to identify and select the appropriate remedial actions for sites where apparent risks exceed acceptable limits.

The RI field activities were carried out in a three-phased approach. The three phases, installation presurvey, reconnaissance, and RI field activities, allowed contractor personnel to confirm the location of areas of environmental concern and identify sampling locations before conducting RI field activities. Five sites investigated during the RI activities include:

- Inside Transformer (OT04)
- POL Tanks (ST05)
- Old Landfill/Dump Site East (LF06)
- Fuel Storage Area (ST09)
- Drum Storage Area (SS10)

The site locations are shown on Figure 1-3 (page 1-9).

The RI field activities were conducted from mid-August through early September of 1993. The RI was conducted in conjunction with RIs at seven other radar installations located throughout northern Alaska. Sixteen contractor employees were stationed in Alaska for the duration of the RI. Sampling activities at the Bullen Point radar installation included collection of surface and subsurface soil samples with hand tools, and collection of surface water, sediment, and seep samples from drainages adjacent to potentially contaminated areas.

A total of 89 samples was collected during the 1993 RI activities at Bullen Point. These included soil, sediment, surface water, active layer water, and surface wipe samples collected from the five sites, upgradient areas to establish background levels, and samples for quality assurance/quality control (QA/QC). A summary of the samples collected is presented in Table ES-1.

Analyses of samples collected during RI activities were conducted by a fixed laboratory in Anchorage, Alaska, and a temporary laboratory set up at Barrow, Alaska. Laboratory analyses conducted by the temporary laboratory were conducted on a quick turnaround basis. Analyses conducted in Anchorage, Alaska, included primarily standard turnaround but also a few quick turnaround analyses.

The Air Force conducted a risk assessment once the data had been validated and compiled. The purpose of the risk assessment was to evaluate the human and ecological health risks that

TABLE ES-1. SUMMARY OF REMEDIAL INVESTIGATION SAMPLING

SITE	MEDIUM	NUMBER OF ENVIRONMENTAL SAMPLES
Background (BKGD)	Soil/Sediment	5
	Surface Water	2
Inside Transformer (OT04)	Soil/Sediment	5
	Surface Wipe	3
POL Tanks (ST05)	Soil/Sediment	34
	Active Layer Water	2
	Surface Water	2
Old Landfill/Dump Site East (LF06)	Soil/Sediment	9
	Surface Water	2
Fuel Storage Area (ST09)	Soil/Sediment	6
	Surface Water	1
Drum Storage Area (SS10)	Soil/Sediment	3
Total Environmental Samples	Soil/Sediment	62
	Active Layer and Surface Water	9
	Surface Wipe	3
QA/QC SAMPLES		
Ambient Condition Blanks	Water	1
Equipment Blanks	Water	3
Trip Blanks	Water	3
Replicates/Duplicates	Soil/Sediment	7
	Surface Water	1
Total Samples	Soil/Sediment	69
	Active Layer and Surface Water	17
	Surface Wipe	3

may be associated with chemicals released to the environment at the sites investigated during the RI. The risk assessment characterizes the probability that measured concentrations of hazardous chemical substances will cause adverse effects in humans or the environment in the absence of remediation. The risk assessment will be used in conjunction with state and federal standards and/or guidance to determine if remediation (site cleanup) is necessary. The Bullen Point Risk Assessment (U.S. Air Force 1996) was submitted under separate cover.

CHRONOLOGY OF ACTIVITIES

Project scoping documents were submitted between June and August 1993 for review by Air Force Center for Environmental Excellence (AFCEE) and regulatory agencies. These documents include the Work Plan, Sampling and Analysis Plan, Health and Safety Plan, and Community Relations Plan for seven DEW Line installations and Cape Lisburne. The installation Presurvey and the Reconnaissance trips were conducted in order to provide the information necessary to conduct the RI/FS activities. The Presurvey was conducted in May 1993 by a small group of contractor employees accompanied by Air Force representatives.

The Reconnaissance trip was completed in June 1993 by contractor employees, and AFCEE and ADEC representatives. RI field activities were conducted from mid-August through early September 1993. Sampling was conducted from the areas of least contamination to areas of increasing contamination. The sequence of sampling from least to most contaminated was based on previous sampling data, field screening, and visual observations. Field screening was used to assist in determining the areal extent of contamination and sampling location. Where quick turnaround sample analyses determined gaps in the areal extent of contamination or exposure point concentrations for potentially exposed populations were not defined, a second round of samples was collected and analyzed.

SUMMARY OF REMEDIAL INVESTIGATION/FEASIBILITY STUDY

The following paragraphs describe RI activities conducted at the five sites that are the focus of this report and summarizes the findings of the RI. Summaries of human health and ecological risks posed by chemicals detected at each site are included. The remedial alternatives are presented for the sites recommended for cleanup. The evaluation of remedial alternatives is presented in the FS, Section 5.0

Inside Transformer (OT04). The Inside Transformer (OT04) site consists of the southwest section of the module train where the "inside transformer" was previously located and the associated soil and gravel below the former transformer location (Figure 4-1, page 4-9). A 1986 field reconnaissance trip by a previous contractor indicated that the transformer had leaked onto the surrounding floor tiles (Dames and Moore 1986). The transformer and oil-covered floor tiles were removed in approximately 1989, but the transformer pad and some floor materials were not removed.

Sampling and analyses have determined that the Inside Transformer (OT04) site is contaminated with low levels of Aroclor 1254, a group of polychlorinated biphenyls (PCBs). The contaminated media at the site include the building floor materials and the soils below the module train

building. The source of contamination is likely to be dielectric fluids containing PCBs that were suspected to have spilled and/or leaked in small quantities during maintenance of the facility equipment. The site is deactivated, and the transformers have been removed from this site.

Migration of contaminants from the site appears to have been minimal. Affected media is limited to approximately 15 square feet of the building floor materials where the transformer was previously located and a small gravel area below the module train. Analytical data suggest that migration of PCBs from the building floor materials to the surrounding soil is minimal. The potential for migration of PCBs is not anticipated as the site is relatively flat, and PCBs tend to bind tightly with soil particles.

The risk assessment concluded that risks posed to human health or ecological receptors by site contaminants are minimal given current and future site uses. Potential noncancer hazards and cancer risks were identified in soil from Aroclor 1254. The risks and hazards are based on a conservative future scenario and are not of a magnitude that normally requires remedial action.

Levels of PCBs detected on the floor materials inside the transformer building could pose a direct contact exposure route to PCBs which can potentially bioaccumulate in the environment. Therefore, the site is being recommended for remedial action. The contaminated area at the site consists of approximately 15 square feet of floor material. The remedial action alternative recommended for the site is removal and offsite incineration. A complete description and evaluation of the remedial alternatives considered for this site are presented in the FS, Section 5.0.

POL Tanks (ST05). The POL Tanks are located approximately 300 feet northwest of the module train. The POL Tanks site consists of seven POL tanks and the associated pumphouse placed on a gravel pad (Figure 4-2, page 4-23). The three southern tanks are approximately 20,000 gallons each, and the four northern tanks are approximately 10,000 gallons each. A fill pipe extends from the northwest corner of the gravel pad to a disturbed tundra area to the north. The tanks were abandoned in 1971 when the installation closed. Liquid level depth gauge readings indicate one of the tanks contains water and a sheen, and the other six tanks are empty.

Sampling and analyses have determined that the POL Tanks (ST05) site is contaminated with petroleum hydrocarbons [diesel range petroleum hydrocarbons (DRPH) and gasoline range petroleum hydrocarbons (GRPH)], benzene, toluene, ethylbenzene and xylene (BTEX) compounds, and other volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) that are components of diesel fuel. The contaminated areas at the site are soil/sediment and surface water. The area beneath the west POL Tanks has the highest concentrations of affected soil. Contaminant soil concentrations decrease with distance from the POL Tanks. The suspected source of contamination is spills and/or leaks from the POL Tanks and associated piping. The POL Tanks no longer contain fuel. The tanks have been inactive since 1971.

Migration of contaminants from the site appears to have occurred via surface and subsurface pathways from the gravel pad below the POL Tanks to the surrounding gravel and tundra areas. Contaminants detected in soil/sediment and surface water at downgradient sites, the Old

Landfill/Dump Site East (LF06) and the Drum Storage Area (SS10), were similar to those detected below the gravel pad below the POL Tanks; however, concentrations were lower.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current site uses. Under a future scenario, using the surface water in the drainage pathways from the site as a drinking water supply results in a low potential risk to human health. The human health risk, however, is not of a magnitude that normally requires remedial action. The ecological risk assessment (ERA) concluded that the overall potential risks presented by site contaminants are minimal. Therefore, under current site conditions and considering the findings of the risk assessment, remediation of the site is not necessarily warranted.

Levels of petroleum compounds (primarily diesel) detected in soil/sediment at the site significantly exceed ADEC guidance cleanup levels. In addition, site contaminants have migrated downgradient of the site and have impacted soil/sediment and surface water. Therefore, the site is being recommended for remedial action. The affected areas at the site are the gravel pad area on the west portion of the POL Tanks, the gravel pad area to the south of the POL Tanks, and a small tundra area north of the POL Tanks site near the inactive fuel fill port. The remedial action alternative recommended for these areas is enhanced bioremediation. A complete description and evaluation of the remedial alternatives recommended for this site are presented in the FS, Section 5.0.

Old Landfill/Dump Site East (LF06). The Old Landfill/Dump Site East is the location of the installation landfill that was used from 1956 to 1971 (when the installation was deactivated); it is less than one acre in size (Figure 3-1, page 3-9). The dump site is located approximately 600 feet east of the module train and extends to the shore of a lagoon that opens to the Beaufort Sea. The Old Landfill/Dump Site East was covered with gravel and graded; however, minor erosion from wave action has caused some of the rusty drums and other landfill debris to become exposed.

Sampling and analyses have determined that the Old Landfill/Dump Site East (LF06) site is not significantly contaminated. Only relatively low levels of DRPH, VOCs, and SVOCs were detected at the site. It is suspected that low levels of DRPH, VOCs, and SVOCs are due to migration of affected surface and active layer water from the POL Tanks (ST05) site. Similar compounds were detected at elevated levels in the soil/sediment and surface water samples collected at the upgradient POL Tanks site.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current and future site uses. A potential human health noncancer hazard was identified in surface water from DRPH. This potential hazard is based on a future scenario in which the site surface water would be used as a sole drinking water supply. Even using the conservative future scenario, the potential human health risks at the site are not of a magnitude that normally requires remedial action. The ERA concluded that the overall risk to potential receptors at the site is minimal. Based on the RI sampling and analyses, risk assessment, and current and future site uses, remedial actions are not warranted at the site. No significant human health or ecological risks were identified at the site. In addition, levels of

contamination do not exceed ADEC guidance cleanup levels. Therefore, the Old Landfill/Dump Site East (LF06) site is recommended for no further action.

Fuel Storage Area (ST09). The Fuel Storage Area (ST09) is located approximately 100 feet west of the POL Tanks (ST05) site, and consists of a gravel pad that has been reworked and has an uneven surface (Figure 4-3, page 4-45). The Fuel Storage Area is deactivated and no structures exist at the site. The site is believed to have been used for storage of drummed fuel products. It was deactivated in 1971 with the rest of the installation.

Sampling and analyses have determined that the Fuel Storage Area (ST09) site is contaminated with petroleum hydrocarbons (DRPH and GRPH), and volatile and semi-volatile organics, most of which are common components of diesel fuel. The affected area at the site is the gravel adjacent to, and west of, the affected area at the POL Tanks site. The suspected source of contamination is spills and/or leaks from the POL Tanks that have migrated to the site via surface and active layer water.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current site uses. The potential human health risks at the site are not of a magnitude that normally requires remedial action. The ERA concluded that the overall potential risks presented by site contaminants are minimal. Therefore, under current and future site conditions and considering the findings of the risk assessment, remediation of the site is not necessarily warranted.

Levels of petroleum compounds (primarily diesel) detected in soil/sediment at the site exceed ADEC guidance cleanup levels. In addition, site contaminants have migrated downgradient of the site, and have impacted gravel area, and surface water. Therefore, the site is being recommended for remedial action. The affected area at the site is the gravel area adjacent to, and west of, the POL Tanks. The remedial action alternative recommended for the site is enhanced bioremediation. A complete description and evaluation of the remedial alternatives considered for this site are presented in the FS, Section 5.0.

Drum Storage Area (SS10). The Drum Storage Area (SS10) site is located approximately 100 feet northeast of the POL Tanks (ST05) site (Figure 3-2, page 3-27). The site was used to stockpile drummed fluids such as solvents, antifreeze, and lube oil, and consists of a gravel pad area elevated approximately three feet above the tundra. Posts remain that supported a platform used to store drums off the ground surface. The site was deactivated with the installation in 1971.

Sampling and analyses have determined that the Drum Storage Area (SS10) site is not significantly contaminated. Only relatively low levels of DRPH and GRPH were detected in soils at the site. It is suspected that low levels of DRPH and GRPH are due to migration of affected surface and active layer water from the POL Tanks (ST05) site. Similar compounds were detected at elevated levels in the soil/sediment and surface water samples collected at the upgradient POL Tanks site.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current and future site uses. In addition, levels of contamination do not exceed ADEC guidance cleanup levels. Based on the RI sampling and analyses, risk assessment, and current and future site uses, remedial actions are not warranted at the site. No significant human health or ecological risks were identified at the site. Therefore, the Drum Storage Area (SS10) site is recommended for no further action.

CONCLUSIONS

To meet the Air Force's commitment to identify, quantify, and remediate waste disposal sites at installations throughout the United States, the prime contractor completed an RI/FS at five sites at the Bullen Point radar installation. The investigation was completed in accordance with the guidelines established in the Air Force's IRP. The RI/FS involved field investigations, sampling, and analysis at five sites at the Bullen Point radar installation.

Based on the RI sampling and data analyses and quantitative risk assessment, the Air Force has concluded there is no human health or ecological risk associated with observed conditions, and recommends no further remedial action for two of the five sites. These sites, presented in Table ES-2, are the Old Landfill/Dump Site East (LF06) and the Drum Storage Area (SS10).

At the three remaining sites, contaminant levels either may represent a potential risk to receptor populations or exceed ADEC cleanup guidance levels. It is recommended that remedial actions be conducted at these sites. These sites include the Inside Transformer (OT04), POL Tanks (ST05), and Fuel Storage Area (ST09). The remedial action alternatives recommended for these three sites are presented in Table ES-3.

ES-2. SITES RECOMMENDED FOR NO FURTHER ACTION

SITE NAME	SITE ID NUMBER
Old Landfill/Dump Site East	LF06
Drum Storage Area	SS10

TABLE ES-3. SITES RECOMMENDED FOR REMEDIAL ACTION

SITE NAME	SITE ID NUMBER	MEDIUM	RECOMMENDED REMEDIAL ALTERNATIVE
Inside Transformer	OT04	Floor Materials	Offsite incineration
POL Tanks	ST05	Gravel	Enhanced bioremediation
		Tundra	Enhanced bioremediation
Fuel Storage Area	ST09	Gravel	Enhanced bioremediation

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1.0 INTRODUCTION

The United States Air Force (Air Force) has prepared this Remedial Investigation/Feasibility Study (RI/FS) report to present the results of RI/FS activities at five sites located at the Bullen Point radar installation. The remedial investigation (RI) field activities were conducted at the Bullen Point radar installation during the summer of 1993. The five sites at Bullen Point were investigated because they were suspected of being contaminated with hazardous substances. The RI/FS was conducted in accordance with the requirements of the Air Force Installation Restoration Program (IRP). RI activities were conducted using methods and procedures specified in the RI/FS Work Plan, Sampling and Analysis Plan (SAP), and Health and Safety Plan (U.S. Air Force 1993a,b,c).

Section 1.0 of this report presents information concerning the objectives and implementation of the IRP, a description of the installation and the environmental setting at Bullen Point, and brief background information on the five Bullen Point sites. Project activities, including project objectives and scope, summaries of field and laboratory methods, methodologies for data evaluation and risk estimation, and a summary of background sampling, analytical results and migration pathways are described in Section 2.0. Section 3.0 documents the RI sampling and analysis results on a site-by-site basis for the two sites where no further action is recommended, identifies potential migration pathways and receptors, summarizes the human health and ecological risks, and describes the conclusions and recommendations for each of these sites. Section 4.0 presents the RI sampling and analysis results for the three sites where remedial actions may be warranted. This section also identifies all Applicable or Relevant and Appropriate Requirements (ARARs), potential migration pathways and receptors, summarizes human health and ecological risks, and describes the conclusions and recommendations, including the recommended remedial alternative for cleanup at each site. Section 5.0 presents the Feasibility Study (FS) of potential remedial actions for the sites that may require cleanup.

The recommended actions for each of the sites, presented in Sections 3.0 and 4.0, are preliminary only. The actions for each site will be determined only after review of this RI/FS document and the Bullen Point Risk Assessment (U.S. Air Force 1996) by regulatory agencies and interested parties. During the decision process the public will be notified through fact sheets and public notices as to the recommended action for each site and will be given the opportunity to comment on the proposed action for each site.

Appendix A provides references and a list of acronyms used in this document. Appendix B presents photographs of the Bullen Point radar installation and sites. Appendix C is the Statement of Work describing the scope of the RI/FS activities at the Bullen Point radar installation. Sample collection logs are presented in Appendix D; sample Chain-of-Custody forms are in Appendix E. Cross-reference tables and analytical data are presented in Appendix F, and data validation reports are in Appendix G.

1.1 THE UNITED STATES AIR FORCE INSTALLATION RESTORATION PROGRAM

The Air Force IRP is the basis for assessment and response action on Air Force installations under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The Air Force IRP is designed to identify, confirm/quantify, and remedy problems associated with past and present management of hazardous substances and hazardous wastes at Air Force facilities. CERCLA defines a hazardous substance in Section 101; the definition includes, as examples, any substance designated pursuant to Section 311(b)(2)(A) of the Federal Water Pollution Control Act (FWPCA), any element, compound, mixture, solution, or substance designated pursuant to Section 102 of CERCLA, and hazardous wastes identified pursuant to Section 3001 of the Resource Conservation and Recovery Act (RCRA). A hazardous waste, as defined in RCRA, "may pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of or otherwise managed" (Section 1004[2][B] of RCRA).

The Department of Defense (DOD) initiated the IRP in 1976 to identify, investigate, and mitigate environmental hazardous waste contamination that may be present at DOD facilities. In June 1980, DOD issued Defense Environmental Quality Program Policy Memorandum (DEQPPM) 80-6, requiring identification of past hazardous waste disposal sites at DOD agency installations. The Air Force implemented DEQPPM 80-6 in December 1980 and revised it in 1981.

Executive Order 12316 of 14 August 1981 directed the military to design its own program to remedy uncontrolled hazardous waste disposal sites consistent with the National Contingency Plan (NCP) established by CERCLA. In response to the directive, the DOD instructed its branches to identify hazardous waste disposal sites to which they contributed wastes, and to comply with environmental regulations at the installation level when implementing cleanup. DOD subsequently developed the basic IRP after which the Air Force IRP was modeled. DEQPPM 81-5 of 11 December 1981, implemented by Air Force Headquarters in January 1982, sets forth the basic authority and objectives for the Air Force programs.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) augmented the scope and requirements of CERCLA and provided specific directives to federal facilities regarding investigation of waste disposal sites. Under SARA, technologies that provide permanent removal or destruction of hazardous wastes or contaminants are preferable to actions that only contain or isolate the materials. SARA also provides for greater interaction with public and state agencies and expands the role of the U.S. Environmental Protection Agency (EPA) in the evaluation of the health risks associated with contamination. SARA requires early determination of ARARs and the consideration of potential remediation alternatives at the initiation of an RI/FS. Remedial actions taken under CERCLA must comply with ARARs, which generally consist of federal, state, and local regulations. Remedial actions at facilities regulated under CERCLA are selected based on the results of an RI/FS. The RI/FS process is described in the NCP. The RI phase includes specific steps for determining the nature and extent of environmental contamination. Subsequently, the FS is implemented to evaluate alternative remedial actions prior to selection of the most appropriate action for a specific facility.

To respond to changes in the NCP brought about by SARA, the Air Force modified its IRP in November 1986 to improve continuity in the site investigation and remedial planning process for Air Force installations. In July 1987 the President signed Executive Order 12580, delegating responsibility to secretaries of various agencies to conduct site investigations and remedial actions at federal facilities. The order defined relationships between various federal and state agencies and assigned EPA the role of facilitator in resolving conflicts.

Prior to 1988 the Air Force IRP was organized into four phases, described below:

- Phase I, Installation Assessment/Records Search, identified past waste disposal sites at Air Force installations that might pose a hazard to public health or the environment. Sites identified during Phase I could be recommended for no further action, confirmation studies (Phase II), or remedial action (Phase IV).

- Phase II, Confirmation/Quantification, was intended to define and quantify contamination present at sites identified during Phase I. Stage 1 of Phase II consisted of an initial assessment, including environmental sampling, to determine whether contamination was present. Depending on the results of Stage 1, subsequent stages of investigation could be recommended to improve the characterization of site contamination.

- Phase III, Technology-Based Development, included development of new technologies for treating contaminants identified at Air Force installations. The results of Phase II investigations were used to determine the need for Phase III activities.

- Phase IV, Remedial Action, involved development and implementation of plans to remedy contamination at sites.

In 1988, the Air Force replaced the phased approach of the IRP with an approach more closely resembling the RI/FS approach used by EPA. Under this approach, Phase II investigations and Phase IV remedial action planning are conducted in a more parallel fashion to expedite implementation of site cleanups.

1.2 INSTALLATION DESCRIPTION AND ENVIRONMENTAL SETTING

Bullen Point radar installation, also known as POW-3, was active between 1953 and 1971. The inactive installation is retained by the Air Force. The Bullen Point Distant Early Warning (DEW) Line station is one of many DEW Line stations located across the arctic regions of North America and Greenland. The stations were designed to operate and maintain radar systems for the detection of aircraft that may be a threat to national security.

The Bullen Point installation was constructed as an auxiliary station. Initially it consisted of module train, rotation radar, and support facilities. Facilities at the installation are the most prominent feature of the area. Presently they include an inactive radome and four 30-foot

communications antennas, a radome, a group of eight buildings attached by covered walkways (the module train), two pumphouses, a warehouse, seven diesel oil tanks, a 250,000-gallon water storage tank, associated roads and pads, and a 3,500-foot gravel airstrip.

A Short Range Radar (SRR) System was under construction during the 1993 RI activities at the installation. The new radar system is designed for unmanned operation and consists of a radar structure, support building, and a helicopter landing area.

A variety of past activities at the station may have resulted in environmental contamination. The Air Force is investigating and remediating actual and potential sources of contamination through activities conducted under the IRP.

1.2.1 Physical Geography

The Bullen Point radar installation is located at 70°10'N, 146°50'W on the Arctic Coastal Plain. The nearest populated area is Dead Horse, approximately 40 miles to the west. The facility is established in 620 acres of low lying tundra. The maximum elevation on Bullen Point is 18 feet above mean sea level (AMSL), and drainage is radially away from the high points. The Bullen Point installation is situated adjacent to the northern coast, on a relatively flat area below a gradual slope. The general location of Bullen Point radar installation is shown on Figure 1-1. An area location map is presented in Figure 1-2, and a site plan is provided on Figure 1-3.

1.2.2 Climate (Meteorological Conditions and Air Quality)

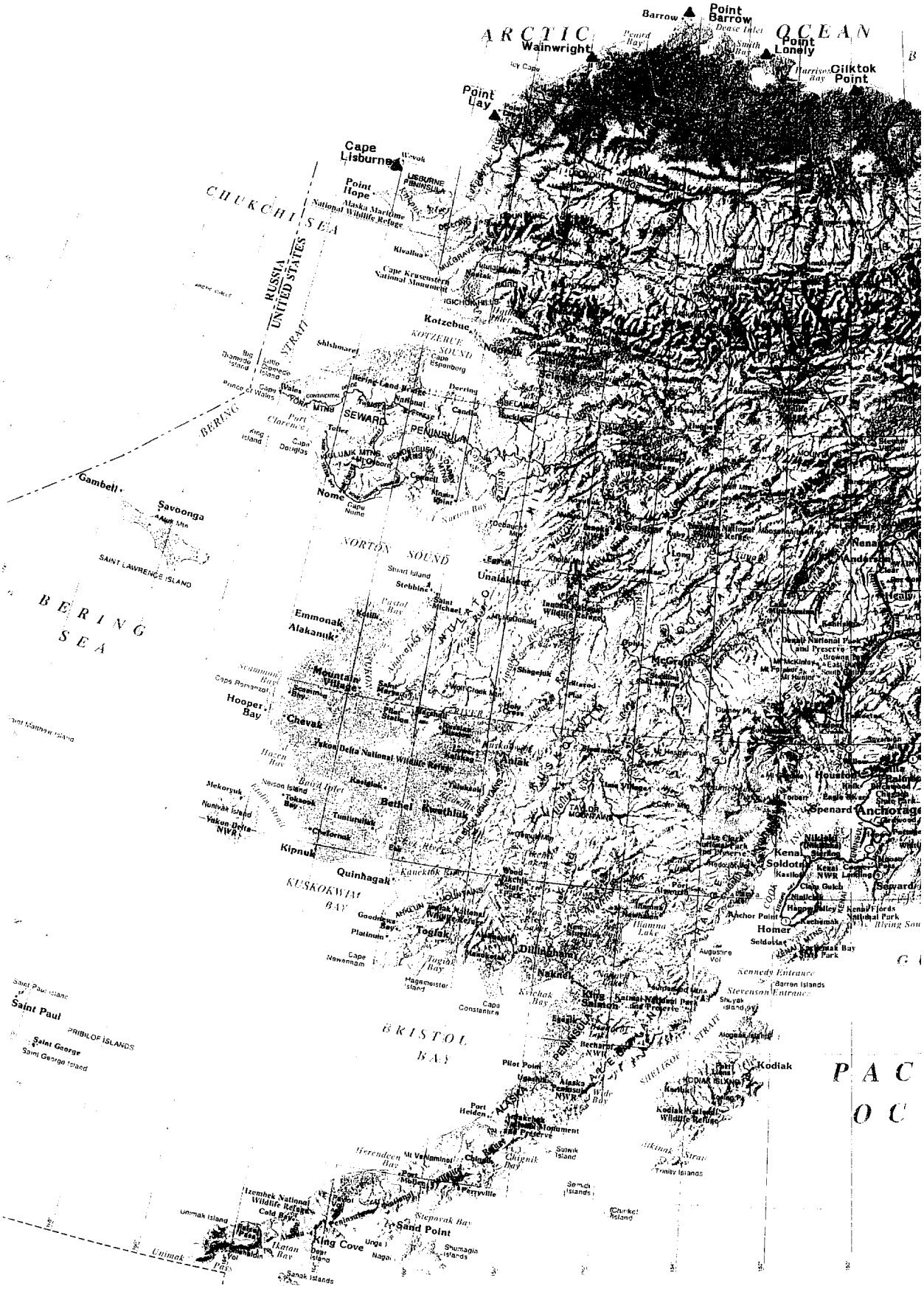
The nearest source of meteorological and air quality data is at Prudhoe Bay, 35 miles to the west. Because of similarity in elevation and proximity to the Beaufort Sea, conditions at Prudhoe Bay should approximate those at the Bullen Point installation. Average daily low temperatures in July and January at Prudhoe Bay are 27°F and -31°F, respectively. Between 1970 and 1977, the lowest temperature recorded was -56°F.

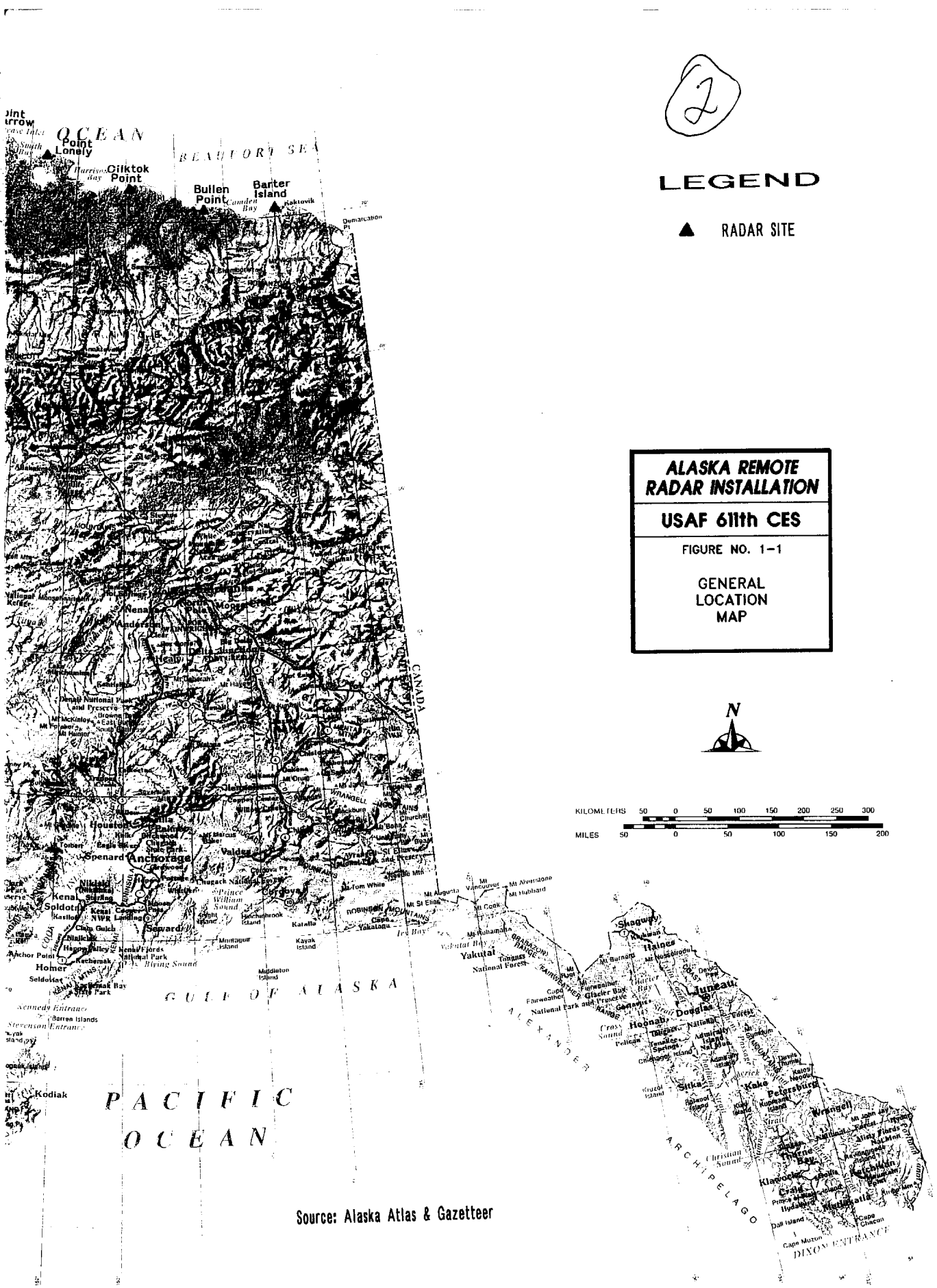
Annual precipitation averages 5 to 11 inches per year, including snowfall. Snowfall is about 25 inches per year. Average April wind-packed snow depth is 16 inches. Total cloud cover occurs 54 percent of the year and fog may be expected 115 days per year (U.S. Fish and Wildlife Service 1982).

Strong wintertime westerly winds are common. They often occur with snowstorms and drifting snow. Equivalent chill temperatures are below -40°F on over half the days in January, February, and March. In the summer, the cold air mass associated with the Arctic Ocean rides over the Arctic Coastal Plain, creating temperature inversions with cold air below and warmer air above. Such inversions break up when winds from the south or west bring warmer air into the coastal areas (Hart Crowser 1987).

Air quality data have not been collected at the Bullen Point facility, but ambient conditions are expected to be better than at Prudhoe Bay. Pollutant concentrations at Prudhoe Bay are well below national standards.

(1)


ARCTIC OCEAN
Barrow
Point Barrow
Wainwright
Point Lonely
Cilktok Point
Point Lay
Cape Lisburne
Point Hope
CHUKCHI SEA
RUSSIA
UNITED STATES
Kotzebue
Nome
Gambell
Savoonga
SAINT LAWRENCE ISLAND
BERING SEA
NORTON SOUND
Unalakleet
Emmonak
Alakanuk
Mountain Village
Hooper Bay
Chevak
Yukon Delta National Wildlife Refuge
Bethel
Kwethluk
Kipnuk
Quinhagak
KUSKOKWIM BAY
Togiak
Dillingham
Naknek
King Salmon
Saint Paul
Saint George
PRIBILOF ISLANDS
BRISTOL BAY
Pilot Point
Kodiak
Port Heiden
Chignik
Perryville
Sand Point
King Cove
Unimak Island
Cold Bay
Unimak Pass
Anchorage
Spenard
Kenai
Soldotna
Homer
Seward
Houston
Palmer
Wasilla
Chugach State Park
Kenai Fjords National Park
Anchor Point
Seldovia
Kachemak Bay State Park
Kennedy Entrance
Barren Islands
Shuyak Island
Afognak Island
KODIAK ISLAND
Kodiak National Wildlife Refuge
Trinity Islands
Semidi Islands
Shumagin Islands
Sanak Islands
Denali National Park and Preserve
Lake Clark National Park and Preserve
Katmai National Park and Preserve
Aniakchak National Monument and Preserve
Alaska Peninsula NWR
Becharof NWR
Izembek National Wildlife Refuge
Togiak NWR
Yukon Delta NWR
Kenai NWR
Alaska Maritime National Wildlife Refuge
Cape Krusenstern National Monument
Bering Land Bridge National Preserve
SEWARD PENINSULA
KOTZEBUE SOUND
NORTON SOUND
KUSKOKWIM MOUNTAINS
TAYLOR MOUNTAINS
ALASKA RANGE
CHUGACH MTNS
KENAI MTNS
WRANGELL MTNS
BROOKS RANGE
DE LONG MTNS
ANGAYUCHAM MTNS
KOYUKUK RIVER
YUKON RIVER
KUSKOKWIM RIVER
ANDREAFSKY RIVER
KOBUK RIVER
NOATAK RIVER
KILLIK RIVER
COLVILLE RIVER
SAGAVANIRKTOK RIVER
ALASKA
YUKON TERRITORY
Barrow
Point Barrow
Wainwright
Point Lonely
Cilktok Point
Point Lay
Cape Lisburne
Point Hope
Kotzebue
Nome
Gambell
Savoonga
Unalakleet
Emmonak
Alakanuk
Mountain Village
Hooper Bay
Chevak
Bethel
Kwethluk
Kipnuk
Quinhagak
Togiak
Dillingham
Naknek
King Salmon
Saint Paul
Saint George
Pilot Point
Kodiak
Port Heiden
Chignik
Perryville
Sand Point
King Cove
Unimak Island
Cold Bay
Anchorage
Spenard
Kenai
Soldotna
Homer
Seward
Houston
Palmer
Wasilla
Chugach State Park
Kenai Fjords National Park
Anchor Point
Seldovia
Kachemak Bay State Park
Kennedy Entrance
Barren Islands
Shuyak Island
Afognak Island
KODIAK ISLAND
Trinity Islands
Semidi Islands
Shumagin Islands
Sanak Islands
Denali National Park and Preserve
Lake Clark National Park and Preserve
Katmai National Park and Preserve
Aniakchak National Monument and Preserve
Alaska Peninsula NWR
Becharof NWR
Izembek National Wildlife Refuge
Togiak NWR
Yukon Delta NWR
Kenai NWR
Alaska Maritime National Wildlife Refuge
Cape Krusenstern National Monument
Bering Land Bridge National Preserve
SEWARD PENINSULA
KOTZEBUE SOUND
NORTON SOUND
KUSKOKWIM MOUNTAINS
TAYLOR MOUNTAINS
ALASKA RANGE
CHUGACH MTNS
KENAI MTNS
WRANGELL MTNS
BROOKS RANGE
DE LONG MTNS
ANGAYUCHAM MTNS
KOYUKUK RIVER
YUKON RIVER
KUSKOKWIM RIVER
ANDREAFSKY RIVER
KOBUK RIVER
NOATAK RIVER
KILLIK RIVER
COLVILLE RIVER
SAGAVANIRKTOK RIVER
ALASKA
YUKON TERRITORY



2

LEGEND

▲ RADAR SITE

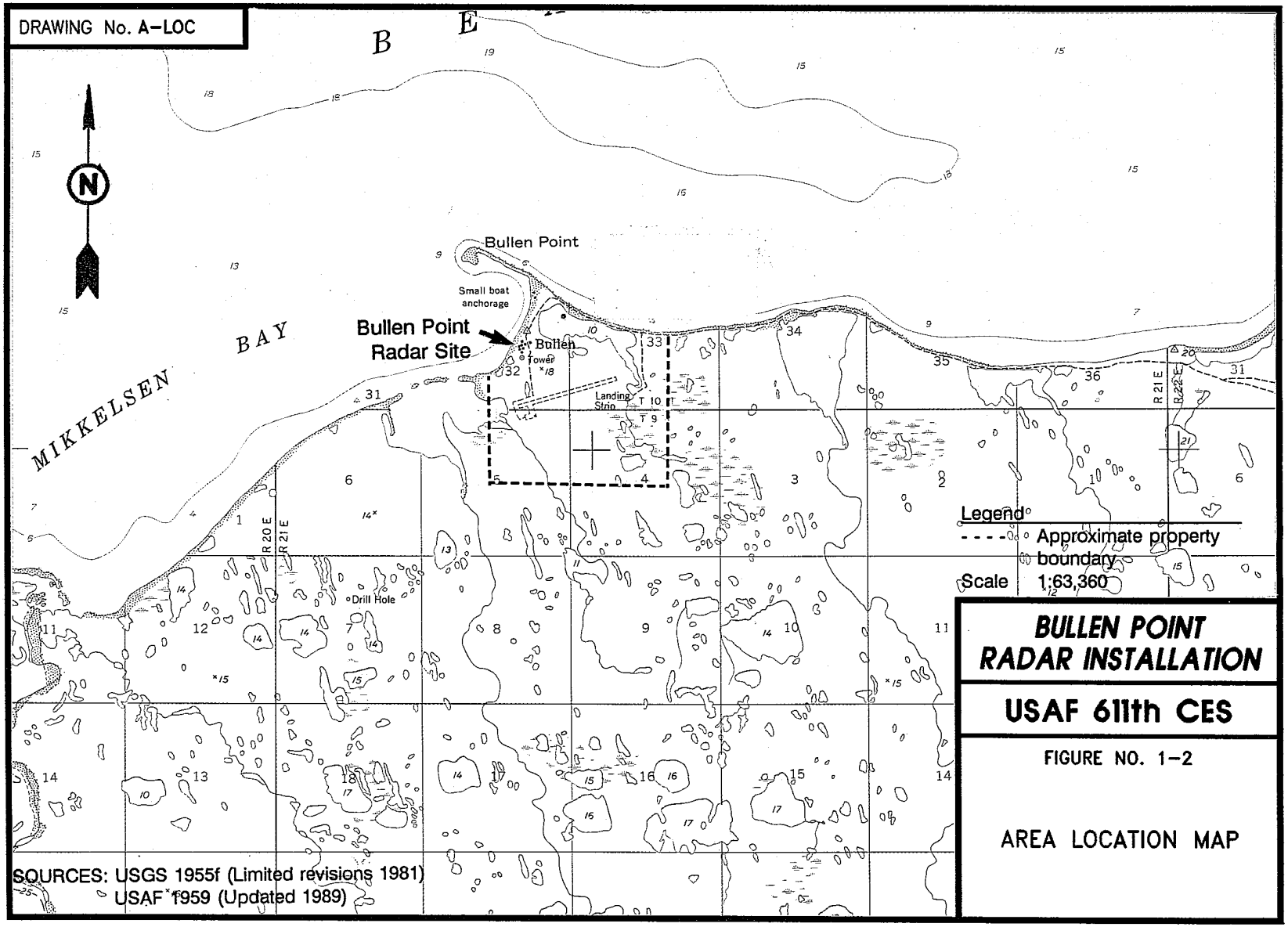
ALASKA REMOTE RADAR INSTALLATION

USAF 611th CES

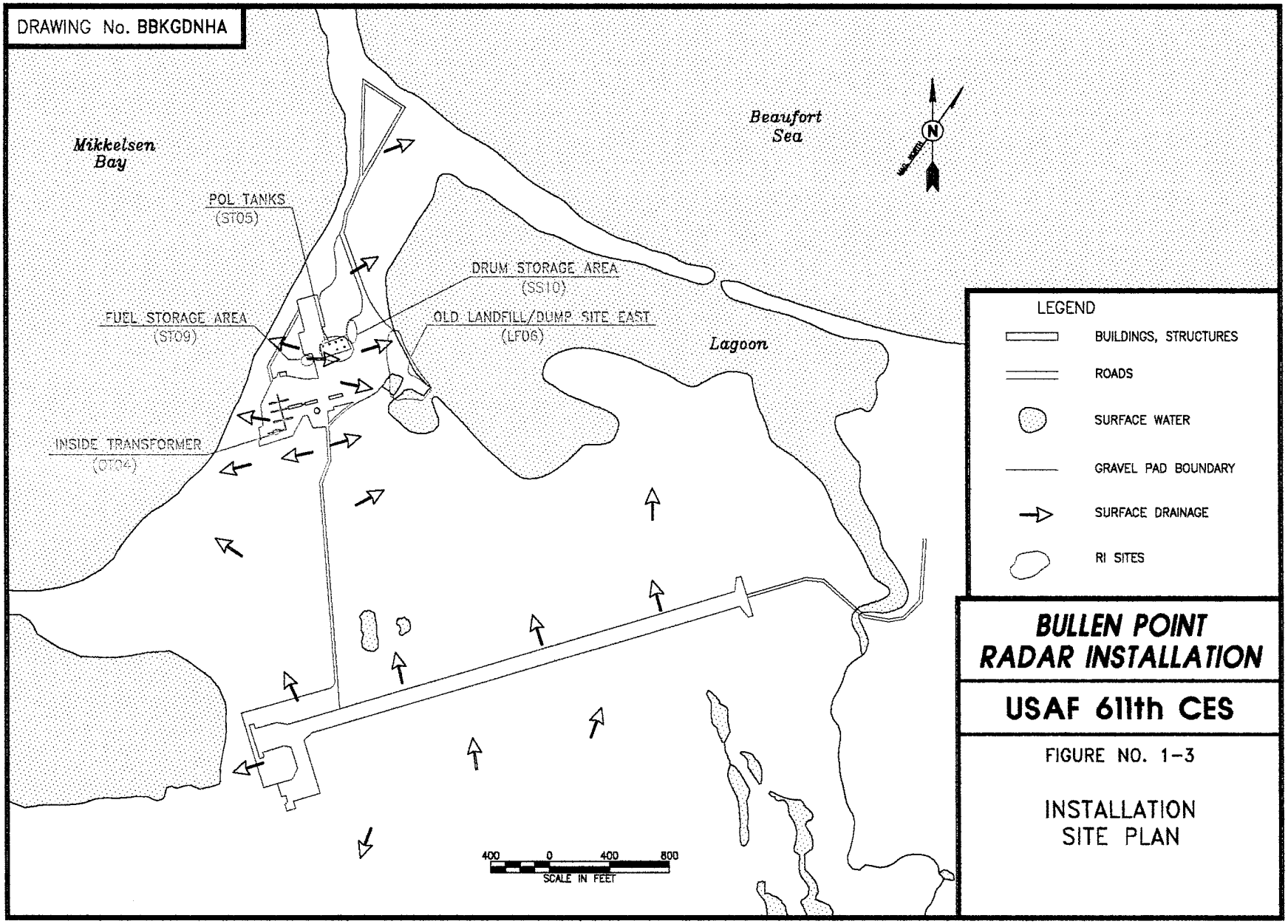
FIGURE NO. 1-1

GENERAL LOCATION MAP

Source: Alaska Atlas & Gazetteer


DRAWING No. A-LOC
B E
BAY
MIKKELSEN
Bullen Point
Small boat anchorage
Bullen Point Radar Site
Bullen Tower
Landing Strip
T 10
T 9
R 20 E
R 21 E
R 22 E
Drill Hole
Legend
Approximate property boundary
Scale 1:63,360
SOURCES: USGS 1955f (Limited revisions 1981)
USAF 1959 (Updated 1989)
BULLEN POINT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 1-2
AREA LOCATION MAP

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DRAWING No. BBKGDNHA
Mikkelsen Bay
Beaufort Sea
N
POL TANKS
(ST05)
DRUM STORAGE AREA
(SS10)
FUEL STORAGE AREA
(ST09)
OLD LANDFILL/DUMP SITE EAST
(LF06)
Lagoon
INSIDE TRANSFORMER
(ST04)
400 0 400 800
SCALE IN FEET
LEGEND
BUILDINGS, STRUCTURES
ROADS
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
RI SITES
BULLEN POINT
RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 1-3
INSTALLATION
SITE PLAN

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1.2.3 Geology

This section presents information on the regional and local geology of the Bullen Point area.

1.2.3.1 Regional Geology. Geologic units of all the principal time-stratigraphic systems from Precambrian to Quaternary are represented in Alaska. For the last two or three million years, frost climates have prevailed in Alaska, and the geomorphic processes have been either periglacial or glacial (Wahrhaftig 1965). Although glacial activity was extensive, it was by no means all-encompassing. Glaciation is evident in many parts of the state including the Pacific Mountain System, Arctic Mountains, Ahklun Mountains, and southern Seaward Peninsula. Some great expanses, however, had no glacial activity. The principal areas not glaciated include the Intermountain Plateaus, Arctic Foothills, and Arctic Coastal Plain. Many periglacial features such as polygonal ground, sorted circles, pingos, and ice wedges can be observed on the Arctic Coastal Plain. Figure 1-4 depicts the extent of Alaska's glacial areas.

Alaska's generally cold climate regime has produced permafrost, a combination of geologic, hydrologic, and meteorologic characteristics that produces permanently frozen ground. Permafrost occurs in both unconsolidated sediments and bedrock; its distribution includes most of the state with the notable exception of the Pacific coastal area. Permafrost is continuous on the Arctic Coastal Plain and has a significant impact on the flow of ground and surface water. The distribution of Alaska's permafrost areas is shown on Figure 1-5. Permafrost is discussed in detail in Section 1.2.4.1.

The very strong geologic processes at work in Alaska have produced a unique environmental setting reflected in the general geology of the Arctic Region (Figure 1-6). A popular theory of the formation of the Arctic Region is that it was once an ocean basin adjacent to the Canadian Shield. Rifting of the Canadian Shield occurred during Mesozoic time, and the Arctic Region drifted southwest forming the Colville Basin to the south and the Arctic Ocean to the north. At the same time, the Brooks Range orogeny began creating a source for the newly-created Colville Basin. Continued uplift of the Brooks Range produced a prograding delta that filled in the Colville Basin.

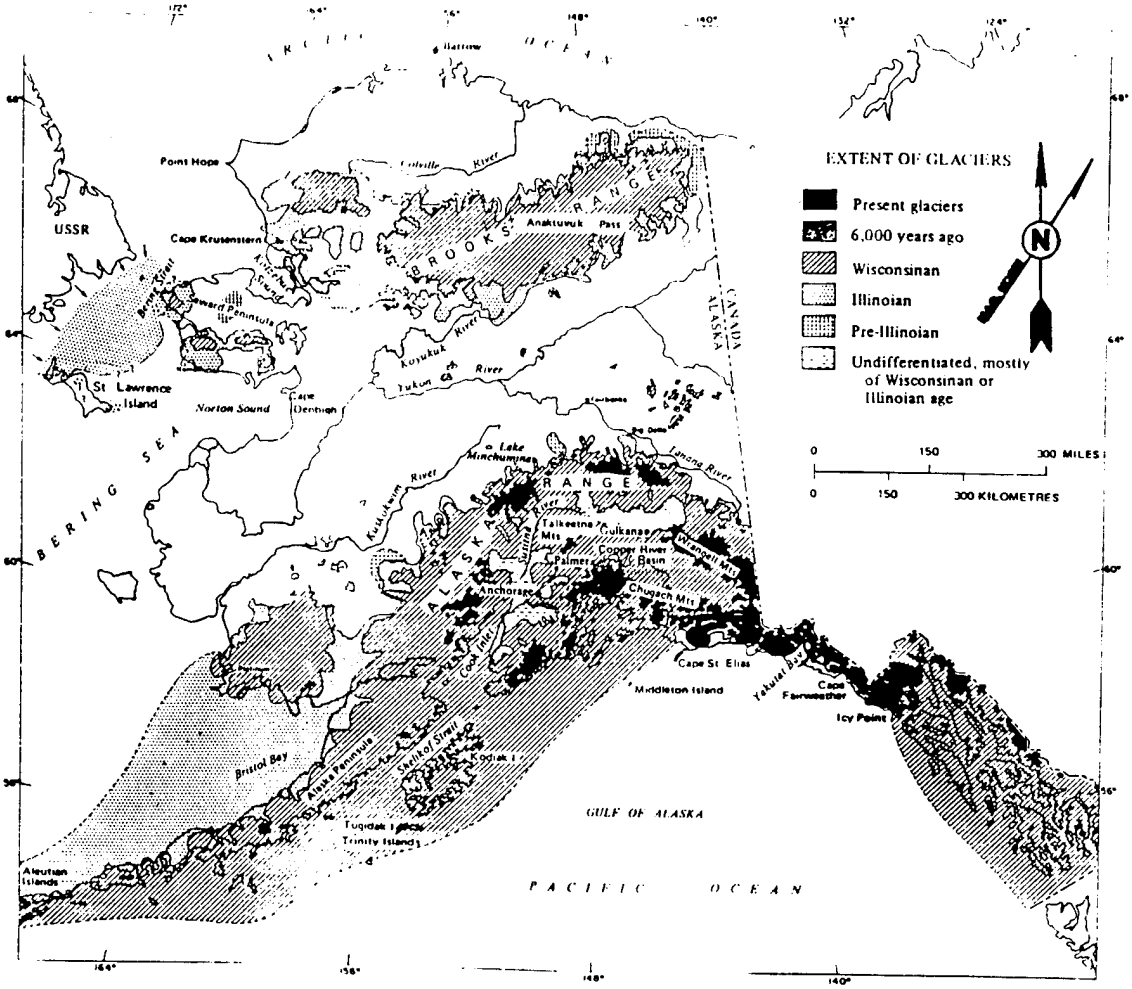
1.2.3.2 Local Geology. The Bullen Point installation is located on a low coastal area approximately 10 to 18 feet AMSL. The installation contains a wide variety of terrain, including shallow lagoons, numerous and varied stages of thaw lakes, intermediate zones of polygonal ground, and upland areas of relatively flat tundra mat. A chain of barrier islands is located offshore.

Surficial deposits in the area consist of sand and gravel near the shoreline and along stream channels; silt, sand, and gravel deposits in the inland low areas; and eolian silt and fine sand deposits in the upland areas. Permafrost was encountered at approximately two to four feet during August and September 1993.

Oil, a major natural resource, is present in the region. Numerous oil wells have been drilled offshore on some of the barrier islands, but none have been drilled in the immediate vicinity of the installation.

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DRAWING No. LIS1-4



SOURCE: Pewe 1975

ALASKA REMOTE RADAR INSTALLATIONS

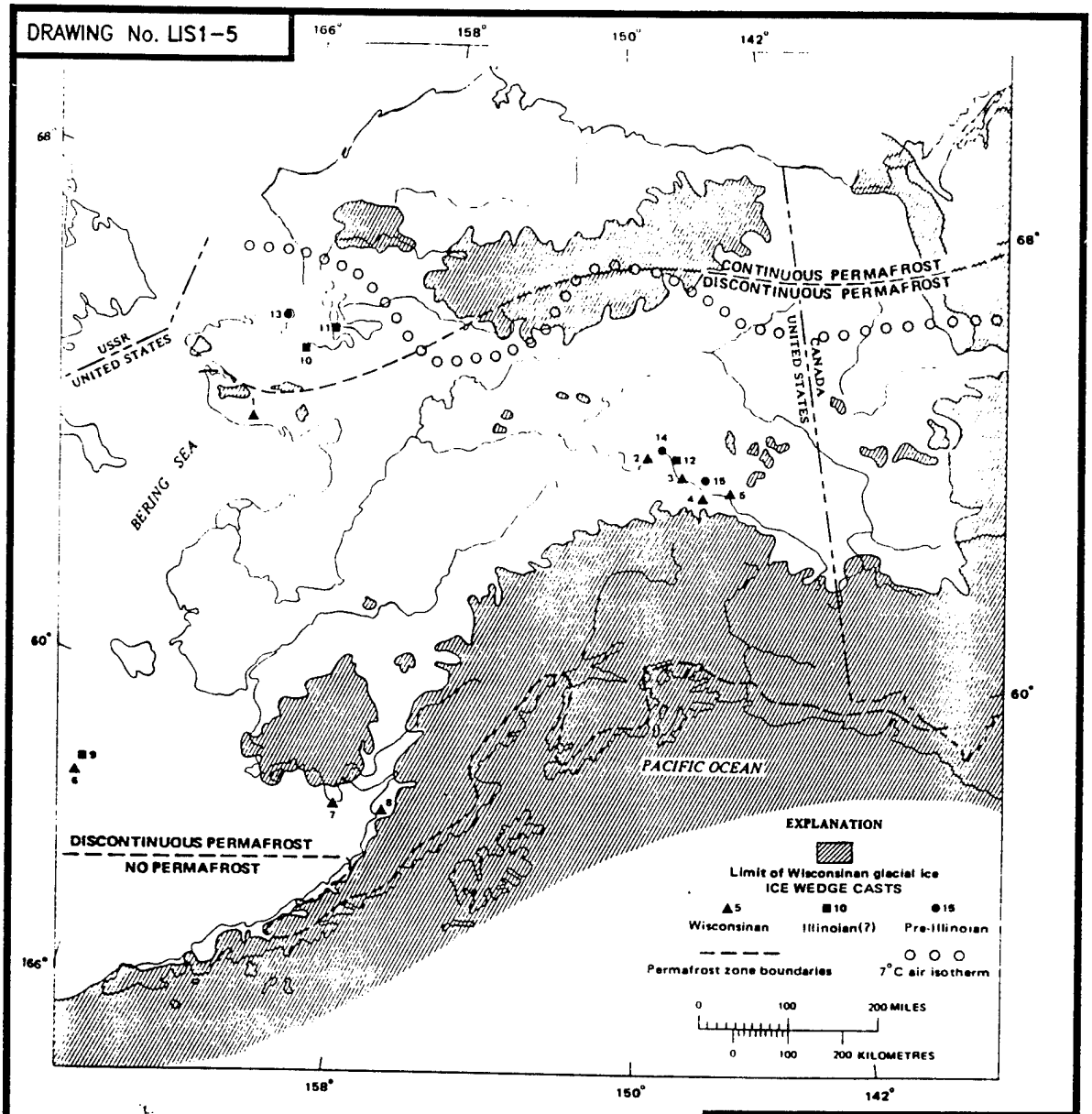
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FIGURE NO. 1-4

QUATERNARY GLACIATION IN ALASKA

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DRAWING No. LIS1-5



SOURCE: Pewe 1975

ALASKA REMOTE RADAR INSTALLATIONS

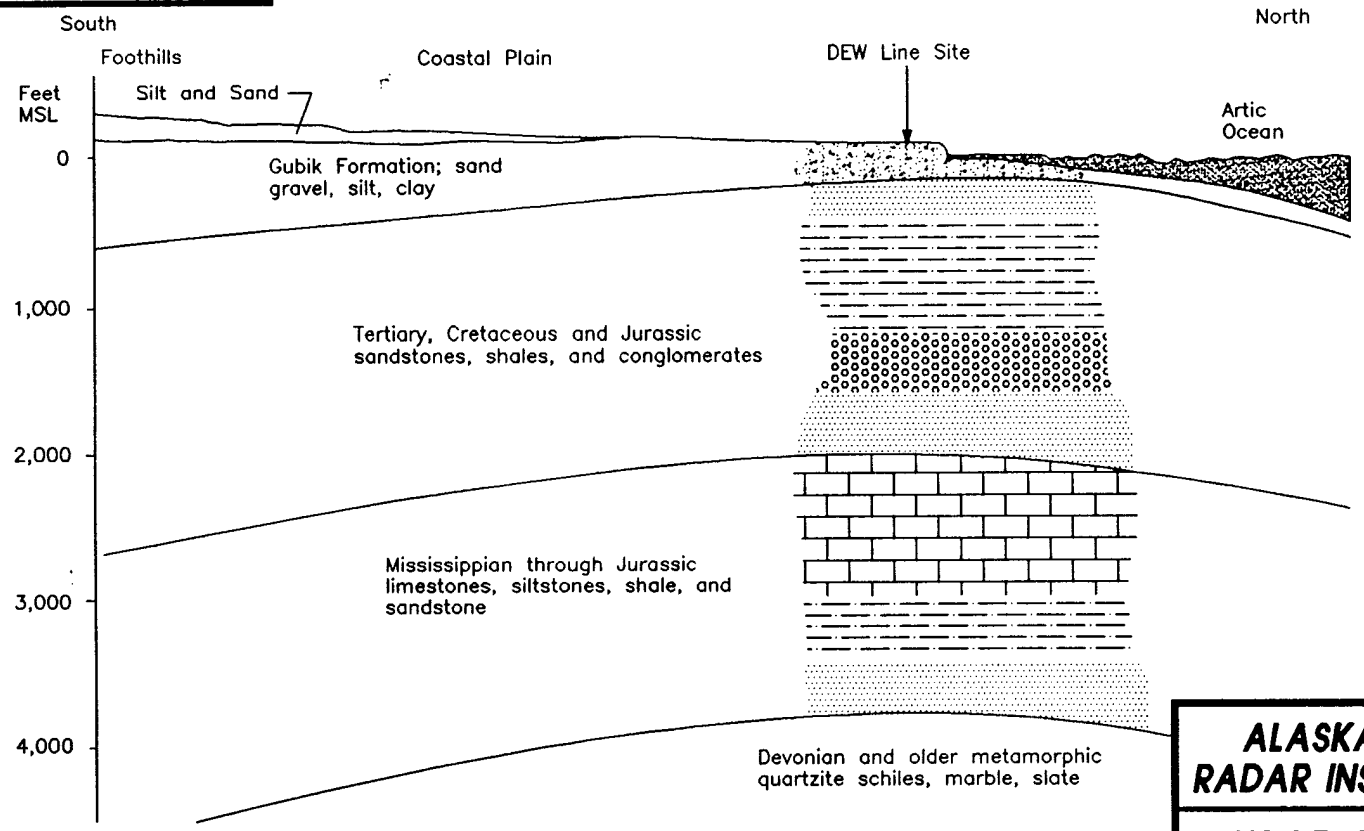
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FIGURE NO. 1-5

PERMAFROST MAP

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DRAWING No. LAY1-6



SOURCE: CH2M HILL 1981

Not to Scale

ALASKA REMOTE RADAR INSTALLATIONS

USAF 611th CES

FIGURE NO. 1-6

GENERALIZED NORTH-SOUTH GEOLOGIC CROSS SECTION

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The only known faults and seismic activity documented on the North Slope are approximately 70 miles east and approximately 60 to 80 miles south of the Bullen point installation.

1.2.4 Hydrology

Ground water/permafrost and surface water are discussed in the following sections.

1.2.4.1 Ground Water/Permafrost. Permafrost has a profound influence on Alaska's ground water resources. Permafrost is defined by the *Glossary of Geology* (American Geological Institute 1972) as:

- Any soil, subsoil, or other surficial deposit, or even bedrock, occurring in arctic or subarctic regions at a variable depth beneath the earth's surface in which a temperature below freezing has existed continuously for a long time (from two years to thousands of years). This definition is based exclusively on temperature and disregards the texture, degree of compaction, water content, and lithologic character of the material.

Permafrost has a major impact on the relationship between surface water and ground water in cold regions such as Alaska. Although ground water in permafrost regions follows the same geologic and hydrologic principles as in temperate areas, the hydrologic regime is modified in the following ways:

- Permafrost acts as an impermeable barrier to the movement of ground water because pore spaces are ice-filled in the zone of saturation. Recharge and discharge are, therefore, limited to unfrozen channels penetrating the permafrost zone. The unfrozen channels are termed perforating taliks. Permafrost restricts the downward percolation of water and increases runoff, enhancing the creation of lakes and swamps (Feulner et al. 1971).

- Permafrost zones tend to reduce evapotranspiration. The generally low ground temperatures tend to reduce direct evaporation and transpiration (the escape of moisture through plant tissue into the air). Vegetation growth is enhanced near large surface water bodies where permafrost usually occurs at greater depth.

- Permafrost restricts an aquifer's storage capacity and the number of locations from which ground water may be withdrawn. Subpermafrost ground water occurs beneath the permafrost zone and is usually dependable. Suprapermafrost water occurs in the active zone, above the permafrost table, and tends to be seasonal; it freezes during the cold winter months.

- The ground water temperature varies from 32 to 40.1°F in permafrost regions because of the low ground temperatures (Williams 1970). Water tends to be more viscous in this temperature range and, therefore, moves slower than in temperate regions.

Low ground temperatures create the necessary environment for permafrost to form. The segment above the permafrost table is called the active zone, because it freezes and thaws with seasonal weather changes. The permafrost zone remains frozen year-round. The active zone is significant because suprapermafrost active zone water exists within it.

Ground water has been found in aquifers beneath the continuous permafrost, but little is known of these aquifer systems. Shallow ground water sources are also present in river gravel and in thaw bulbs beneath deep lakes. Active zone water is found during the summer months when this layer thaws, but the layer is relatively thin. The thickness of the active zone at Bullen Point ranged from one to six feet during the 1993 RI.

Surface features may have dramatic impacts on the subsurface distribution of permafrost because they influence heat transfer. Heat flow through surface water is greater than through land. Permafrost may be discontinuous or present at greater depth under and near large bodies of water such as rivers or deep lakes. Smaller bodies of water may affect the configuration of the permafrost surface or the total thickness of the permafrost at any given point. Figure 1-7 is a generalized representation of the relationship of surface features to the underlying permafrost.

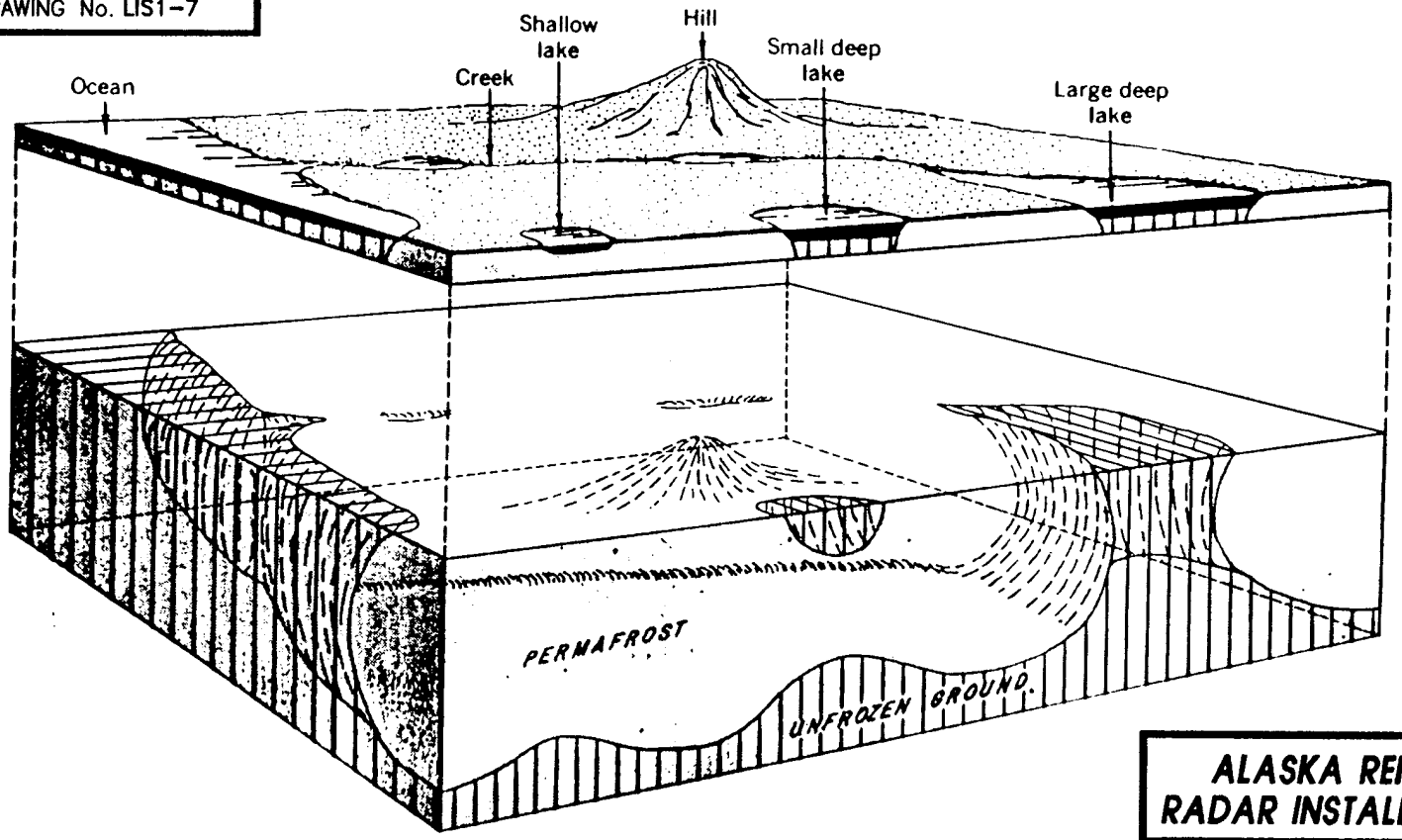
1.2.4.2 Surface Water. The surface water conditions at the installation are similar to other arctic coastal areas and include lagoons along the Beaufort coast, thaw lakes, and shallow streams. The drainage is generally to the north. Surface drainage occurs as sheetflow and ephemeral streams and may drain into larger streams or directly to the ocean. A partially-captured thaw lake forms a brackish-water lagoon to the east of the installation. This lagoon is shallow and freezes solid in winter. Several small, slow-moving streams drain the abundant thaw lakes and polygonal ground near the facility. The lakes in the vicinity of the Bullen Point installation are generally less than 10 feet deep. The surface water drainage features in the vicinity of the installation are shown on Figure 1-8.

The installation is located in an area where large freshwater lakes were the only source of drinking water. Drinking water for the Bullen Point installation was provided by a reservoir southwest of the main facility structures that was formed by damming a stream. Since operations ceased, the dam has been breached and the reservoir drained.

1.2.5 Industrial Activities

Primary industrial activities at the installation include operation and maintenance of the radar system. The Bullen Point radar installation was built to support the air defense system in Alaska. The installation became operational in 1953 when communications were provided by high frequency radio. The original equipment still remains but was replaced with a new Short Range Radar system, which is currently operational. The installation is unmanned except for periodic maintenance of the active radar system.

DRAWING No. LIS1-7



SOURCE: Selkregg 1975

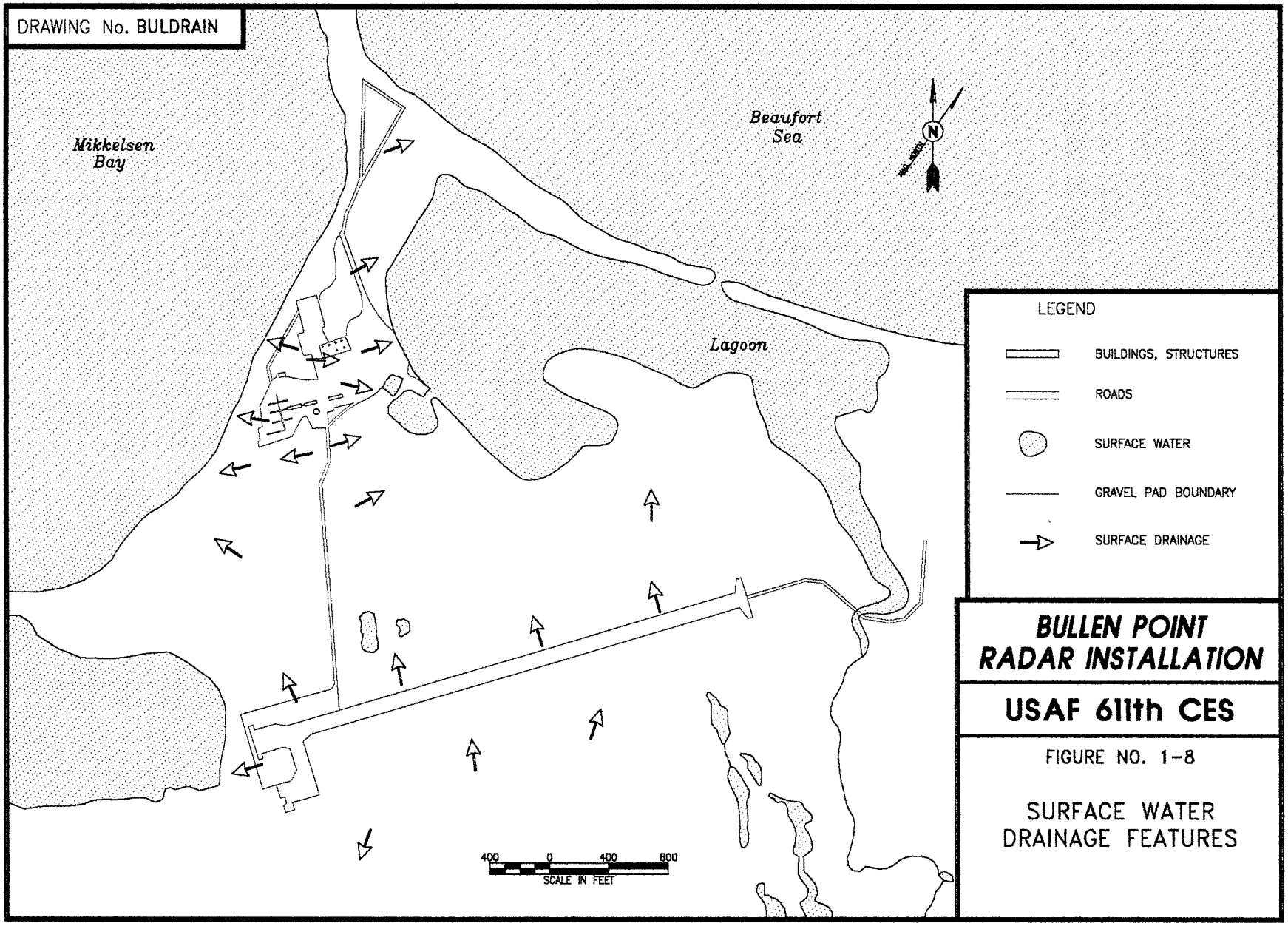
ALASKA REMOTE RADAR INSTALLATIONS

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FIGURE NO. 1-7

SURFACE FEATURE IMPACTS ON PERMAFROST DISTRIBUTION

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DRAWING No. BULDRAIN
Mikkelsen Bay
Beaufort Sea
Lagoon
N
LEGEND
BUILDINGS, STRUCTURES
ROADS
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
400 0 400 800
SCALE IN FEET
BULLEN POINT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 1-8
SURFACE WATER DRAINAGE FEATURES

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Presently, the installation consists of an active Short Range Radar tower, a technical services building, and a warehouse and an inactive module train, rotating radar, and support facilities. The inactive module train housed the electronics equipment work areas and the radar tower, personnel quarters, administration offices, a mechanical room with emergency boiler and fuel storage, and a personnel support module with water storage, showers, and toilets.

1.2.6 Biology

This section presents information on the regional fauna and flora of the Bullen Point area.

1.2.6.1 Vegetation. There are three major vegetation habitats at the Bullen Point installation. These include the wet sedge meadow, flooded tundra and associated wetlands, and marine zone vegetation associated with beaches and the terrestrial/marine interface. Plants dominating the wet sedge meadow include sedge, *Carex aquatilis*; moss, *Scorpidium scorpioides*; and pendent grass, *Arctophila fulva* in standing water, with cottongrass, *Eriophorum angustifolium*, and another moss, *Drepanocladus lycopodioides*, more common as drainage improves. Marine zone vegetation includes the sedge, *Carex subspathacea*, and alkali grass, *Puccinellia phyrganodes*, adjacent to the beaches and the spit north of the installation (Hart Crowser 1987).

1.2.6.2 Fish. Fish common to western Beaufort Sea nearshore habitats include four-horn sculpin, *Myoxocephalus quadricornis*; arctic cisco, *Coregonus autumnalis*; and arctic char, *Salvelinus alpinus*. Nine-spined stickleback, *Pungitius pungitius*, are found in fresh and brackish water habitats along the arctic coast (Hart Crowser 1987). Streams adjacent to the installation appear to have good spawning habitats (ASTS 1982).

1.2.6.3 Birds. Eighty-five species of birds, predominantly waterfowl and shorebirds, may be found in the vicinity of the Bullen Point installation. Species likely to occur include arctic loon, *Gavia arctica*; mallard, *Anas platyrhynchos*; eiders, *Somateria* spp.; oldsquaw, *Clangula hyemalis*; American golden and black-bellied plovers, *Pluvialis* spp.; long-billed dowitcher, *Limnodromus scolopaceus*; ruddy turnstone, *Arenaria interpres*; pectoral sandpiper, *Calidris melanotos*; dunlin, *C. alpina*; red and northern phalaropes, *Phalaropus* spp.; parasitic jaeger, *Stercorarius* spp.; arctic tern, *Sterna paradisaea*; and glaucous gull, *Larus hyperboreus* (Hart Crowser 1987).

1.2.6.4 Mammals. Marine mammals that have been reported near the Bullen Point installation include beluga, *Delphinapterus leucas*; bowhead whale, *Balaenoptera mysticetus*; walrus, *Odobenus rosmarus*; polar bear, *Ursus maritimus*; ringed seal, *Phoca hispida*; and bearded seals, *Erignathus barbatus* (ASTS 1982). Excellent caribou, *Rangifer tarandus*, summer range is adjacent and south of the installation. Least weasel, *Mustela nivalis*; short-tailed weasel, *M. erminea*; red fox, *Vulpes vulpes*; arctic fox, *Alopex lagopus*; and arctic ground squirrel, *Spermophilus parryii*, occur seasonally in the area (ADF&G 1978). The Canning Delta muskox herd, *Ovibos moschatus*, uses the tundra adjacent to the installation and moose, *Alces alces*; grizzly bear, *Ursus arctos*; wolverine, *Gulo luscus*; and gray wolf, *Canis lupus*, are also found in the vicinity of Bullen Point.

1.2.6.5 Endangered Species. Threatened and endangered species which may occur in the vicinity of the Bullen Point installation include the spectacled eider, *Somateria fischeri*, listed as threatened (Alaska Biological Research 1994), and bowhead whale, a federally listed endangered species. Bowhead whales pass the installation about 20 miles offshore during their westward fall migration.

1.2.7 Demographics

The Bullen Point installation is presently unmanned except for occasional visits by maintenance workers. No villages are located near the station. Transportation to the installation is limited to aircraft, seasonal barges, and extremely limited land travel. No roads connect to the facility.

1.2.7.1 Cultural Resources. A 1981 cultural resources survey of the Bullen Point installation vicinity revealed one archeological site, located north of the Petroleum, Oil, and Lubricants (POL) Tanks, consisting of a wooden, semi-subterranean, sod-roofed structure. Most of the other cultural resources in the area represent Traditional Land Use sites and are summarized in Table 1-1. None of these sites has been evaluated for listing in the National Register of Historic Places.

TABLE 1-1. KNOWN CULTURAL RESOURCE SITES IN THE VICINITY OF BULLEN POINT RADAR INSTALLATION[a]

SITE NAME	TLUI # / AHRS #	DESCRIPTION	LOCATION
Sauagvik	MB-41, 117 / --	Ruins, bones, sod houses, fishing.	In the immediate vicinity of Bullen Point.
--	--	No number or description (Nielsen 1977); may have been removed by POW-3 site construction.	About 1.8 miles southwest of Bullen Point.
Ikpigauraq	MB-42 / --	Three sod houses.	About 2.5 miles east of Bullen Point.
	-- / XFI-001	Eskimo camp shown on a 1902 manuscript by S.J. Marsh.	In the immediate vicinity of Bullen Point.

[a] Data from Nielson (1977); NSB (1980).
TLUI = Traditional Land Use Inventory.
AHRS = Alaska Heritage Resource Survey.

Source: Hart Crowser 1987

The locality of Bullen Point was shown on a 1902 manuscript map by S.J. Marsh as an Eskimo campsite. The installation is within the subsistence use area of the villages of Nuiqsut and Kaktovik. Subsistence animals in the area include seal, caribou, whale, fish, wildfowl, and furbearers.

1.2.7.2 Recreation. Little recreational activity takes place in the area around the installation because of its isolation, location, and the extreme climatic conditions of the area. Access to the area is limited, and no facilities or accommodations are available locally. Occasionally sportsmen fly from the Prudhoe Bay area to the Bullen Point installation for char fishing in Mikkelsen Bay.

1.3 SITE INVENTORY

This section presents information on the IRP sites at the Bullen Point radar installation. It includes summaries of previous IRP activities and remedial actions that have been conducted at the installation.

1.3.1 Sites at Bullen Point

Five sites at the Bullen Point radar installation were investigated during the 1993 RI activities. Three sites were determined to be of concern based on previous IRP sampling data. Additionally, there were two sites identified for investigation based on previous IRP activities and the 1993 RI activities. The three sites previously sampled are the Inside Transformer (OT04), POL Tanks (ST05), and Old Landfill/Dump Site East (LF06). Previous IRP sampling at these areas determined that contaminants were present. Additional sites were identified based on previous IRP activities and the 1993 RI activities as listed: literature search, pre-survey and reconnaissance trips, communication with personnel from Alaska Department of Environmental Conservation (ADEC), and information on disposal practices at DEW Line stations. The additional sites include the Fuel Storage Area (ST09) and the Drum Storage Area (SS10). Prior to this RI/FS, no sampling had been conducted at these two sites.

It should be noted that none of the five sites is on, or is proposed to be included on, the national priority list (NPL) of Superfund sites.

1.3.2 Previous IRP Activities

An Air Force contractor conducted Phase I Installation Assessment/Records Search activities at the Bullen Point radar installation and six other DEW Line stations in 1980 and 1981 (CH2M Hill 1981). Phase I activities included a detailed review of pertinent installation records from both government and civilian contractors, contacts with various government and private agencies for documents relevant to the program, and onsite visits during July and August 1981. The onsite visits included interviews with key station employees, ground tours of station facilities, and plane overflights to identify past disposal and possible contaminated areas.

Stages 1 and 2 of the Phase II Confirmation/Quantification activities were conducted in 1986 (Dames and Moore 1986, 1987). Phase II, Stage 1 activities involved field investigations of specific sites that were identified in the Phase I Installation Assessment/Records Search activities. A surface water sample was collected at the Bullen Point installation.

A Technical Operations Plan for the Phase II, Stage 2 work was prepared in August. Phase II, Stage 2 activities involved field investigation of one site, including additional soil sampling based on findings from the Phase II, Stage 1 field investigation. Onsite observations and analytical results were recorded in the Phase II, Stage 2 Draft Report (Dames and Moore 1987).

By 1988, the Air Force had replaced the phased approach with an approach more similar to the RI/FS activities of EPA. RI/FS Stage 3 activities and a Final Work Plan were completed for the Bullen Point installation in June 1988 (Woodward-Clyde 1988). The Stage 3 Final Work Plan called for subsurface soil investigations, surface water and sediment sampling, possible removal actions, hydrologic assessment, a demographic survey, an endangerment assessment (health risk assessment), and an FS for the remedial alternatives. The Stage 3 Final Report of September 1990 summarized the results of the RI and supported a no further action decision (Woodward-Clyde 1990).

The Air Force's IRP Decision Document for Bullen Point of October 1990 concluded that no further action was needed at the Bullen Point RI/FS sites. However, correspondence from ADEC personnel to Air Force personnel in November 1991 disagreed with the no further action conclusion, and stated that further investigation was needed and corrective action appeared necessary because of improper waste disposal practices and other issues.

In January 1992, an Environmental Assessment was prepared for a proposed prototype Short Range Radar station at the Bullen Point DEW Line station and concluded that sociocultural and air quality impacts would be insignificant (Hart Crowser 1987).

Although not an IRP activity, an Air Force contractor conducted a hydrocarbon screening soil sampling program at the Bullen Point installation in preparation for construction activities associated with proposed radar stations (ENSR 1992). A total of 520 screening samples and 65 samples for laboratory analysis were collected from 2 areas at the Bullen Point installation. Petroleum products were detected in soil samples in these areas; complete results are described in the report. A letter indicated that petroleum contamination was discovered during SRR construction activities in 1992 (Matrix Construction 1992). Construction of the SRR systems was initiated in 1992 and was completed in 1994.

1.3.3 Previous Remedial Actions

Following the RI/FS Stage 3 activities (Woodward-Clyde 1988) the Air Force conducted a general cleanup at the installation. Drums, debris, wastes, transformers, and floor tiles contaminated with transformer fluid were removed from the installation.

2.0 PROJECT ACTIVITIES

This section of the report describes the project objectives and scope, the RI field program and methodology, the analytical programs, background sampling, and analytical results. In addition, data evaluation, risk estimate methodologies, potential migration pathways, and receptors are presented.

2.1 PROJECT OBJECTIVES AND SCOPE

The objectives of the Bullen Point DEW Line radar installation RI/FS are to confirm the presence or absence of chemical contamination in the environment at the installation; define the extent and magnitude of confirmed chemical releases; gather adequate data to determine the magnitude of potential risks to human health and the environment; and gather adequate data to identify and select the appropriate remedial actions for sites where apparent risks exceed acceptable limits or contamination exceeds regulatory guidelines. The project objectives include the following goals:

- Define the horizontal and vertical extent of soil contamination and the range of contaminant concentration;
- Determine the physical and chemical properties of soil contaminants to describe contaminant toxicity and mobility;
- Define the extent of surface and active zone water contamination and the range of contaminant concentrations;
- Describe real and potential surface and subsurface contaminant migration pathways in terms of movement of dissolved and suspended contaminants through the active zone above permafrost, and movement of dissolved and suspended contaminants in surface water;
- Generate adequate valid data to support development of a baseline risk assessment that quantifies, to the extent possible, potential risks to human health and the environment posed by chemicals of concern (COCs) at the Bullen Point DEW Line installation studied under this RI; and
- Select the most feasible remedy, cleanup action, to reduce risks at sites where risks exceed acceptable limits.

2.2 RI FIELD ACTIVITIES

This section presents a summary of the field activities conducted during the RI, the organization of the RI field team, and the chronology of field work.

2.2.1 RI Field Program

The RI field program at the Bullen Point radar installation was carried out in accordance with the RI/FS Work Plan, the SAP, and the Health and Safety Plan (U.S. Air Force 1993a,b,c). These RI/FS planning documents were developed as specified in the Delivery Order No. 22 Statement of Work (Appendix C) and IRP Handbook (U.S. Air Force 1991a).

The scope of the field investigation was described in detail in the Field Sampling Plan (U.S. Air Force 1993b). The field activities included the following:

- Collecting and analyzing surface and subsurface soil samples and sediment samples from sites with potential or confirmed contamination. These samples were described and analyzed for petroleum and other chemical residues. Samples were collected using hand tools.

- Collecting and analyzing samples of surface water from potentially affected streams, surface water features such as lakes or ponds, and any apparent leachate discharge points. Samples of active layer water were collected from boreholes at areas if soils were found to be saturated and an adequate quantity of water for sample collection had entered the hole.

- Collecting and analyzing background soil, sediment, and surface water samples to characterize natural background conditions.

- Measuring relative surface elevations of sampling points and stream channels to determine surface slopes and stream gradients.

- Collecting samples of potential chemical residues and waste materials at sites where such materials were suspected and had not yet been characterized.

- Conducting real-time air monitoring using portable field instruments.

- Measuring surface distances and approximate elevations to locate sampling points relative to fixed reference points.

The RI activities described above were carried out in three phases as follows:

- Installation Pre-Survey. The pre-survey was conducted by a small group of contractor employees (four total) accompanied by Air Force representatives. The purpose of the pre-survey was to confirm the location of areas of environmental concern at the installation. Pre-survey activities were limited to visual inspection of the sites, surface distance measurements, site photography, and confirmation of the location of structures and sites as shown on installation plan maps. The information gathered from the pre-survey was combined with existing documentation to support development of the RI/FS scoping documents. The

pre-survey was completed at the Bullen Point installation on 12 May 1993 by an Air Force contractor.

- Installation Reconnaissance. The installation reconnaissance was conducted by a group of contractor employees on 28 June 1993. The purpose of the reconnaissance was to identify sampling locations for investigation during the RI. The contractor staff made detailed observations of potentially contaminated areas and performed limited intrusive activities (e.g., digging shallow holes with a shovel to determine the apparent depth of contamination at areas of soil staining). Data gathered during the installation reconnaissance provided the basis for determining the sites to be sampled, the approximate number of samples and their locations, analyses for each sample, and equipment and supply needs for the RI.

- Remedial Investigation Field Activities. The RI field activities were conducted from mid-August through early September of 1993. The RI was conducted in conjunction with RIs at seven other radar installations located throughout northern Alaska. Fifteen contractor employees were stationed in Alaska for the duration of the RI. Sampling activities at the Bullen Point radar installation included collection of surface and subsurface soil samples with hand tools (e.g., shovels, scoops, and bucket augers) and collection of surface water, sediment, and seep samples from potentially contaminated areas. The RI activities also included operation of temporary northern Alaska (Barrow, Alaska) laboratory facilities operated by a subcontractor.

2.2.2 Field Team Organization and Subcontractors

The organization of the RI field team, the responsibilities of the RI team members, and subcontractors used during RI activities are presented in Figure 2-1 (Note: all Bullen Point sampling was conducted by the "B" RI Field Sampling Team). The AFCEE restoration team chiefs that managed and conducted oversight of the RI field activities included Mr. Marty Faile, Mr. Mike McGhee, and Mr. Samer Karmi.

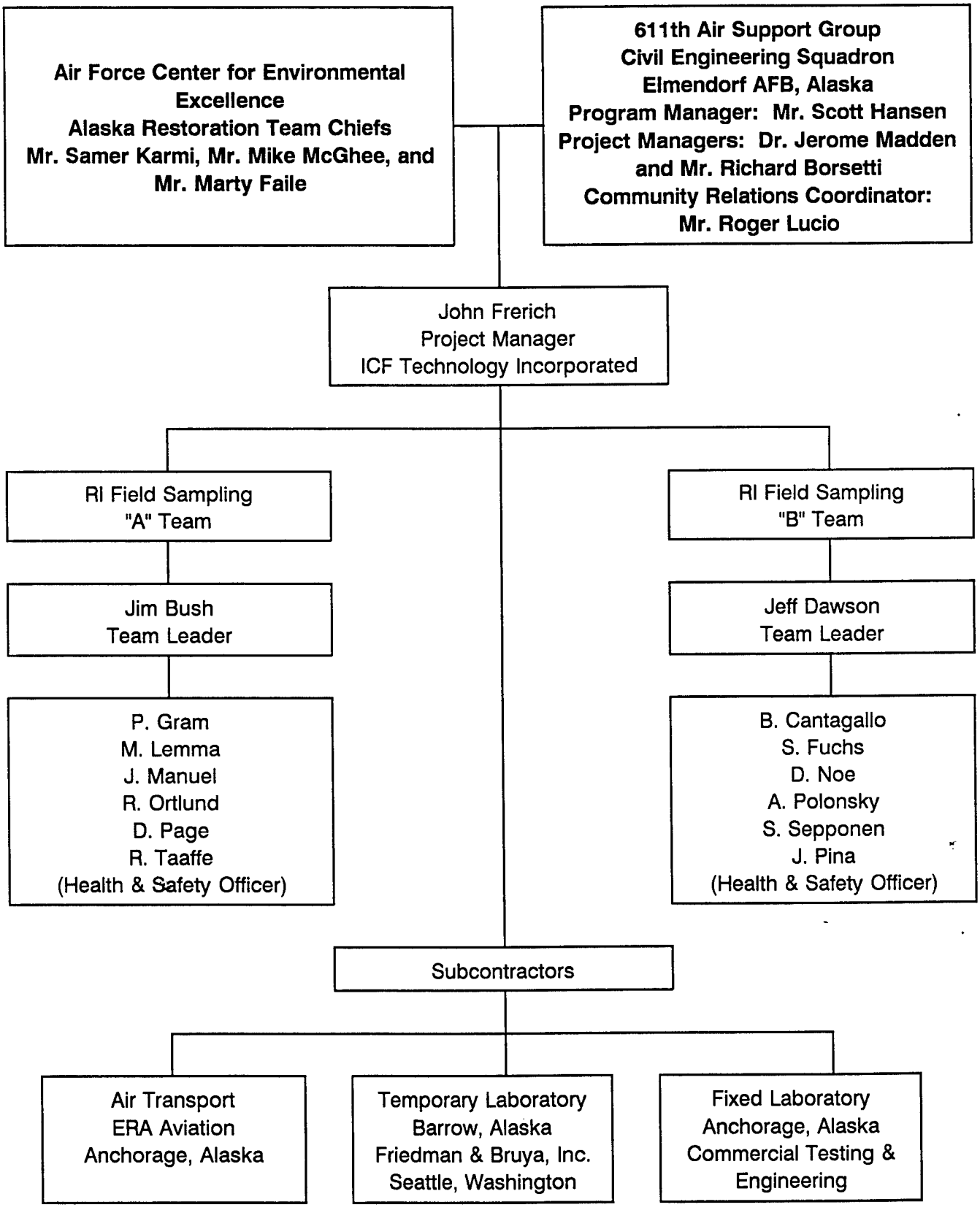
2.2.3 Chronology of Field Work

The RI field work at the Bullen Point radar installation conducted during summer 1993 was accomplished in the following chronological order:

12 May	Conducted pre-survey.
28 June	Conducted reconnaissance.
09 August	Stockpiled RI sampling supplies at Bullen Point radar installation.
10 August	Staked out 24 sample locations at OT04, LF06, and background.

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FIGURE 2-1. FIELD TEAM ORGANIZATION



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11 August	Set up a grid system for sample collection at ST05 and adjusted sample locations at LF06. Collected and analyzed 22 total petroleum hydrocarbon (TPH) field screening samples.
12 August	Completed the grid setup for ST05, dug two test pits and one 50-foot trench. Collected and analyzed 21 TPH field screening samples.
15 August	Collected 5 soil and 3 wipe samples at OT04, 11 soil samples and 1 water sample at LF06, 5 soil and 2 water samples for background, and 2 quality assurance/quality control (QA/QC) samples.
16 August	Added two new sites and staked out 12 sample locations at ST05, ST09, and SS10. Collected 26 soil and 4 water samples at ST05, 5 soil and 1 water sample at ST09, and 3 soil samples at SS10.
03 September	Staked out 13 sample locations at OT04, ST05, and ST09. Collected 1 soil sample at OT04, 11 soil samples at ST05, 1 soil sample at ST09, and 2 QA/QC samples.

2.3 RI SAMPLING AND ANALYSES

A summary of the RI sampling and analysis activities conducted during this investigation is presented in this section. Included are descriptions of the number of samples collected by media, QA/QC samples collected, background sampling and analyses, analytical programs, chronology of laboratory analyses, laboratory QA/QC programs, and data validation and reporting.

2.3.1 Sampling Procedures

Contractor personnel collected samples from various media at the Bullen Point radar installation using numerous sample collection methods and procedures. The collection methods were determined at the time of collection, based on sample location and prevailing environmental conditions. Media sampled during the RI included surface and subsurface soils, surface water, and sediment. These media were extracted generally from man-emplaced fill, gravel pads, and scraped areas; and natural tundra soils/sediments and surface water bodies. All sampling tools or other devices used during sampling were decontaminated before use. Standard procedures, developed by the contractor for sampling methodologies used during the RI are presented in Appendix D of the RI/FS SAP (U.S. Air Force 1993b). Sample collection logs for all samples collected during RI activities at the Bullen Point installation are presented in Appendix D. The logs provide detailed sample information such as media, location, depth, and analyses requested. Completed chain-of-custody forms for all samples collected during the RI at the Bullen Point installation are presented in Appendix E.

2.3.2 Summary of RI Sampling

Contractor personnel collected 89 samples from various media at the Bullen Point radar installation. Seven samples were collected to determine organic and inorganic background concentrations in soil/sediment and surface water. Fifteen samples were collected for QA/QC. QA/QC samples included duplicates, replicates, equipment rinsate blanks, trip blanks, and ambient condition blanks. Sixty-seven samples were collected to determine the nature and extent of contamination at the five sites at Bullen Point. Table 2-1 presents a summary of RI sampling conducted at Bullen Point.

2.3.2.1 Field QA/QC Samples. The field QA/QC program consisted of QA/QC samples, quality control (QC) checks, and limits for field procedures.

QA/QC Samples. QA/QC samples collected during this investigation included duplicate water samples, replicate soil/sediment samples, trip blanks, ambient condition blanks, and equipment rinsate blanks.

During RI sampling activities at the Bullen Point installation, QA/QC samples collected included the following: one duplicate water sample, seven replicate soil/sediment samples, three trip blanks, one ambient condition blank, and three equipment rinsate blanks. Table 2-2 summarizes all samples collected and analyzed during RI activities at the Bullen Point installation, including the QA/QC samples.

In addition to the above QA/QC samples, extra volumes of selected samples were collected and submitted for internal laboratory QA/QC (matrix spike and matrix spike duplicates). Extra sample volumes were submitted at a minimum of 1 per 10 samples. Extra volumes submitted included triple volume for organic water analyses and double volume for inorganic water analyses.

TABLE 2-1. SUMMARY OF BULLEN POINT REMEDIAL INVESTIGATION FIELD SAMPLING ACTIVITIES

ACTIVITY	TOTAL
Water Samples Collected for Lab Analyses (includes QA/QC)	17 samples
Soil/sediment Samples Collected for Lab Analyses (including QA/QC)	69 samples
Drums of Investigation Derived Waste Generated (1 drum water)	0 sample[a]
Wipe Samples Collected for PCB Lab Analyses	3 samples
TOTAL WIPE, WATER, AND SOIL SAMPLES FOR LAB ANALYSES	89 samples

[a] Investigation derived wastes (IDW) from Bullen Point were combined with the IDW from Oliktok Point. These were collectively sampled during the Oliktok Point investigation.

(1)

TABLE 2-2. SUMMARY OF SAMPLING AND ANALYSES CONDUCTED FO

ANALYSES	VOC* 8010	BTEX*	VOC 8260	SVOC	Metals[b]	TPH-Diesel[b] Range 3510/3550	TPH - Gasoline[b] Range
ANALYTICAL METHOD	SW8010	SW8020	SW8260	SW8270	SW3050 (Soil) 3005 (Water)/6010	Diesel 8100M	Gas 5030/8015M
BULLEN POINT							
Background	5 Soil 2 Water	5 Soil 2 Water	5 Soil 2 Water	5 Soil 2 Water	5 Soil 2 Water (Total) 2 Water (Dissolved)	5 Soil 1 Water	5 Soil 2 Water
Inside Transformer (OT04)	NA	NA	NA	NA	NA	NA	NA
POL Tanks (ST05)	NA	24 Soil 4 Water	3 Soil 2 Water	3 Soil 2 Water	2 Soil	34 Soil 4 Water	24 Soil 4 Water
Old Landfill/Dump Site East (LF06)	9 Soil 2 Water	9 Soil 2 Water	2 Soil 1 Water	2 Soil 1 Water	2 Soil 1 Water (Total) 1 Water (Dissolved)	9 Soil 2 Water	9 Soil 2 Water
Fuel Storage Area (ST09)	NA	6 Soil 1 Water	1 Soil 1 Water	1 Soil 1 Water	NA	6 Soil 1 Water	6 Soil 1 Water
Drum Storage Area (SS10)	3 Soil	3 Soil	1 Soil	1 Soil	1 Soil	3 Soil	3 Soil
Total Field Analyses	17 Soil 4 Water	47 Soil 9 Water	12 Soil 6 Water	12 Soil 9 Water	10 Soil 3 Water (Total) 3 Water (Dissolved)	57 Soil 8 Water	47 Soil 9 Water
QA/QC SAMPLES							
Trip Blanks	1 Water[c]	3 Water	2 Water	NA	NA	NA	1 Water
Equipment Blanks	1 Water[c]	3 Water	2 Water	2 Water	2 Water (Total) 1 Water (Dissolved)	1 Water	3 Water
Ambient Condition Blanks	NA	NA	1 Water	NA	NA	NA	NA
Field Replicates	2 Soil	5 Soil	1 Soil	1 Soil	1 Soil	6 Soil	5 Soil
Field Duplicates	1 Water	1 Water	1 Water	1 Water	1 Water (Total) 1 Water (Dissolved)	1 Water	1 Water
Total Site Analyses	19 Soil 7 Water	52 Soil 16 Water	13 Soil 12 Water	13 Soil 12 Water	11 Soil 6 Water (Total) 5 Water (Dissolved)	63 Soil 10 Water	52 Soil 14 Water

NA Not analyzed.
* These analyses were completed on a quick turnaround basis.
a The number of soil sample includes sediment samples collected from surface water features.
b Some of these analysis were completed on a 24-hour turnaround at a temporary fixed laboratory at Barrow, Alaska.
c These samples were analyzed for a short list of four HVOCs using a modified method (SW8010M).
d Investigation derived wastes from Bullen Point were combined with the investigation derived wastes from Oliktok Point. These

(2)

S CONDUCTED FOR BULLEN POINT REMEDIAL INVESTIGATIONS[a]

)iesel[b] ıge 3550	TPH - Gasoline[b] Range	TPH Residual Range*	PCB*	Pesticides*	TDS	TSS	TOC	TCLP[d]	TOTAL SAMPLES
8100M	Gas 5030/8015M	Diesel 8100M	SW8080/8080M	SW8080/8080M	E160.1	E160.2	SW9060	SW1311	
;oil /ater	5 Soil 2 Water	NA	5 Soil 1 Water	5 Soil 1 Water	2 Water	2 Water	2 Water	NA	5 Soil 2 Water
A	NA	NA	5 Soil 3 Wipe	4 Soil	NA	NA	NA	NA	5 Soil 3 Wipe
Soil ater	24 Soil 4 Water	10 Soil	2 Soil	2 Soil	2 Water	2 Water	2 Water	NA	34 Soil 4 Water
;oil /ater	9 Soil 2 Water	NA	9 Soil 2 Water	9 Soil 2 Water	1 Water	1 Water	1 Water	NA	9 Soil 2 Water
;oil /ater	6 Soil 1 Water	1 Soil	NA	NA	1 Water	1 Water	1 Water	NA	6 Soil 1 Water
;oil	3 Soil	NA	3 Soil	NA	NA	NA	NA	NA	3 Soil
Soil /ater	47 Soil 9 Water	11 Soil	24 Soil 3 Water 3 Wipe	20 Soil 3 Water	6 Water	6 Water	6 Water	NA	62 Soil 9 Water 3 Wipe
IA	1 Water	NA	NA	NA	NA	NA	NA	NA	3 Water
/ater	3 Water	NA	1 Water	1 Water	NA	NA	NA	NA	3 Water
IA	NA	NA	NA	NA	NA	NA	NA	NA	1 Water
;oil	5 Soil	1 Soil	3 Soil	3 Soil	NA	NA	NA	NA	7 Soil
/ater	1 Water	NA	1 Water	1 Water	1 Water	1 Water	1 Water	NA	1 Water
Soil Vater	52 Soil 14 Water	12 Soil	27 Soil 5 Water 3 Wipe	23 Soil 5 Water	7 Water	7 Water	7 Water	1 Water	69 Soil 17 Water 3 Wipe

ırrow, Alaska.

om Oliktok Point. These were collectively sampled during the Oliktok Point investigation.

2.3.2.2 Background Sampling and Analyses. Seven background samples were collected from upgradient areas during field activities at the Bullen Point radar installation to establish background concentrations for naturally occurring organic compounds. In order to obtain a representative range of inorganic (metal) concentrations in soil/sediments and surface waters of the North Slope, 44 samples (29 soil/sediment and 15 water) from seven North Slope radar installations were collected. The seven installations include Barter Island, Bullen Point, Oliktok Point, Point Lonely, Point Barrow, Point Lay, and Wainwright. Approximately five soil/sediment and two surface water background samples were collected from each of these installations to determine the background concentrations of inorganic analytes across similar coastal arctic environments of the North Slope.

The seven background samples were collected from tundra and pond areas during the RI at Bullen Point. These consisted of four soil, one sediment, and two surface water samples.

Four background soil samples were analyzed for diesel range petroleum hydrocarbons (DRPH), gasoline range petroleum hydrocarbons (GRPH), benzene, toluene, ethylbenzene, and xylenes (BTEX), halogenated volatile organic compound (HVOCs), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and total metals.

One background sediment sample was analyzed for DRPH, GRPH, BTEX, HVOCs, VOCs, SVOCs, pesticides, PCBs, and total metals.

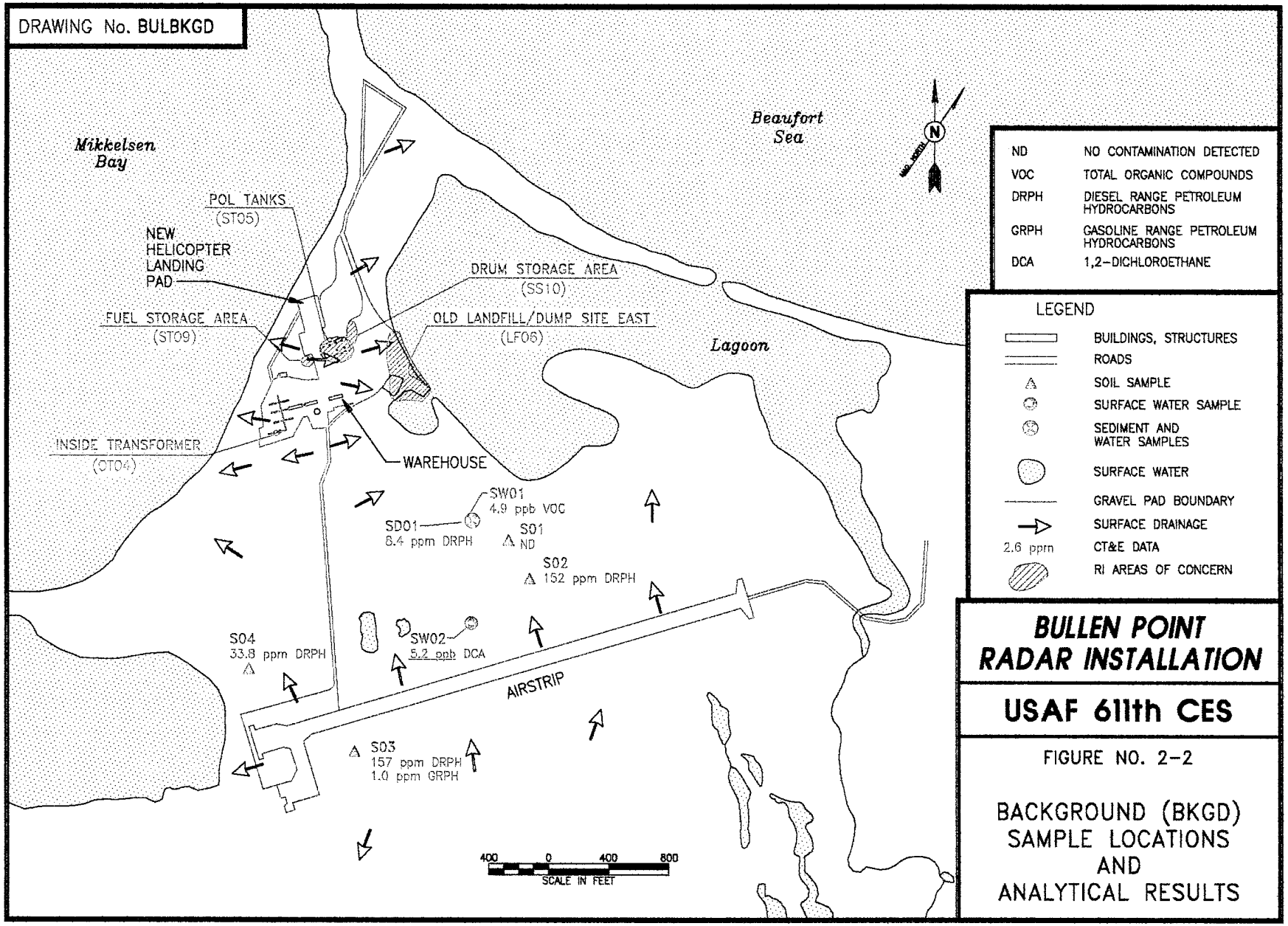
Two background surface water samples were analyzed for GRPH, BTEX, HVOCs, VOCs, SVOCs, pesticides, PCBs, total organic carbon (TOC), total suspended solids (TSS), total dissolved solids (TDS), and total and dissolved metals. In addition, one sample was analyzed for DRPH.

Data Summary. Background sample locations at Bullen Point are illustrated in Figure 2-2. The data summary table (Table 2-3) presents analytical results for all background samples collected at Bullen Point. Detection and quantitation limits, action levels, and the associated field and laboratory blank results are included on the data summary table.

Below is a discussion of organic compounds and inorganic analytes detected in background samples at Bullen Point. A discussion of TDS, TSS, and TOC is included. Analytical results are presented in Table 2-3 and Figure 2-2.

Organics. Organic compounds detected in background soil and sediment samples include DRPH and GRPH. DRPH were detected in four of the background soil/sediment samples at concentrations ranging from 8.43 to 157 mg/kg. GRPH were detected in one soil sample at 1.03 mg/kg (sample BKGD-S03). DRPH and GRPH are assumed to be the result of naturally occurring biogenic hydrocarbons; DRPH in background samples were identified by the laboratory as not being consistent with middle distillate fuels. Although some naturally occurring compounds were detected in the DRPH and GRPH analyses of some of the soil/sediment background samples, the organic concentration in background samples is assumed to be non-detect. This conservative approach was used because it is not possible to determine what degree, if any, the DRPH and GRPH detected in site samples were naturally occurring

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DRAWING No. BULBKGD
Mikkelsen Bay
Beaufort Sea
Lagoon
POL TANKS (ST05)
NEW HELICOPTER LANDING PAD
FUEL STORAGE AREA (ST09)
DRUM STORAGE AREA (SS10)
OLD LANDFILL/DUMP SITE EAST (LF06)
INSIDE TRANSFORMER (OT04)
WAREHOUSE
SW01
4.9 ppb VOC
SD01
8.4 ppm DRPH
S01
ND
S02
152 ppm DRPH
S04
33.8 ppm DRPH
SW02
5.2 ppb DCA
AIRSTRIP
S03
157 ppm DRPH
1.0 ppm GRPH
400 0 400 800
SCALE IN FEET
ND NO CONTAMINATION DETECTED
VOC TOTAL ORGANIC COMPOUNDS
DRPH DIESEL RANGE PETROLEUM HYDROCARBONS
GRPH GASOLINE RANGE PETROLEUM HYDROCARBONS
DCA 1,2-DICHLOROETHANE
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
SURFACE WATER SAMPLE
SEDIMENT AND WATER SAMPLES
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
2.6 ppm CT&E DATA
RI AREAS OF CONCERN
BULLEN POINT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 2-2
BACKGROUND (BKGD) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY

Installation: Bullen Point
Site: Background (BKGD)

Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range	Environmental Samples					Field Blanks			Lab Blanks	
					S01	S02	S03	S04	SD01	AB01	EB01	TB01		
Laboratory Sample ID Numbers					4123-1 4202-1	4123-4 4202-2	4123-5 4202-3	4123-6 4202-4	4123-7 4202-5	4180-3	4204-9 4121-7 4122-7	4122-8 4204-8	4121 4122 4180 4204	4202 4123
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4.00-157	<4.00	152[d]	157[d]	33.8[d]	8.43J[d]	NA	NA	NA	NA	<4.00
GRPH	0.400	0.400-0.600	100	<0.500-1.03	<0.500	<0.600	1.03	<0.600	<0.600	NA	<20	NA	<20	<0.400
BTEX (8020/ 8020 Mod.)			10 Total BTEX	<0.125-<0.20	<0.125	<0.150	<0.20	<0.150	<0.150					
Benzene	0.020	0.025-0.040	0.5	<0.025-<0.040	<0.025	<0.030	<0.040	<0.030	<0.030	<1[c]	<1	<1	<1	<0.020
Toluene	0.020	0.025-0.040		<0.025-<0.040	<0.025	<0.030	<0.040	<0.030	<0.030	<1[c]	<1	<1	<1	<0.020
Ethylbenzene	0.020	0.025-0.040		<0.025-<0.040	<0.025	<0.030	<0.040	<0.030	<0.030	<1[c]	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.050-0.080		<0.050-<0.080	<0.050	<0.060	<0.080	<0.060	<0.060	<2[c]	<2	<2	<2	<0.040
VOC 8010	0.020	0.025-0.040	90	<0.025-<0.040	<0.025	<0.030	<0.040	<0.030	<0.030	NA	<1-7	<1	<1	<0.020
VOC 8260	0.020	0.025-0.035		<0.025-<0.035	<0.030	<0.025	<0.035	<0.025	<0.025	<1	<1-5.7	<1	<1	<0.020
SVOC 8270	0.200	0.240-1.00		<0.240-<1.00	<0.290-<1.00	<0.260	<0.290	<0.240-<1.00	<0.250-<1.00	NA	<10	NA	<10	<0.200
Pesticides	0.001-0.10	0.002-0.020		<0.002-<0.020	<0.002-<0.020	<0.002-<0.020	<0.003-<0.020	<0.002-<0.020	<0.002-<0.020	NA	NA	NA	NA	<0.002-<0.020
PCBs	0.020	0.020	10	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	NA	NA	NA	NA	<0.020

□ CT&E Data.
NA Not analyzed.
J Result is an estimate.
a The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
c BTEX determined by 8260 method analysis.
d The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point Matrix: Soil/Sediment
Site: Background (BKGD) Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Bullen Bkgd. Range	Environmental Samples					Field Blank			Lab Blanks
						S01	S02	S03	S04	SD01		EB01		
Laboratory Sample ID Numbers						4123-1	4123-4	4123-5	4123-6	4123-7		4121-7		4123 4121
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		µg/L		µg/L
Aluminum	0.35	2		1,500-25,000	3,800-12,000	5,030	9,700	12,000	10,300	3,800		<100		<100
Antimony	N/A	60-70		<7.8-<230	<60J-<70	<64J	<61	<70	<63	<60J		<100		<100
Arsenic	0.11	6.0-7.0		<4.9-8.5	<6.0-<7.0	<6.4	<6.1	<7.0	<6.3	<6.0		<100		<100
Barium	0.024	1		27-390	28-150	46	120	150	97	28		<50		<50
Beryllium	N/A	3.0-3.5		<2.6-6.4	<3.0-<3.5	<3.2	<3.1	<3.5	<3.2	<3.0		<50		<50
Cadmium	0.33	3.0-3.5		<3.0-<36	<3.0-<3.5	<3.2	<3.1	<3.5	<3.2	<3.0		<50		<50
Calcium	0.69	4		360-59,000	3,100-59,000	59,000	3,100	6,100	43,300	29,000		<200		<200
Chromium	0.066	1		<4.3-47	7.8-20	10	17	20	19	7.8		<50		<50
Cobalt	N/A	60-70		<5.1-12	<60-<70	<64	<61	<70	<63	<60		<100		<100
Copper	0.045	1		<2.7-45	5.8-15	7.4	11	12	15	5.8		<50		<50
Iron	0.50	2		5,400-35,000	7,200-20,600	13,000	12,300	18,700	20,600	7,200		<100		<100
Lead	0.13	2-6.4		<5.1-22	<6.0-9.7	<6.4	7.6	9.7	9.6	<6.0		<100		<100
Magnesium	0.96	4		360-7,400	2,400-7,400	5,100	2,400	2,800	7,400	3,100		<200		<200
Manganese	0.025	1		25-290	65-290	200	130	65	290	70		<50		<50
Molybdenum	N/A	3.0-3.5		<2.5-<11	<3.0-<3.5	<3.2	<3.1	<3.5	<3.2	<3.0		<50		<50
Nickel	0.11	1		4.2-46	9.9-24	14	13	17	24	9.9		<50		<50
Potassium	23	3,000-3,500		<300-2,200	<3,000R-<3,500	<3,200R	<3,100	<3,500	<3,200	<3,000R		<5,000		<5,000

☐ CT&E Data.
N/A Not available.
J Result is an estimate.
R Result has been rejected.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point Matrix: Soil/Sediment
Site: Background (BKGD) Units: mg/kg

METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Bullen Bkgd. Range	Environmental Samples					Field Blank			Lab Blanks
						S01	S02	S03	S04	SD01		EB01		
Laboratory Sample ID Numbers						4123-1	4123-4	4123-5	4123-6	4123-7		4121-7		4123 4121
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		µg/L		µg/L
Selenium	1.2	60-70		<7.8-<170	<60-<70	<64	<61	<70	<63	<60		<100		<100
Silver	0.53	3.0-3.5		<3-<110	<3.0-<3.5	<3.2	<3.1	<3.5	<3.2	<3.0		<50		<50
Sodium	0.55	5-170		<160-680	<160-260	<160	<160	<170	<160	260		340		<250
Thallium	0.011	0.3		<0.2-<1.2	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3		<5		<5
Vanadium	0.036	1		6.3-59	11-32	14	26	32	27	11		<50		<50
Zinc	0.16	1		9.2-95	29-60	35	33	29	60	30		<50		<50

☐ CT&E Data.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point Matrix: Surface Water
Site: Background (BKGD) Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range	Environmental Samples		Field Blanks			Lab Blanks
					SW01	SW02	AB01	EB01	TB01	
Laboratory Sample ID Numbers					4204-1 4122-1 4121-1	4204-2 4122-2 4121-2	4180-3	4204-9 4122-7	4122-8 4204-8	4121 4122 4180 4204
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
DRPH	100	200		<200	<200	NA	NA	NA	NA	<200
GRPH	20	20		<20	<20	<20	NA	<20	NA	<20
BTEX (8020/8020 Mod.)										
Benzene	1	1	5	<1	<1	<1	<1[c]	<1	<1	<1
Toluene	1	1	1,000	<1	<1	<1	<1[c]	<1	<1	<1
Ethylbenzene	1	1	700	<1	<1	<1	<1[c]	<1	<1	<1
Xylenes (Total)	2	2	10,000	<2	<2	<2	<2[c]	<2	<2	<2
VOC 8010										
1,2-Dichloroethane	1	1	5	4.9-5.2	4.9	5.2	NA	<1	<1	<1
VOC 8260										
1,2-Dichloroethane	1	1.0	5	1.9B-4.5B	4.5B	1.9B	<1	1.1	<1	<1
SVOC 8270	10	10		<10	<10	<10	NA	<10	NA	<10
Pesticides	0.05	0.1-2		<0.1-<2	<0.1-<2	NA	NA	NA	NA	<0.1
PCBs	1	2	0.5	<2	<2	NA	NA	NA	NA	<1
TOC	5,000	5,000		17,000-30,700	30,700	17,000	NA	NA	NA	<5,000
TSS	100	200		13,000-19,000	13,000	19,000	NA	NA	NA	<200
TDS	10,000	10,000		241,000-1,853,000	1,853,000	241,000	NA	NA	NA	<10,000

□ CT&E Data.
NA Not analyzed.
B The analyte was detected in the associated blank.
[c] BTEX determined by 8260 method analysis.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point | Matrix: Surface Water | METALS ANALYSES: TOTAL
Site: Background (BKGD) | Units: µg/L | (DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Bullen Bkgd. Range	Environmental Samples				Field Blank			Lab Blank
						SW01	SW02				EB01		
Laboratory Sample ID Numbers						4121-1	4121-2				4121-7		4121
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				µg/L		µg/L
Aluminum	17.4	100		<100-350 (<100-340)	<100-200 (<100-<100)	200 (<100)	<100 (<100)				<100 (<100)		<100 (<100)
Antimony	N/A	100	6	<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)				<100 (<100)		<100 (<100)
Arsenic	5.3	100	50	<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)				<100 (<100)		<100 (<100)
Barium	1.2	50	2,000	<50-93 (<50-91)	<50-60 (<50-58)	60 (58)	<50 (<50)				<50 (<50)		<50 (<50)
Beryllium	N/A	50	4	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Cadmium	1.7	50	5	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Calcium	34.5	200		4,500-88,000 (4,100-86,000)	33,000-88,000 (33,000-86,000)	88,000 (86,000)	33,000 (33,000)				<200 (<200)		<200 (<200)
Chromium	3.29	50	100	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Cobalt	N/A	100		<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)				<100 (<100)		<100 (<100)
Copper	2.3	50	1,300	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Iron	25	100		180-2,800 (<100-1,600)	370-950 (180-190)	950 (190)	370 (180)				<100 (<100)		<100 (<100)
Lead	6.6	100	15	<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)				<100 (<100)		<100 (<100)

☐ CT&E Data.
N/A Not available.

TABLE 2-3. BACKGROUND ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Background (BKGD)
Matrix: Surface Water
Units: µg/L
METALS ANALYSES: TOTAL (DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Bullen Bkgd. Range	Environmental Samples					Field Blank		Lab Blank
						SW01	SW02				EB01		
Laboratory Sample ID Numbers						4121-1	4121-2				4121-7		4121
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L				µg/L		µg/L
Magnesium	47.8	200		<5,000-53,000 (2,600-54,000)	10,000-53,000 (11,000-54,000)	53,000 (54,000)	10,000 (11,000)				<200 (<200)		<200 (<200)
Manganese	1.24	50		<50-510 (<50-120)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Molybdenum	N/A	50		<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Nickel	5.5	50	100	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Potassium	1,154	5,000		<5,000 (<5,000)	<5,000 (<5,000)	<5,000 (<5,000)	<5,000 (<5,000)				<5,000 (<5,000)		<5,000 (<5,000)
Selenium	62.4	100	50	<100 (<100)	<100 (<100)	<100 (<100)	<100 (<100)				<100 (<100)		<100 (<100)
Silver	2.6	50	50	<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Sodium	27.7	250		8,400-410,000 (8,200-450,000)	31,000-410,000 (37,000-450,000)	410,000 (450,000)	31,000 (37,000)				340 (330)		<250 (<250)
Thallium	0.57	5	2	<5 (<5)	<5 (<5)	<5 (<5)	<5 (<5)				<5 (<5)		<5 (<5)
Vanadium	1.8	50		<50 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)
Zinc	8.2	50		<50-160 (<50)	<50 (<50)	<50 (<50)	<50 (<50)				<50 (<50)		<50 (<50)

☐ CT&E Data.
N/A Not available.

compounds. The range of background concentrations detected for all analytes are presented in data summary tables for each of the five sites presented in Sections 3.0 and 4.0.

One organic compound was detected in background surface water samples collected at Bullen Point. This compound, 1,2-dichloroethane, was detected in the two background water samples at 4.9 and 5.2 µg/L. This compound was also detected in the associated field blank sample at a concentration of 1.1 mg/kg and is assumed to be the result of field decontamination procedures. The hexane and methanol used in the decontamination procedures may have contained impurities including 1,2-dichloroethane.

Inorganics. Thirteen metals were detected in background soil/sediment samples at Bullen Point. The results of inorganic analyses are presented in Table 2-3.

Six metals were detected in background surface water samples collected at Bullen Point. The results of inorganic analyses are presented in Table 2-3. TOC was reported at 30,700 and 17,000 µg/L in surface water samples BKGD-SW01 and BKGD-SW02, respectively. In the same two respective samples, TSS were reported at 13,000 and 19,000 µg/L, and TDS were reported at 1,853,000 and 241,000 mg/kg.

2.3.3 Laboratory Analyses

This section describes the RI analytical program. Summaries of the soil/sediment and water analyses conducted during the RI are presented in Tables 2-4 and 2-5. Table 2-4 presents a description of the soil analytical methods and number of soil samples collected, and Table 2-5 presents a description of the water analytical methods and the number of water samples collected during the RI.

2.3.3.1 Analytical Program. Analyses of samples were conducted by a fixed laboratory in Anchorage, Alaska, and a temporary laboratory set up at Barrow, Alaska. The analytical testing conducted by each laboratory is discussed below.

The fixed laboratory in Anchorage, Alaska, was operated by Commercial Testing & Engineering (CT&E). CT&E analyzed samples as follows:

Analyses	Analytical Method
Volatile Organic Compounds	SW5030/8260
Metals	SW3050 (Soil) 3005 (Water)/6010
Semi-Volatile Organic Compounds	SW3550 (Soil) 3510 (Water)/8270
Total Dissolved Solids	E160.1
Total Suspended Solids	E160.5
Total Organic Carbon	SW9060
Moisture Content	ASTM D 2216
Toxicity Characteristic Leaching Procedure (TCLP)	SW1311

TABLE 2-4. ANALYTICAL METHODS AND TOTAL NUMBER OF SOIL ANALYSES

SOIL ANALYSES[a]	ANALYTICAL METHOD	REPORTING UNITS	NUMBER OF ANALYSES	REPLICATES	TOTAL ANALYSES
VOC 8010	SW5030/8010	mg/kg	17	2	19
VOC 8260	SW5030/8260	mg/kg	12	1	13
SVOC	SW3550/8270	mg/kg	12	1	13
Total Metals Analysis --ICP Screen	SW3050/6010	mg/kg	10	1	11
TOC, Soil	SW9060	mg/kg	0	0	0
TPH - Diesel Range	SW3510/3550/8100M	mg/kg	57	6	63
TPH - Gasoline Range	SW5030/8015M	mg/kg	47	5	52
TPH - Residual Oil	SW3510/3550/8100M	mg/kg	11	1	12
BTEX	SW5030/8020/8020M	mg/kg	47	5	52
PCB	SW5030/8080/8080M	mg/kg	24	3	27
Pesticides	SW5030/8080/8080M	mg/kg	20	3	23
TOTAL SOIL ANALYSES			257	28	285
TOTAL SOIL SAMPLES			62	7	69

M Modified.
a Includes soil and sediment analyses.

TABLE 2-5. ANALYTICAL METHODS AND TOTAL NUMBER OF WATER ANALYSES

WATER ANALYSES	ANALYTICAL METHOD	REPORTING UNITS	NUMBER OF ANALYSES	TRIP BLANKS	AMBIENT CONDITION BLANKS	EQUIPMENT BLANKS	DUPLICATES	TOTAL ANALYSES
VOC 8260	SW5030/8260	µg/L	6	2	1	2	1	12
SVOC	SW3550/8270	µg/L	9	0	0	2	1	12
Total Metals Analysis --ICP Screen	SW3005/6010	µg/L	3	0	0	2	1	6
Dissolved Metals Analysis --ICP Screen	SW3005/6010	µg/L	3	0	0	1	1	5
TOC, Nonpurgable	SW9060	µg/L	6	0	0	0	1	7
Residue, Filterable (TSS)	E 160.2	µg/L	6	0	0	0	1	7
Residue, Filterable (TDS)	E 160.1	µg/L	6	0	0	0	1	7
TPH - Diesel Range	SW3510/3550/8100M	µg/L	8	0	0	1	1	10
TPH - Gasoline Range	SW5030/8015M	µg/L	9	1	0	3	1	14
TPH - Residual Oil	SW3510/3550/8100M	µg/L	0	0	0	0	0	0
BTEX	SW5030/8020/8020M	µg/L	9	3	0	3	1	16
VOC 8010	SW5030/8010	µg/L	4	0	0	0	1	5
Halogenated Volatile Organic Compounds	SW5030/8010M	µg/L	0	1	0	1	0	2
PCB	SW5030/8080/8080M	µg/L	3	0	0	1	1	5[a]
Pesticides	SW5030/8080/8080M	µg/L	3	0	0	1	1	5
TOTAL WATER ANALYSES			75	7	1	17	13	113
TOTAL WATER SAMPLES			9	3	1	3	1	17

[a] In addition, three wipe samples were collected and analyzed for PCBs.

In addition, for the first few weeks of the field activities, CT&E provided the following analyses on a quick turnaround basis:

Analyses	Analytical Method
Halogenated Volatile Organic Compounds	SW5030/8010
Benzene, Toluene, Ethylbenzene, and Xylenes	SW5030/8020
Gasoline Range Petroleum Hydrocarbons	8015 Modified
Diesel Range Petroleum Hydrocarbons	8100 Modified
Polychlorinated Biphenyls/Pesticides	SW5030/8080

The temporary laboratory in Barrow, Alaska was operated by Friedman & Bruya (F&B) of Seattle. F&B analyzed samples for the following constituents:

Analyses	Analytical Method
Halogenated Volatile Organic Compounds (four compounds only)	SW5030/8010 Modified
Benzene, Toluene, Ethylbenzene, and Xylenes	SW5030/8020 Modified
Polychlorinated Biphenyls/Pesticides	SW3550/8080 Modified
Diesel Range Organics (DRO)	8100 Modified
Gasoline Range Organics (GRO)	8010/8020/8015 Modified
Residual Range Organics	8100 Modified

Analytical methods used during sample analyses for this project are summarized in Tables 2-4 and 2-5 and are developed from the reference methods described in the following sources:

- *Test Methods for Evaluating Solid Waste (Physical/Chemical Methods)* Third Edition, EPA SW-846. September 1986.
- *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020. March 1983.
- *Standard Methods for the Examination of Water and Wastewater*, APHA/AWWA, 17th Edition. 1989.
- *Interim Guidance for Non-UST Soil Cleanup Levels*, Alaska Department of Environmental Conservation. July 1991.

Project-specific analytical methods and procedures, target analytes, quantitation limits, and acceptance criteria are presented in the RI/FS SAP (U.S. Air Force 1993b).

2.3.4 Chronology of Laboratory Analyses

Laboratory analyses conducted by the temporary laboratory, F&B, in Barrow, Alaska, were conducted on a quick-turnaround basis. The samples collected at Bullen Point radar installation were analyzed by this laboratory during the period from 19 August to 07 September 1993.

Analyses at the CT&E laboratory in Anchorage, Alaska, were conducted between 18 August and 16 September 1993. These analyses included a few quick-turnaround analyses and primarily standard-turnaround analyses.

2.3.5 Laboratory QA/QC Programs

The quality assurance (QA) objectives for this project were achieved through implementation of specific procedures for sampling, chain-of-custody, calibration, laboratory analyses, data validation and reporting, internal QC, audits, preventive maintenance, and corrective actions.

A detailed description of QA/QC measures, frequency, and corrective actions used by both labs is presented in the Quality Assurance Project Plan (QAPjP) [Section 1 of the RI/FS SAP (U.S. Air Force 1993b)]. Ultimately, the relevant laboratory standard operating procedures (SOPs) provide full and detailed guidance regarding all method-specific laboratory QA/QC criteria and appropriate corrective actions.

Data quality for the organic analyses was monitored by the laboratory through a QA program that included analyses of initial and continuing calibrations, method blanks, surrogate spikes, internal standards, matrix spikes and matrix spike duplicates, and laboratory control samples. The identification of target analytes at levels above the detection limit was confirmed by gas chromatography/mass spectrometry (GC/MS) or analysis on a gas chromatograph (GC) equipped with a different column (second column confirmation).

Data quality for the inorganic analyses was monitored through a QC program that included analyses of initial and continuing calibrations, laboratory control samples, method blanks, duplicate samples, post-digestion analytical spikes, and matrix spikes.

Laboratory QC samples were analyzed at a rate of at least one per 20 determinations. See the RI/FS QAPjP for laboratory-specific criteria for the frequency of QC sample analyses and corrective actions regarding QC analyses.

2.3.6 Data Validation and Reporting

Data validation is a systematic process of reviewing a group of sample data to provide assurance that the data are adequate for their intended use. The validation activities were performed in accordance with the following EPA documents to the extent that they were applicable:

- *Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses*. EPA. Hazardous Site Evaluation Division. December 1990.
- *Laboratory Data Validation Guidelines for Evaluating Inorganic Analyses*. EPA. Hazardous Site Evaluation Division. October 1989a.
- *Test Methods for Evaluating Solid Waste (Physical/Chemical Methods)* Third Edition, EPA SW-846. September 1986.

Prior to releasing data for use by project staff, selected data packages underwent a formal validation procedure to examine laboratory compliance with QA requirements and other factors that determine the quality of the data. The organic validation was performed by the prime contractor in accordance with the EPA Functional Guidelines for Evaluating Organic Analyses. The following factors were examined:

- Sample holding times;
- Sample chain-of-custody;
- GC/MS tuning criteria;
- Initial and continuing calibration;
- Method blanks;
- Practical quantitation limits;
- Laboratory blank contamination;
- Surrogate spike recoveries;
- Matrix spike/duplicate analysis;
- Field duplicate analysis;
- Ambient condition blank contamination;
- Trip blank contamination;
- Internal standard area;
- Pesticide instrument performance;
- Compound identification criteria; and
- Analyte identification and quantitation.

The inorganic data validation was performed in accordance with the EPA Functional Guidelines for Evaluating Inorganic Analyses. Parameters evaluated include:

- Holding time;
- Blank results;
- Instrument calibration;
- Inductively coupled plasma (ICP) spectroscopy interference check analysis;
- Laboratory control samples;
- Duplicate analysis;
- Spike analyses;
- Furnace analyses (spikes and duplicates);
- Serial dilution;
- Detection limits; and
- Analyte quantitation.

When a data package was received from the laboratory, the analytical results and associated QA/QC documentation were reviewed for technical compliance, and data validation reports were prepared summarizing the QA/QC parameters that were reviewed. The review included evaluation of laboratory and field blank sample data, and review of all data for accuracy, precision, and completeness.

A cross-section of CT&E analytical data, representing approximately 15 percent of all the CT&E analyses, underwent formal data validation. Because some reporting errors were found in the

F&B analytical data, 100 percent of the F&B data was validated. Once the validation for a batch of samples was completed, a validation report was prepared. The report highlights all the QC criteria evaluated, and notes any major deficiencies or QA problems. Although a minimal amount of analytical data was rejected during data evaluation, the acceptable and valid data from CT&E and F&B are sufficient to meet the project objectives. The data validation reports for data generated by CT&E and F&B are presented in Appendix G.

2.4 METHODOLOGY FOR RISK ESTIMATION

This section describes the methods used to determine the potential risks to human and ecological receptors from chemicals detected in samples collected from the five sites at the installation. A summary of the risks posed by chemicals detected at each of the sites is presented on a site-by-site basis in Sections 3.0 and 4.0. The complete human health and ecological risk assessments are presented in the Bullen Point Risk Assessment (U.S. Air Force 1996), which has been submitted under separate cover.

In addition to the methods for risk evaluation, this section presents contaminant fate and transport, general potential migration pathways, and receptor groups common to all of the six Bullen Point sites.

2.4.1 Human Health Risk

The evaluation of human health risk is conducted in accordance with standard risk assessment methodology as described in *Risk Assessment Guidance for Superfund (RAGS): Human Health Evaluation Manual, Part A* (EPA 1989b), *Region 10 Supplemental Risk Assessment Guidance for Superfund* (EPA 1991a), and the *Handbook to Support the Installation Restoration Program Statements of Work* (U.S. Air Force 1991). This section presents a summary of the approach used in evaluating the human health risks associated with the sites at the Bullen Point radar installation.

The Bullen Point DEW Line installation presented a unique challenge to the development of a human health risk assessment. Many of the conventional assumptions applied to risk assessments do not apply to the North Slope of Alaska. Bullen Point is remote and sparsely populated. Native residents from surrounding areas, largely Inupiats, follow a lifestyle that includes a significant subsistence component; much of their food consists of mammals (whales, seals, and caribou), aquatic life (arctic char), and birds (ptarmigan and ducks) that are abundant in this area of the arctic. The climate is generally harsh, and the soil and surface water are frozen for approximately nine months of the year. The following paragraphs present some of the approaches and assumptions used in the development of the human health risk assessment.

The general approach to the human health risk assessment was to quantify the excess lifetime cancer risk and the noncancer hazard associated with exposure to the site contaminants detected at each of the five sites at the installation. The maximum concentration of each chemical detected was used as the exposure point concentration instead of an arithmetic mean or 95th percentile upper confidence limit (UCL) because contamination was infrequently detected

and found to be generally of low concentration. Incorporating nondetects into the calculation of an average or UCL when the frequency of positive detects is low tends to yield low and unreliable estimates of contamination. Use of the maximum concentration yields a more conservative estimate of risk or hazard.

Chemical concentrations detected in soil, sediment, or surface water samples from each of the sites were compared to risk-based screening levels (RBSLs), ARARS, and background concentrations. A chemical was selected as a COC if the maximum concentration at which the chemical was detected exceeded the corresponding background concentration, and the RBSL (based either on cancer risk or noncancer hazard) or an ARAR. In addition, chemicals detected above background levels were retained as potential COCs if no RBSL or ARAR was available. COCs selected in this manner were evaluated in the human health risk assessment.

An exposure pathway describes the course a chemical will take from a source to an exposure point where a receptor can come into contact with the chemical. The exposure pathways by which exposure to the COCs at Bullen Point may occur include ingestion, dermal contact, and inhalation. The dermal contact and inhalation pathways were not considered complete or significant because the arctic climate precludes dermal contact with and volatilization of site contaminants, so they were not evaluated. Exposure pathways that were considered for all sites were incidental ingestion of soil/sediment and ingestion of surface water.

Three potential receptor groups were evaluated in the risk assessment: an adult conducting maintenance at the unmanned radar installation (worker), an adult inhabitant of a community on the North Slope of Alaska (native), and a child living in a North Slope community (child).

The risk assessment assumed a residential scenario when estimating the soil/sediment and water ingestion rates. The soil/sediment ingestion rate was based on EPA default values, 100 mg/day for adults and 200 mg/day for children. The drinking water ingestion rate assumed a potential future scenario in which the surface water where chemicals were detected at the site will be used as a source of drinking water for 180 days per year at the EPA default ingestion rate of 2 liters per day.

The exposure duration assumed a DEW Line worker would be conducting periodic maintenance at the Bullen Point installation for 10 years. The exposure duration for the native was estimated at 55 years. EPA's default reasonable maximum exposure duration is 30 years; however, this is based on the residence time in one location for the continental United States. Because Alaskan natives are more likely to remain in North Slope communities for a longer period, 55 years was determined to be a more appropriate estimate of residence time.

The risk assessment was based on the assumptions above, along with chemical-specific toxicity data, to quantitatively and qualitatively express the hazards and risks. To characterize potential noncancerous effects, comparisons were made between projected intakes of the COCs and chemical-specific toxicity values. The potential noncancerous health effects were expressed as a hazard quotient (HQ). To assess the overall potential for noncancerous effects posed by more than one chemical at a site, the hazard quotients were summed and reported as the hazard index. An HQ or hazard index of 1.0 is the regulatory benchmark. Noncancer hazards greater

than 1.0 are generally considered a concern, and noncancer hazards of less than 1.0 are generally considered to not warrant further evaluation.

To characterize the potential for carcinogenic effects, the probability that an individual will develop cancer over a lifetime of exposure, the risks were estimated from projected intakes of the COCs and chemical-specific dose-response information. The cancer risks are calculated on a chemical-specific basis and are added together (if more than one chemical associated with cancer risk is a COC at the site) to estimate the total cancer risk for the site. The total cancer risk for each pathway is generally not considered to be of concern unless it exceeds a value of 1×10^{-6} (EPA 1991b).

Excess lifetime cancer risk is the incremental increase over and above the background (i.e., if no exposure to site chemicals occurs) in the probability of developing cancer during one's lifetime. For example, a 1×10^{-6} excess lifetime cancer risk means that, in a population of one million people exposed to the carcinogen throughout their lifetimes, the average incidence of cancer may increase by one case. The background probability among Americans of developing cancer at some time in their lives is about one in four (American Cancer Society 1993). The calculation of cancer risks uses information (i.e., cancer slope factors) developed by the EPA that represents upper bound estimates, so any cancer risks estimated in the risk assessment should be regarded as upper bounds on the potential cancer risks rather than accurate representations of true cancer risk. The true cancer risk is likely to be lower than that predicted (EPA 1989a).

Excess lifetime cancer risk and noncancer hazard were calculated for the soil/sediment ingestion and water ingestion pathways. Other pathways were eliminated from consideration as described in the Bullen Point Risk Assessment (U.S. Air Force 1996). The risks and hazards associated with chemicals detected at the Bullen Point sites are presented on a site-by-site basis in Sections 3.0 and 4.0 of this RI/FS report.

2.4.2 Ecological Risk

The objective of the environmental risk assessment (ERA) is to estimate potential impacts to aquatic and terrestrial plants and animals at the Bullen Point DEW Line installation. The evaluation of environmental risks was conducted in accordance with current Air Force and EPA guidance, specifically, *Handbook to Support the Installation Restoration Program Statements of Work* (U.S. Air Force 1991), *Framework for Ecological Risk Assessment* (EPA 1992), and *Ecological Risk Assessment Guidance for Superfund* (EPA 1994).

The approach used to assess potential ecological impacts was conceptually similar to that used to assess human health risks. Potentially exposed populations (receptors) were identified, and information on exposure and toxicity was combined to derive estimates of risk. However, the scope of ERAs is generally different from that of human health risk assessments in that ecological assessment focuses on potential impacts to a population of organisms rather than to individual organisms (except in the case of endangered species where individuals are considered). In addition, because ecosystems are composed of a variety of species, ecological assessments evaluate potential impacts to numerous species instead of a single species (as is the case in human health assessments).

Ideally, ERAs should evaluate potential risks to communities and ecosystems, as well as to individual populations. However, because of the large number of species and communities present in natural systems, such ecosystem-wide assessments are very complex and appropriate assessment methodologies have not yet been developed. In addition, dose-response data on community or ecosystem responses are generally lacking. Therefore, evaluations of potential impacts to communities or ecosystems are qualitative.

The degree to which potential ecological impacts can be characterized is highly dependent upon the data available to support such estimates. Data required include: information regarding contaminant release, transport, and fate; characteristics of potential receptor populations; and adequate supporting toxicity data for the COCs. The degree to which the existing database can meet these requirements dictates the extent to which potential ecological impacts can be evaluated.

Ecological receptors can be exposed to COCs through abiotic and biotic media. Potential exposure pathways for terrestrial and aquatic organisms include direct contact and ingestion of contaminated soil/sediment and/or surface water. The most significant route of exposure for plants is direct contact with soil. Aquatic organisms such as fish and invertebrates are primarily exposed through direct contact with surface water, but may be exposed to COCs through ingestion of plant and animal items in the diet, and incidental ingestion of soil/sediment while foraging (although only direct contact with surface water is used to develop risk estimates). Birds and mammals may be exposed to COCs through ingestion of surface water, ingestion of plant and animal diet items, and incidental ingestion of soil/sediment.

The potential ecological receptors evaluated in the risk assessment include plants, aquatic organisms, birds, and mammals likely to occur along the Arctic Coastal Plain. Representative species from these groups of receptors were selected based primarily on the species' likelihood of exposure given their preferred habitat and feeding habits. Species that may be particularly sensitive to environmental impacts, such as endangered or threatened species, were also evaluated. The representative species are presented in Table 2-6. Any threatened or endangered species evaluated in the ERA are not considered representative of the Arctic Coastal Plain or the DEW Line installations. These species are evaluated to provide information about whether they face potential risks from exposure to COCs.

Potential risks to representative species were estimated by evaluating sampling data for the relevant exposure media (i.e., soil/sediment and surface water). Potential risks to plants were evaluated based on a comparison of the average contaminant concentrations in the site soil/sediment via toxicity information in the literature. Potential impacts on aquatic receptors were evaluated by comparing average surface water concentrations to toxicity reference values (TRVs). Potential impacts to birds and mammals were evaluated for selected representative species by comparisons of estimated exposures, based on potential dietary intakes of COCs, to TRVs. TRVs for representative species are derived by selecting toxicity values from the literature and extrapolating to the species of concern. TRVs are then divided into the estimated exposure concentration to derive the HQ. If the HQ is less than one, then adverse effects are not expected. Conversely, if the HQ is equal to or greater than one a potential for adverse effects exists. The confidence level of the risk estimate is increased as the magnitude of the HQ departs

TABLE 2-6. REPRESENTATIVE AND SENSITIVE SPECIES AT THE DEW LINE INSTALLATION SITES

COMMON NAME	GENUS AND SPECIES
Sedge	*Carex* spp.
Cottongrass	*Eriophorum* spp.
Willow	*Salix* spp.
Berries	*Vaccinium* spp.
Water fleas	*Daphnia* spp.
Nine-spined stickleback	*Pungitius pungitius*
Arctic char	*Salvelinus alpinus*
Lapland longspur	*Calcarius lapponicus*
Brant	*Branta bernicla*
Glaucous gull	*Larus hyperboreus*
Pectoral sandpiper	*Calidris melanotos*
Brown lemming	*Lemmus trimucronatus*
Arctic fox	*Alopex lagopus*
Barren-ground caribou	*Rangifu tarandus*
Spectacled eider[a]	*Somateria fischeri*
Steller's eider[b]	*Polysticta stelleri*

a This species is listed as threatened under the Endangered Species Act; it is considered a sensitive specie in the ERA.

b This species is listed as a candidate for threatened status; it is considered a sensitive specie in the ERA.

from 1.0. For example, there is greater confidence in a risk estimate where the HQ is 0.1 or 10, than in an HQ such as 0.9 to 1.1.

TRVs are calculated to be protective for long-term exposures. This is accomplished by using chronic chemical and receptor-specific no-effect dosages as starting points when such data is available. If chronic or receptor-specific data is not available, then uncertainty and scaling factors (to account for differences in body size) are incorporated in the derivation of the TRVs. This is standard practice in ERAs and is illustrated in screening level benchmarks used in the ERA for sediments (Hull and Suter 1994), aquatic biota (Suter and Mabrey 1994), and wildlife (Opresko et al. 1994). The assumptions incorporated in the ERA assume daily exposure during the receptor's most sensitive life stage (i.e., one breeding season). Consequently, if no risks are

identified at the "chronic" level, there will be no risk related to "acute", or occasional exposures. This should be kept in mind when interpreting the HQ. Although the HQ may be greater than one, the conservatism embodied in the TRV and assumptions of the ERA allow for mitigating factors (e.g., large home range, short seasonal exposure, unlikely repeated exposures at a "hot spot" location) that may result in a finding of no significant risk.

The ERA was intended to be at a screening level, rather than a full scale investigation of the state of the ecosystem. No specific onsite studies of the biota were undertaken. The assessment was based on media sampling (i.e., surface water and soil/sediment samples). The ecological risks associated with the chemicals detected at the Bullen Point sites are presented site-by-site in Sections 3.0 and 4.0 of this RI/FS report. The complete ERA is presented in the Section 3.0 of the Final Bullen Point Risk Assessment (U.S. Air Force 1996).

2.4.3 Contaminant Fate and Transport

The fate and transport of the COCs in soil/sediment, active layer water, and surface water have been accounted for in the sampling plan. Known source areas were sampled, and the extent of migration was evaluated by sampling at increasing distances from the source area. Surface and subsurface sampling was conducted in gravel pads and tundra areas to characterize the extent of contaminant migration. Water samples were collected in boreholes, streams, and ponds and analyzed to evaluate the migration of contamination from source areas to water bodies potentially used by human or ecological receptors. The potential for contaminant migration is discussed on a site-specific basis in Sections 3.0 and 4.0.

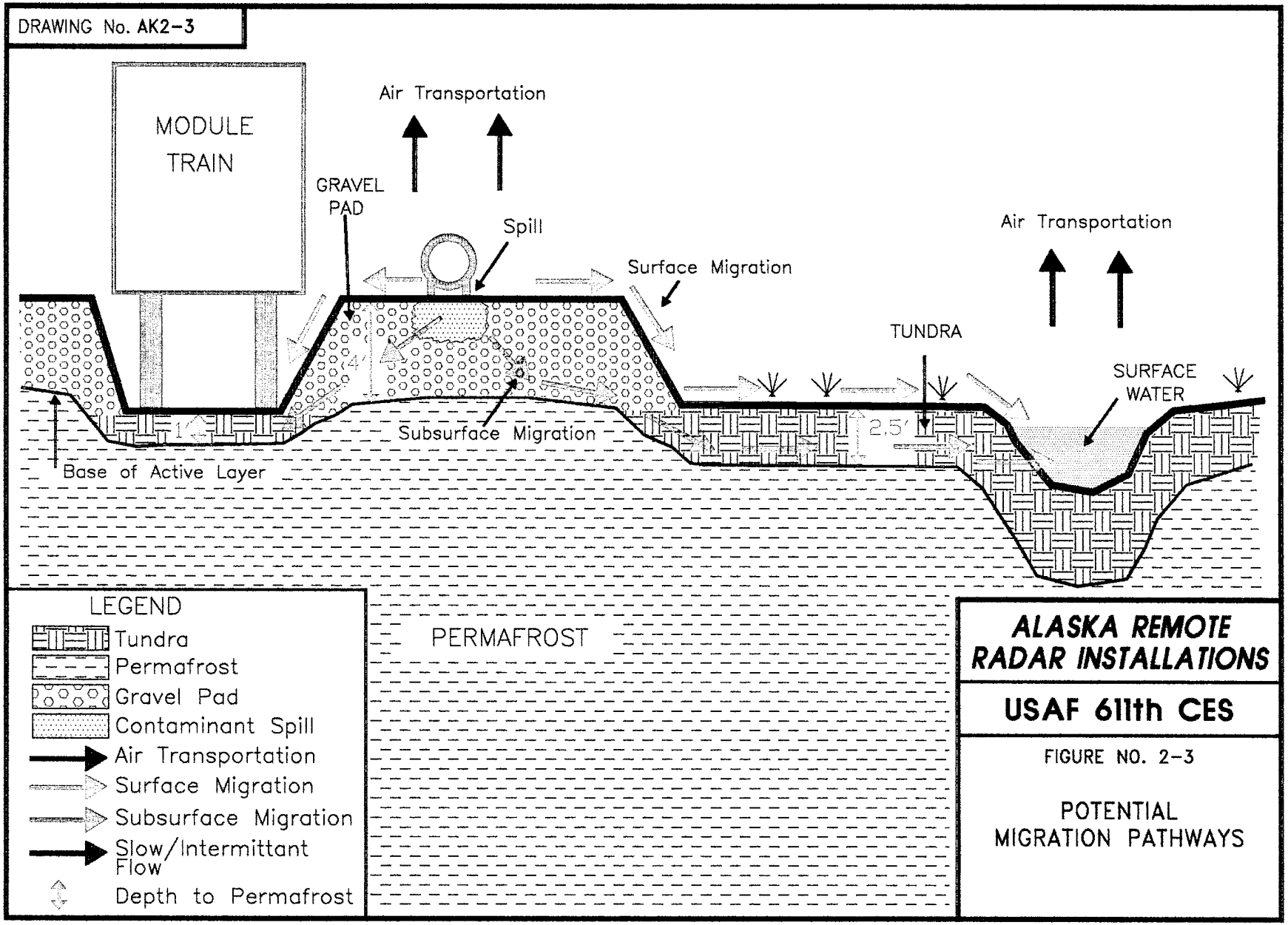
2.4.4 General Migration Pathways

This section presents general information concerning migration pathways for the five sites at the Bullen Point radar installation. Site-specific migration pathways are presented in Sections 3.0 and 4.0.

The potential for contaminant migration exists for any site where a release has occurred. The threat that a contaminated site presents to human health or the environment was assessed according to the potential for contaminant migration, human or ecological receptors, and contaminant concentrations to which the receptors may be exposed.

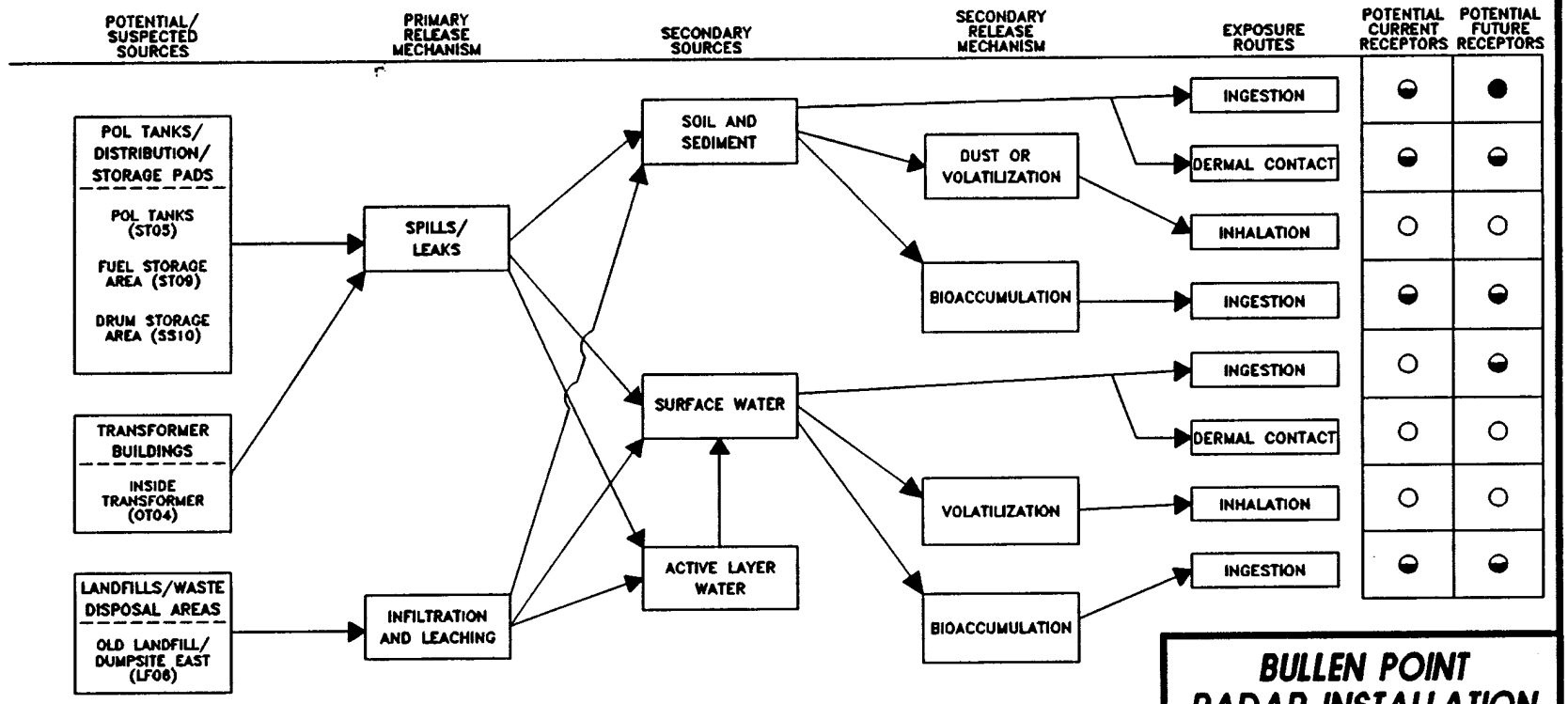
There are three main pathways through which contaminants may reach human and ecological receptors. These pathways are subsurface migration (in affected active layer water), surface migration, and air transportation (as vapors or dust). Potential migration pathways are depicted in Figure 2-3. Figures 2-4 and 2-5 present the potential exposure pathways for the human and ecological receptors, respectively. The discussion of migration pathways is preceded by a general description of the topography and stratigraphy at Bullen Point.

2.4.4.1 Topography. Little topographic relief is expressed at the Bullen Point installation. In general, the tundra is flat or very slightly sloping. The maximum elevation on Bullen Point is approximately 18 feet AMSL, and drainage is radially away from the high points. The Bullen Point installation is adjacent to Mikkelsen Bay and a lagoon.


DRAWING No. AK2-3
MODULE TRAIN
Air Transportation
GRAVEL PAD
Spill
Surface Migration
Air Transportation
TUNDRA
SURFACE WATER
Subsurface Migration
Base of Active Layer
2.5'
LEGEND
Tundra
Permafrost
Gravel Pad
Contaminant Spill
Air Transportation
Surface Migration
Subsurface Migration
Slow/Intermittant Flow
Depth to Permafrost
PERMAFROST
ALASKA REMOTE RADAR INSTALLATIONS
USAF 611th CES
FIGURE NO. 2-3
POTENTIAL MIGRATION PATHWAYS

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DRAWING No. BUL-FLOW



BULLEN POINT RADAR INSTALLATION

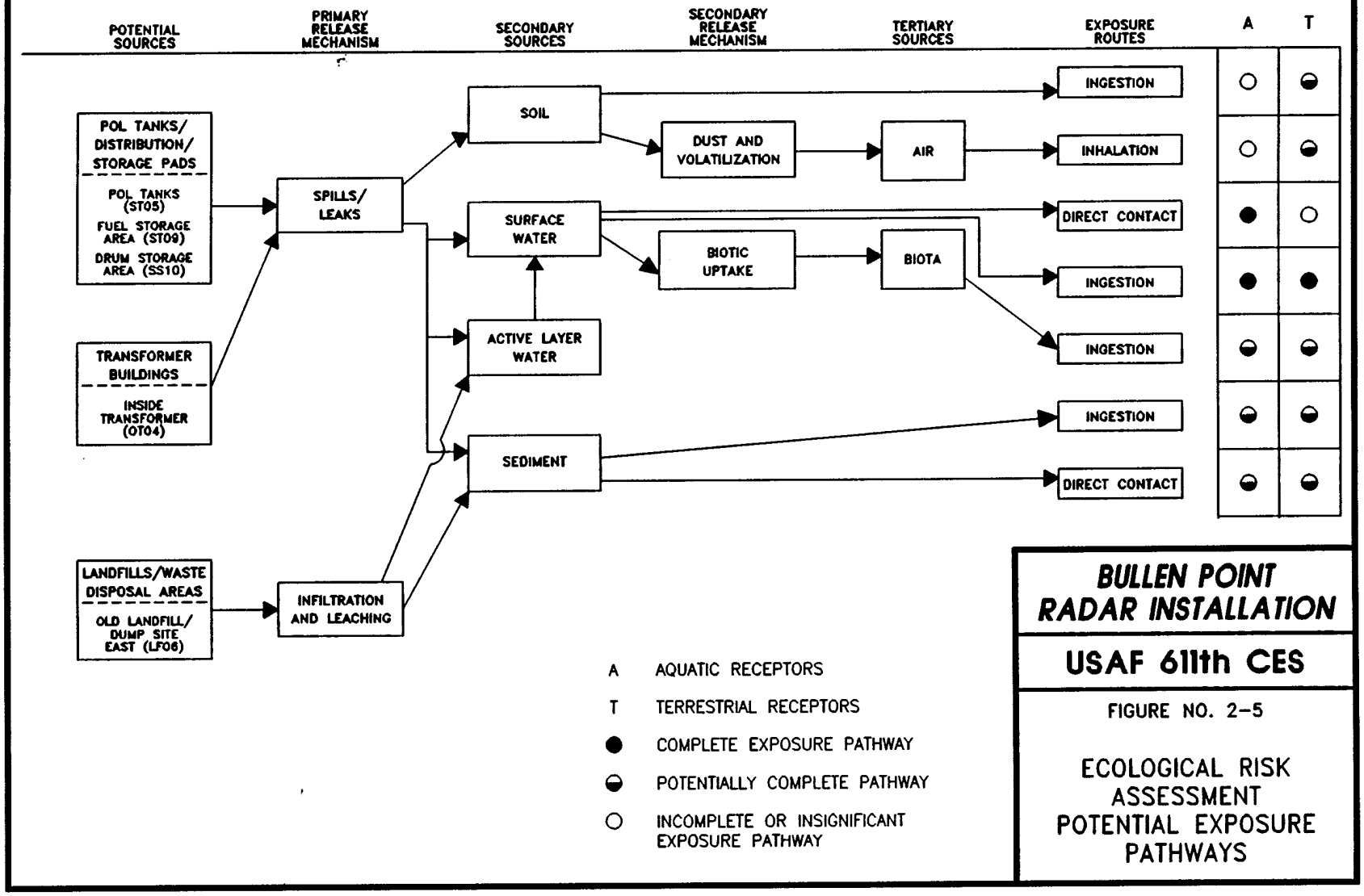
USAF 611th CES

FIGURE NO. 2-4

HUMAN HEALTH RISK ASSESSMENT POTENTIAL EXPOSURE PATHWAYS

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DRAWING No. BUL-FL02



BULLEN POINT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 2-5

ECOLOGICAL RISK ASSESSMENT POTENTIAL EXPOSURE PATHWAYS

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The greatest relief at the installation is the gravel pads and roads, which are of human origin, and rise approximately four to five feet above the tundra. The edges of these features are sloped at the angle of repose for unconsolidated sands and gravels.

The most prominent topographic features, visible from the air and ground surface, are ice wedge polygons. These features are formed by cracking of the ground surface during thermal contraction, followed by the infiltration of water. The water then freezes and forces the crack wider. Repeated freeze-thaw cycles enlarge these features, which form small troughs and may fill with water. Intersecting troughs form polygonal arrangements, which range from a couple of feet to tens of feet across.

Two types of ice wedge polygons exist: low centered and high centered. In low centered polygons, the middle of the polygon is depressed to form a small basin, which may fill with water. A cross-section of one of these basins would reveal an ice-wedge trough on either side of the polygon, berms lining both sides of the troughs, and a basin filling the interior space between the berms. A high centered polygon does not have a depressed center, and consists of intersecting troughs with higher ground in the middle.

Oriented lakes are another prominent tundra feature. These lakes, which form from low centered polygons, are enlarged by the erosional action of wind-induced waves. These lakes are generally not circular but oblong, with the long axis of the lake normal to the prevailing wind direction. They can "migrate" across the tundra at an average rate of three feet per year (Livingstone 1954) and have a stable depth of approximately 10 feet (Hussey and Michaelson 1966).

2.4.4.2 Stratigraphy. The stratigraphy at Bullen Point was examined during RI activities down to the level of the permafrost (generally no deeper than two to four feet). The upper-most features at the site are gravel roads and pads of human origin. These features, which are limited in areal extent, have a maximum height of approximately five feet. They generally consist of well graded sandy gravels with sub-angular to sub-rounded, very fine to coarse sands and sub-angular to sub-rounded gravel clasts ranging from one-quarter inch to one and one-half inches (although gravel clasts ranging up to four inches or more are occasionally encountered). The grains are unconsolidated, and fine material (silts or clays) may be present in minor quantities. The depth to permafrost under the surfaces of gravel pads and roads ranged from two to four feet during August and September 1993.

Gravel pads and roads were constructed on top of native tundra, which occurs throughout the site. The top of the tundra consists of a vegetative mat, in a loamy/silty matrix. This mat can reach several inches in thickness. Underlying the tundra mat are fine to coarse sands and gravels, dark brown organic clays, and silt layers. The depth to permafrost beneath the tundra was approximately two feet during the 1993 RI. Adjacent to the Beaufort Sea, beaches are present that consist of poor to well sorted, sub-rounded to rounded, fine to coarse sands, and sub-rounded to rounded gravel clasts of varying size; minor amounts of fine material are also present.

2.4.4.3 Subsurface Migration. Active layer water flow under the tundra is hampered by the presence of numerous wet depressions and the relatively flat topography; because the depth

to permafrost under these depressions is increased, they tend to act as small catchment basins. These basins limit the potential for the horizontal flow of active layer water (Miller et al. 1980; Robertson 1988). The active layer water flow in these areas is so inhibited that it can contribute little to the midsummer water budget of tundra streams. Most of the active layer water contribution to these streams is from immediately adjacent well drained slopes (Robertson 1988).

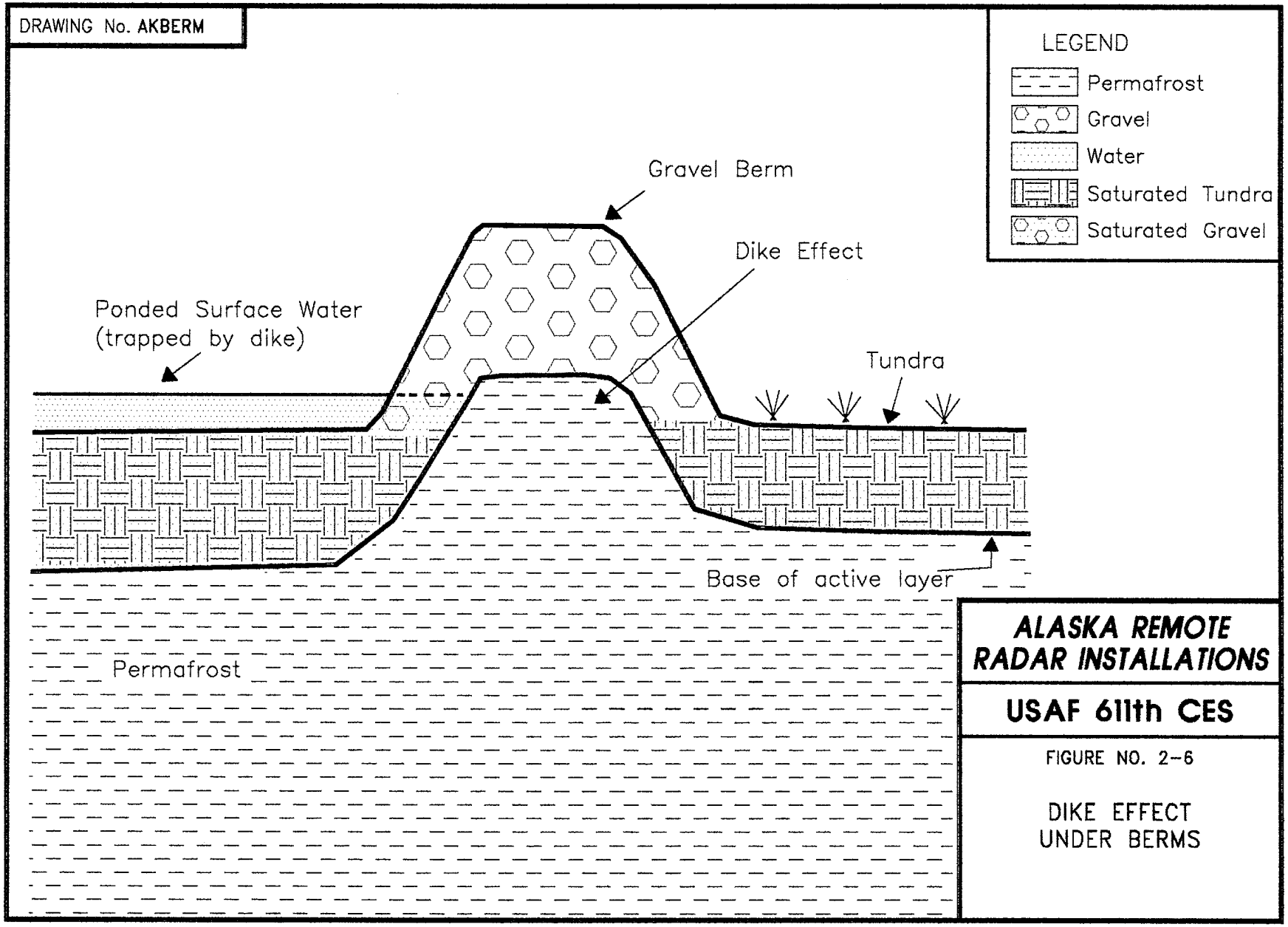
Some generalizations about active layer water flow can be made. Due to the combined effects of low topographic relief and the presence of numerous catchment basins, active layer water migration through areas of tundra is a slow process. The active layer water contribution to tundra streams is mainly from well drained slopes next to those streams. The active layer water flow that does occur is governed by changes in topographic relief and is limited to spring and summer months, with the active layer functioning as a shallow, unconfined aquifer. The water table in such an aquifer tends to mimic topographic features, and active layer water flow is driven by elevation changes. Figure 2-6 illustrates how the elevation changes of gravel roads and berms can restrict active layer water flow.

2.4.4.4 Surface Migration. Surface migration at Bullen Point may occur as a result of the flow of surface water from topographic highs to topographic lows. Surface water flow during the spring thaw, when mounds of snow can channel drainage in unexpected directions, can be markedly different from flow during the summer months. The general surface migration features and directions are depicted in Figure 1-8.

The main factors controlling surface water flow are the topography and water availability. The topography at the Bullen Point installation has very little relief; therefore, there is only a small gradient to drive surface water flow. Combined with the depressions formed by the ice wedge polygons, this creates a multibasinal drainage pattern in which much of the surface water is directed into depressions and small tundra ponds, rather than draining directly into drainage channels. Gravel pads provide the greatest topographic relief at the installation. Surface migration is generally radial out from the gravel pads.

Based upon precipitation alone, Bullen Point could classify as a desert (Robertson 1988). Precipitation along the Beaufort Sea coast averages only seven inches per year (Dingman et al. 1980; Walker et al. 1980). Additionally, 65 percent of the precipitation on the North Slope is in the form of snow (Walker et al. 1980). Most surface water flow occurs during the spring, when melting snow and ice release stored water over a relatively short time-frame and the active layer remains partially frozen. This creates a situation in which there is a large supply of surface water and very little capacity for infiltration. The result is the overland sheet flow of surface water (Robertson 1988), during which drainage is not confined to local drainage features but may travel in a sheet-like fashion over the topography. Snow, ice, and man-made features (gravel pads and roads) may also result in barriers that force the flow of surface water in directions different from those dictated by the underlying ground surface.

There is comparatively little flow of surface water during the summer. In fact, arctic wetlands exist because the lack of significant vertical relief retards the horizontal flow of surface water, and permafrost limits downward flow (Robertson 1988). Overflow from tundra ponds is generally dependant upon summer rainfall.


DRAWING No. AKBERM
LEGEND
Permafrost
Gravel
Water
Saturated Tundra
Saturated Gravel
Gravel Berm
Dike Effect
Ponded Surface Water
(trapped by dike)
Tundra
Base of active layer
Permafrost
ALASKA REMOTE
RADAR INSTALLATIONS
USAF 611th CES
FIGURE NO. 2-6
DIKE EFFECT
UNDER BERMS

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The potential for contaminant migration in surface water is therefore greatest during the spring thaw, which is of relatively short duration, during which the precise direction of flow may be difficult to determine.

There are two small streams that drain the area surrounding the Bullen Point installation. The two streams are located to the east and west of the main installation. A breached dam that was constructed to provide the installation's drinking water source remains at the mouth of the west stream.

2.4.4.5 Air Transport. Air transportation of contaminants is not considered to be a significant migration pathway at Bullen Point. The frozen conditions encountered most of the year are not conducive to the volatilization of organic contaminants or to the transport of affected dust and dirt. During the summer months, the air and ground temperatures remain relatively low (reducing volatility), and the abundant supply of moisture retards the entrainment of affected dust.

2.4.5 Receptors

Three potential human receptor groups were evaluated for the Bullen Point Risk Assessment: an adult assigned to a DEW Line installation (worker), an adult native of the North Slope of Alaska (native), and a native child (child). These receptor groups represent the reasonable maximum exposure at an installation that is not in close proximity to a native village but which may be released for civilian use at some time in the future.

The primary routes of human exposure evaluated in the Bullen Point Risk Assessment are incidental ingestion of soil/sediment and ingestion of surface water.

For the ecological evaluation it was assumed that terrestrial and aquatic species are potential receptors for at least the six months of the year when the region is not ice and snow covered. In addition, it was assumed that species that occur at great distances from the specific installations are not receptors (e.g., whales). Whales may migrate off-shore from the DEW Line sites; it is unlikely, however, that these mammals are potential receptors to COCs released from the sites because of dilution of surface water entering the Arctic Ocean and the distance off-shore that these animals migrate. Potential ecological receptors evaluated in the ERA were discussed in Section 2.4.2.

The potential human health and ecological risks to receptors associated with the contaminants detected at the Bullen Point sites are reported on a site-specific basis in Sections 3.0 and 4.0.

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3.0 REMEDIAL INVESTIGATION - NO FURTHER ACTION SITES

This section of the RI/FS presents results from RI sampling and analysis activities for the two Bullen Point sites recommended for no further action. The two sites considered for no further action and discussed in this section are the Old Landfill/Dump Site East (LF06) and Drum Storage Area (SS10). Each of the no further action sites is presented individually in Sections 3.1 and 3.2. (Note: figures and tables are presented at the end of each section.) The information presented for each site includes site background, field sampling and analytical results, potential migration pathways, human health and environmental risk assessment summaries, and conclusions and recommendations. The site-by-site discussions in this section are intended to provide the reader with all site information needed to support no further action.

Photographs of the Bullen Point installation and the sites investigated during the RI are presented in Appendix B. Data tables in this section list analytical results from samples in which chemicals were detected above quantitation limits. Complete laboratory analytical data sheets for each sample, including quantitation limits for non-detected analytes, are provided in Appendix F.

3.1 OLD LANDFILL/DUMP SITE EAST (LF06)

3.1.1 Site Background

The Old Landfill/Dump Site East is the location of the installation landfill that was used from 1956 to 1971 (when the installation was deactivated); it is less than one acre in size. The dump site is located approximately 600 feet east of the module train and extends to the shore of a lagoon that opens to the Beaufort Sea. The Old Landfill/Dump Site East was covered with gravel and graded; however, minor erosion from wave action has caused some of the rusty drums and other landfill debris to become exposed. The exposed rusty drums were empty, and there was no evidence that suggested any drums contained fluids.

Previous sampling, conducted in 1986, 1987, and 1990 by Air Force contractors, detected TPH in soil and lead in surface water. A detailed list of concentrations of chemicals previously detected is presented in the RI/FS Work Plan (U.S. Air Force 1993a).

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 3.1.3.

3.1.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Old Landfill/Dump Site East (LF06) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

3.1.2.1 Summary of Samples Collected. A total of 11 samples was collected from gravel pads, ponds, and streams at the site. These consisted of eight soil, one sediment, and two surface water samples. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Old Landfill/Dump Site East (LF06) are presented in Figure 3-1.

Eight soil samples were analyzed for DRPH, GRPH, BTEX, VOCs (8010), pesticides, and PCBs. In addition, two samples were analyzed for VOCs (8260), SVOCs. One sample was analyzed for total metals.

The one sediment sample was analyzed for DRPH, GRPH, BTEX, VOCs (8010 and 8260), SVOCs, pesticides, PCBs, and total metals.

Two surface water samples were analyzed for DRPH, GRPH, BTEX, VOCs (8010), pesticides, and PCBs. In addition, one sample was analyzed for VOCs (8260), SVOCs, total and dissolved metals, TOC, TSS, and TDS.

3.1.2.2 Analytical Results. The data summary table (Table 3-1) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds and inorganic analytes with samples collected from the site. Sample locations and analytical results for the samples at the site are illustrated in Figure 3-1. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or field decontamination procedures. Only metals detected above background levels that exceed an RBSL or ARAR are presented on Figure 3-1. The exceptions are presented on the data summary table.

The following section presents a discussion of organic compounds and inorganic analytes detected above background levels at the site. A discussion of TDS, TSS, and TOC is included.

Organics. Organic compounds detected in soil and sediment samples at the site include DRPH and SVOCs. DRPH were detected in six samples ranging from 6.01 to 219 mg/kg. Three SVOCs were detected in two samples at very low levels ranging from 0.447 to 0.74 mg/kg. Two of the SVOCs detected, bis(2-ethylhexyl)phthalate and di-n-butylphthalate, are common laboratory contaminants and probably do not represent actual site conditions.

In surface water samples, only four organic compounds were detected; they are all common components of diesel fuel. DRPH were detected in two samples at 1,840 and 1,870 µg/L. Toluene, ethylbenzene, and xylenes were detected in surface water sample LF06-SW02 at 1.2, 7.6, and 19.2 µg/L, respectively.

Inorganics. Metals analyses indicated that two metals (lead and sodium) were detected at a concentrations above background levels in soil sample LF06-S02 (40 mg/kg and 690 mg/kg, respectively).

In surface water samples, metals analyses detected two metals (aluminum and iron) above background concentrations in sample LF06-SW01 (610 and 3,6000 µg/L, respectively).

TOC, TSS, and TDS were reported in surface water sample LF06-SW01/SW06 at 13,100; 34,000; and 419,000 µg/L, respectively.

3.1.2.3 Summary of Site Contamination. Previous sampling conducted at the Old Landfill/Dump Site East (LF06) detected TPH in soil and lead in surface water. The results and sources of previous sampling efforts are presented in the RI/FS Work Plan (U.S. Air Force 1993a). The quality of the previous IRP sampling data is unknown as is the data validation, if any, that these data have undergone.

TPH were previously detected at 138 mg/kg in a soil sample collected at the southwest border of the Old Landfill/Dump Site East. Lead was reported in a previous surface water sample collected from the west perimeter of the Old Landfill/Dump Site East at a concentration of 0.05 µg/L.

During the 1993 RI, sampling and analyses detected similar concentrations of petroleum compounds (DRPH) in soil (6.01 to 219 mg/kg). DRPH and VOCs were detected in surface water at the site. Lead was not detected during the current RI in surface water samples.

A comparison of historical and current project data indicates the conditions at the Old Landfill/Dump Site East are similar to those in the past. Differences between current and historical data are likely due to more extensive sampling during the 1993 RI. The human health and ecological risks associated with the chemicals detected at the site are presented in Sections 3.1.4 and 3.1.5.

The suspected source of the low levels of petroleum compounds detected during sampling conducted at the Old Landfill/Dump Site East (LF06) site is probably the POL Tanks (ST05) site. The landfill, which has been inactive since 1971, is downgradient from the POL Tanks site, and the contaminants detected at the Old Landfill/Dump Site East are similar to those detected at the POL Tanks (ST05) site.

3.1.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

3.1.3.1 Topography and Stratigraphy. The Old Landfill/Dump Site East site (LF06) is a gravel capped landfill. It is bounded to the southeast and east by a lagoon, and to the south by a tundra pond (Figure 3-1).

During the 1993 RI, the active layer at the installation was approximately two feet thick in tundra areas and four feet thick under the gravel pads. Gravel pad materials at this site were typical

gravels and sands associated with these features, and subsurface tundra materials were typical of the stratigraphy associated with Bullen Point (Section 2.4.4.2).

3.1.3.2 Migration Potential.

Subsurface Migration. The Old Landfill/Dump Site East (LF06) is bordered by surface water bodies in all downgradient locations including a lagoon east of the site and a small freshwater lake in the southwest portion of the site. Although seasonal flow may occur within the site, the surrounding surface water bodies should act as receivers of active layer water from the site. The site is downgradient of the POL Tanks site. Active layer water flow from the gravel pads and tundra in the upgradient POL Tanks area may contribute to surface and subsurface water contamination at the landfill site. Contaminated active layer water that enters surface water bodies no longer presents a potential for subsurface migration, but a potential for surface migration is created. There were no contaminant source areas identified at the Old Landfill/Dump Site East (LF06) site that are expected to impact regional or local active layer water quality. However, low levels of petroleum compounds were detected in the surface water at the Old Landfill/Dump Site East that were also detected at elevated levels at the upgradient POL Tanks (ST05) site.

The east lagoon is considered the most significant receptor of active layer water from the site because it is downgradient of the site. Seeps observed near the base of the landfill suggest that subsurface active layer water flows from the landfill to the eastern lagoon. However, the southwestern freshwater lake is a better indicator of surface water conditions because it is not affected by Beaufort Sea diluting. The analytes detected in surface water and sediment samples from the southwestern lake suggest that it is an active migration pathway from the POL Tanks site.

Surface Migration. Surface water from the landfill drains generally to the east lagoon as indicated by numerous small drainage rills around the landfill's east face. The freshwater lake at the site does receive surface water from the landfill, but the predominant source of surface water flow is from the upgradient POL Tanks (ST05) site. Surface water migration occurs as sheetflow but is probably restricted to the spring when an abundant supply of meltwater is available and infiltration is minimal.

Two surface water samples were collected from the site, one from the freshwater lake and one from a seep adjacent to the east lagoon near the southern boundary of the landfill (Figure 3-1). Petroleum compounds (DRPH and/or BTEX) were detected in both of the surface water samples collected at the landfill. Similar petroleum compounds were detected at elevated levels upgradient at the POL Tanks site. The petroleum compounds detected in surface water at the landfill are probably due to surface and subsurface drainage from the upgradient POL Tanks site. During the 1993 RI activities, construction of a SRR system and regrading of the associated gravel pad was being conducted that may have increased migration potential of the petroleum compounds from the POL Tanks site toward the Old Landfill/Dump Site East.

Air Transport. Air transportation is not believed to be a significant mode of contaminant migration at the site (Section 2.4.4.2).

Summary of Migration Potential. The Old Landfill/Dump Site East site (LF06) is believed to have been affected by surface and active layer water from the POL Tanks (ST05) site. Petroleum compounds were detected in surface water samples collected at the Old Landfill/Dump Site East that were also detected at elevated levels in the soil/sediment and water samples collected at the upgradient POL Tanks site. Analytical data suggest that the contaminants have migrated from the POL Tanks site to the Old Landfill/Dump Site East.

3.1.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the Old Landfill/Dump Site East site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in surface water and soils/sediments at the site. The primary routes of potential exposures at the site are direct contact with soils/sediments, incidental ingestion of soils/sediments, and ingestion of surface water. Because groundwater and air at the Bullen Point sites are not considered complete pathways of exposure, these media were not evaluated as potential pathways to human receptors.

The Bullen Point Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers at the installation, and native adults and children that may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with site chemicals at Bullen Point are presented in Section 3.1.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Bullen Point Risk Assessment (U.S. Air Force 1996) to determine if plants and animals could potentially be affected by the chemicals detected at the Bullen Point installation. Because of the diversity of the plants and animals in the area of the Bullen Point installation, a set of representative species was selected in the ERA for detailed evaluation. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based on their likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches in order to achieve the best characterization of the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Bullen Point. The potential ecological risks associated with the chemicals detected at the site are presented in Section 3.1.5.

3.1.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the Old Landfill/Dump Site East (LF06) site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the chemicals detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

3.1.4.1 Chemicals of Concern. At the Old Landfill/Dump Site East (LF06), no COCs were identified for the soil matrix based on a comparison of the maximum concentrations of detected chemicals to their background, RBSL, and ARAR concentrations. DRPH were identified as a COC for the surface water at the site. The maximum concentration of DRPH exceeded the RBSL based on the noncancer hazard associated with drinking surface water contaminated with petroleum hydrocarbons.

Table 3-2, Identification of COCs at the Old Landfill/Dump Site East, presents the maximum concentrations of chemicals detected at the site, the associated background concentrations, RBSLs, and ARARs, and identifies the COC selected in the risk evaluation.

3.1.4.2 Exposure Pathways and Potential Receptors. Because no COCs were identified for soil/sediment at the Old Landfill/Dump Site East site, only ingestion of surface water was evaluated in the risk assessment.

Three potential receptor groups were evaluated in the risk assessment: an adult working at a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native), and a child living in a North Slope community (child).

3.1.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. No COCs were identified for the soil at the Old Landfill/Dump Site East (LF06). The concentrations measured were below those considered acceptable under EPA Region 10 guidance (EPA 1991) or ARARs.

Noncancer Hazard and Cancer Risk Associated with Surface Water. The noncancer hazard associated with ingestion of surface water at the site by a hypothetical native northern adult is 0.3, and by a DEW Line worker is 0.03, based on the maximum concentration of DRPH. The presence of DRPH in surface water accounts entirely for the quantifiable noncancer hazard for this receptor/pathway combination.

3.1.4.4 Summary of Human Health Risk Assessment. The only risk or hazard associated with the Old Landfill/Dump Site East site is the very low noncancer hazard associated

with DRPH detected in surface water (hazard indices of 0.03 and 0.3). Remedial action is generally not warranted at sites where the excess lifetime cancer risk is less than 1×10^{-6} or the noncancer hazards are less than one (EPA 1991b). In addition, the noncancer hazard for DRPH in surface water were calculated assuming the affected surface water would be used as a sole-source water supply for 180 days per year. Based on site-specific information, the DRPH in surface water does not currently pose a health hazard nor is it likely to pose a hazard in the future. The surface water expressions at the site are frozen most of the year; many are only intermittently filled with water during the summer months. The surface water at the site is not used for a water supply now, nor has it been used in the past. In conclusion, under current uses the COC identified in surface water at the Old Landfill/Dump Site East site poses only a minimal, if any, potential threat to human health. Based on the human health risk assessment, remedial actions are not warranted at the site.

3.1.5 Ecological Risk Assessment

The objective of the ERA is to estimate the potential impacts of chemicals detected at the installation to aquatic and terrestrial plants and animals. A summary of the methods used to assess potential ecological impacts is presented in Section 2.4.2.

3.1.5.1 Chemicals of Concern. COCs were selected based on criteria presented in Section 3.1 of the ERA. The average installation-wide concentrations of COCs were used to calculate the risk estimates. All sites at the installation were considered as potentially usable habitat because the installation has been inactive since 1971. The COC selection process only considered the soil/sediment samples that were at or less than 1.5 feet deep. The soil/sediment samples were screened for depth because it is unlikely that any of the representative species will be exposed to soil/sediments deeper than 1.5 feet. Of the chemicals detected in soils/sediments and surface water at the site, DRPH, iron, and 4-methylphenol were identified as COCs. Iron in surface water was the only COC associated with a potential risk estimate for ecological receptors at this site.

3.1.5.2 Exposure Pathways and Potential Receptors. Potential exposure pathways for terrestrial and aquatic organisms include direct contact with, and ingestion of, contaminated soil/sediment and/or surface water. The most significant route of exposure for plants is direct contact with soil. Aquatic organisms such as fish and invertebrates are primarily exposed through direct contact with surface water. They may also be exposed to COCs through ingestion of plant and animal items in their diet, and incidental ingestion of soil/sediment while foraging, although these pathways are considered less significant and are not used to calculate HQs. Birds and mammals may be exposed to COCs through ingestion of surface water, ingestion of plant and animal diet items (although only ingestion of plant matter was quantified in the estimated exposure equation), and incidental ingestion of soil/sediment.

The potential ecological receptors evaluated in the risk assessment include plants, aquatic organisms, birds, and mammals. These receptor groups were selected based on the species' likelihood of exposure, preferred habitat, and feeding habits. Species that may be particularly sensitive to environmental impacts, such as threatened and endangered species, are considered on an individual basis if present at or near the installation. The spectacled eider (federally listed

as a threatened species) may be present on or near the Bullen Point installation and is evaluated in the ERA. The species evaluated in the ERA are listed in Table 2-6.

3.1.5.3 Risk Characterization. Potential risk to aquatic organisms at the Old Landfill/Dump Site East was attributed to iron. The HQs for iron were 2.9 for the arctic char, nine-spined stickleback, and *Daphnia* spp. The HQs were below 1.0 for exposure to all the COCs for all the terrestrial representative species.

3.1.5.4 Summary of Ecological Risk Assessment. The evaluation of representative plant species indicates no apparent risks from COCs detected at the Old Landfill/Dump Site East.

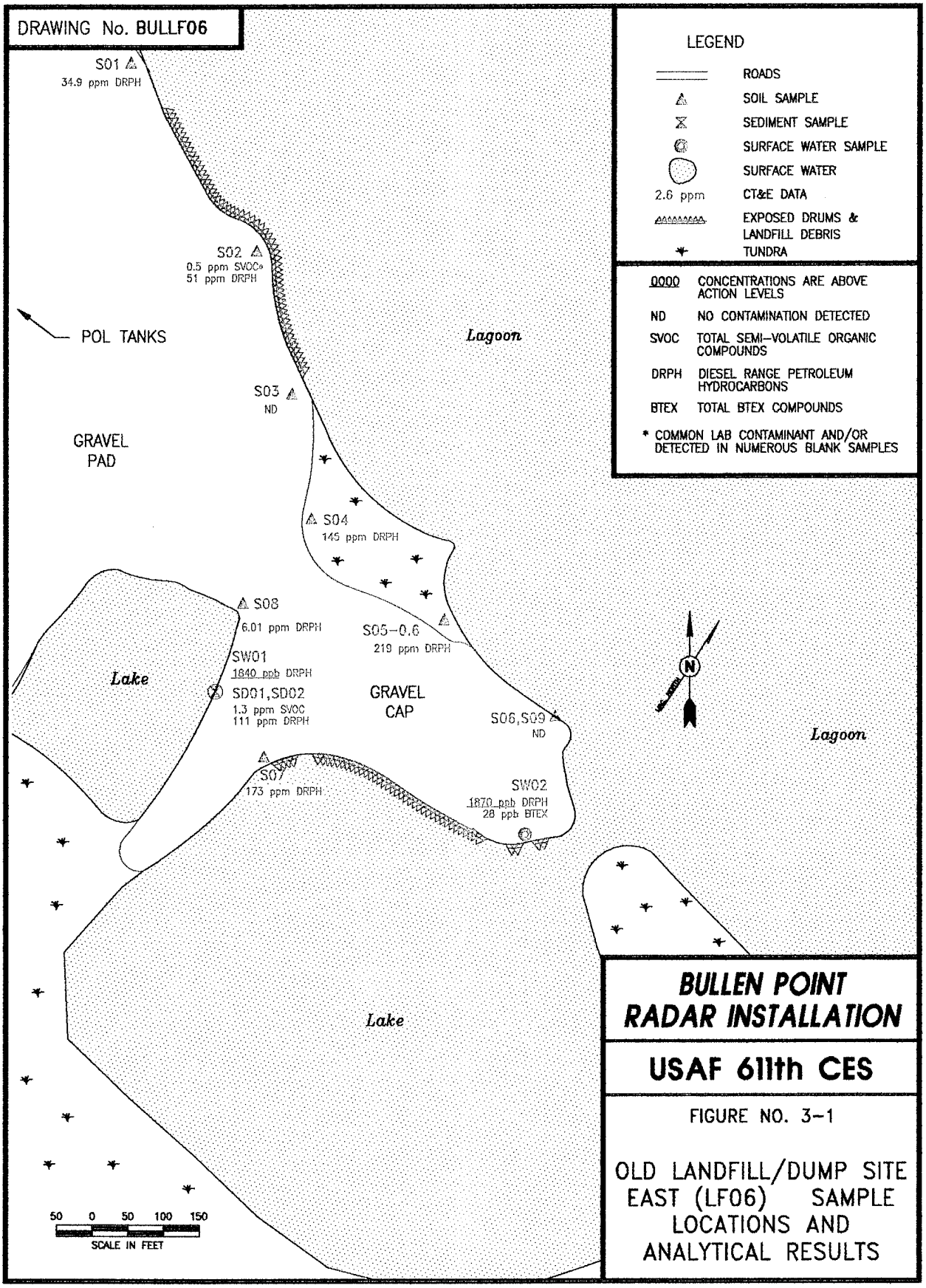
Although the iron HQs for aquatic organisms show a potential for risk, it is important to qualify the risk estimates at the Old Landfill/Dump Site East (LF06) site. The elevated concentration of iron was from one sample collected from a pond that freezes solid in the winter. As a result, this area is not suitable habitat for fish, but may provide habitat for invertebrates. In addition, the potential risk to aquatic species was based on total metal concentrations. If dissolved metal concentrations were used to calculate the risk estimates, the HQs and associated risk estimates for fish and invertebrates would be less than those reported (HQs would be less than 1.0). A third factor to consider is the essential nutrient status of iron. Because iron is a required nutrient and highly regulated by animal metabolism, it is difficult to identify what levels of iron are actually toxic. Considering all these factors, the overall risk to aquatic organisms at this site is minimal.

The risk estimates for avian and mammalian representative species are low at the Old Landfill/Dump Site East.

3.1.6 Conclusions and Recommendations

Sampling and analyses have determined that the Old Landfill/Dump Site East (LF06) site is not significantly contaminated. Only relatively low levels of DRPH, VOCs, and SVOCs were detected at the site. It is suspected that low levels of DRPH, VOCs, and SVOCs are due to migration of affected surface and active layer water from the POL Tanks (ST05) site. Similar compounds were detected at elevated levels in the soil/sediment and surface water samples collected at the upgradient POL Tanks site.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current and future site uses. A potential human health noncancer hazard was identified in surface water from DRPH. This potential hazard is based on a future scenario in which the site surface water would be used as a sole drinking water supply. Even using the conservative future scenario, the potential human health risks at the site are not of a magnitude that normally requires remedial action. The ERA concluded that the overall risk to potential receptors at the site is minimal. Based on the RI sampling and analyses, risk assessment, and current and future site uses, remedial actions are not warranted at the site. No significant human health or ecological risks were identified at the site. Therefore, the Old Landfill/Dump Site East (LF06) site is recommended for no further action.


DRAWING No. BULLF06
S01
34.9 ppm DRPH
S02
0.5 ppm SVOC*
51 ppm DRPH
POL TANKS
Lagoon
S03
ND
GRAVEL
PAD
S04
145 ppm DRPH
S08
6.01 ppm DRPH
S05-0.6
219 ppm DRPH
SW01
1840 ppb DRPH
Lake
SD01,SD02
1.3 ppm SVOC
111 ppm DRPH
GRAVEL
CAP
S06,S09
ND
S07
173 ppm DRPH
SW02
1870 ppb DRPH
28 ppb BTEX
Lagoon
Lake
50 0 50 100 150
SCALE IN FEET
LEGEND
ROADS
SOIL SAMPLE
SEDIMENT SAMPLE
SURFACE WATER SAMPLE
SURFACE WATER
2.6 ppm
CT&E DATA
EXPOSED DRUMS & LANDFILL DEBRIS
TUNDRA
0000 CONCENTRATIONS ARE ABOVE ACTION LEVELS
ND NO CONTAMINATION DETECTED
SVOC TOTAL SEMI-VOLATILE ORGANIC COMPOUNDS
DRPH DIESEL RANGE PETROLEUM HYDROCARBONS
BTEX TOTAL BTEX COMPOUNDS
* COMMON LAB CONTAMINANT AND/OR DETECTED IN NUMEROUS BLANK SAMPLES
BULLEN POINT
RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 3-1
OLD LANDFILL/DUMP SITE EAST (LF06) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 3-1. OLD LANDFILL/DUMP SITE EAST ANALYTICAL DATA SUMMARY

Installation: Bullen Point
Site: Old Landfill/Dump Site East (LF06)
Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks	
					S01	S02	S03	S04	S05-0.6	AB01	EB01	TB01		
Laboratory Sample ID Numbers					4202-6	4123-8 4202-9	4202-10	4202-11	4202-12	4180-3	4204-9 4121-7 4122-7	4122-8 4204-8	4120/4122 4180/4204	4123 4202
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4.00-157	34.9[d]	51.0[d]	<4.00	145	219[d]	NA	NA	NA	NA	<4.00
GRPH	0.400	0.400-1.50	100	<0.500-1.03	<0.600	<0.400	<0.600	<0.500	<1.50	NA	<20	NA	<20	<0.400
BTEX (8020/ 8020 Mod.)			10 Total BTEX	<0.125-<0.20	<0.150	<0.100	<0.150	<0.125	<0.425					
Benzene	0.020	0.020-0.085	0.5	<0.025-<0.040	<0.030	<0.020	<0.030	<0.025	<0.085	<1[c]	<1	<1	<1	<0.020
Toluene	0.020	0.020-0.085		<0.025-<0.040	<0.030	<0.020	<0.030	<0.025	<0.085	<1[c]	<1	<1	<1	<0.020
Ethylbenzene	0.020	0.020-0.085		<0.025-<0.040	<0.030	<0.020	<0.030	<0.025	<0.085	<1[c]	<1	<1	<1	<0.020
Xylenes (Total)	0.040	<0.040-0.710		<0.050-<0.080	<0.060	<0.040	<0.060	<0.050	<0.170	<2[c]	<2	<2	<2	<0.040
VOC 8010	0.020	0.020-0.085		<0.025-<0.040	<0.030	<0.020	<0.030	<0.025	<0.085	NA	<1	<1	<1	<0.020
VOC 8260	0.020	0.020		<0.025-<0.035	NA	<0.020	NA	NA	NA	<1	<1-5.7	<1	<1	<0.020
SVOC 8270														
bis (2-Ethyl-hexyl) phthalate	0.200	0.210	50	<0.240-<1.00	NA	0.447	NA	NA	NA	NA	<10	NA	<10	<0.200
Pesticides	0.001	0.002-0.060		<0.002-<0.020	<0.002-<0.020	<0.002-<0.020	<0.002-<0.020	<0.002-<0.030	<0.002-<0.060	NA	NA	NA	NA	<0.002-<0.020
PCBs	0.020	0.020	10	<0.020	<0.020	<0.020	<0.020	<0.020	<0.060	NA	NA	NA	NA	<0.020

☐ CT&E Data.
NA Not analyzed.
[a] The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
[c] BTEX determined by 8260 method analysis.
[d] The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 3-1. OLD LANDFILL/DUMP SITE EAST ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Old Landfill/Dump Site East (LF06)
Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples						Field Blanks			Lab Blanks	
					S08 & S09 (Replicates)		S07	S08	SD01 & SD02 (Replicates)		AB01	EB01	TB01		
Laboratory Sample ID Numbers					4202-13	4202-16	4202-14	4202-15	4123-9 4202-17	4202-18	4180-3	4204-9 4121-7 4122-7	4122-8 4204-8	4122 4204 4180	4202 4123
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4.00-157	<4.00	<4.00	173[c]	6.01[c]	111J[c]	79J[c]	NA	NA	NA	NA	<4.00
GRPH	0.400	0.400-0.500	100	<0.500-1.03	<0.400	<0.400	<0.400	<0.400	<0.400	<0.500	NA	<20	NA	<20	<0.400
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.125-<0.20	<0.100	<0.100	<0.100	<0.100	<0.100	<0.125					
Benzene	0.020	0.020-0.025	0.5	<0.025-<0.040	<0.020	<0.020	<0.020	<0.020	<0.020	<0.025	NA	<1	<1	<1	<0.020
Toluene	0.020	0.020-0.025		<0.025-<0.040	<0.020	<0.020	<0.020	<0.020	<0.020	<0.025	NA	<1	<1	<1	<0.020
Ethyl-benzene	0.020	0.020-0.025		<0.025-<0.040	<0.020	<0.020	<0.020	<0.020	<0.020	<0.025	NA	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.040-0.050		<0.050-<0.080	<0.040	<0.040	<0.040	<0.040	<0.040	<0.050	NA	<2	<2	<2	<0.040
VOC 8010	0.020	0.020		<0.025-<0.040	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	NA	<1-7	<1	<1	<0.020
VOC 8260	0.020	0.025		<0.025-<0.035	NA	NA	NA	NA	<0.025	NA	<1	<1-5.7	<1	<1	<0.020
SVOC 8270															
4-Methyl-phenol	0.200	0.240		<0.240-<1.00	NA	NA	NA	NA	0.58	NA	NA	<10	NA	<10	<0.200
di-n-Butyl-phthalate	0.200	0.240	8,000	<0.240-<1.00	NA	NA	NA	NA	0.74	NA	NA	<10	NA	<10	<0.200
Pesticides	0.001	0.002-0.020		<0.002-<0.020	<0.002-<0.020	<0.002-<0.020	<0.002-<0.020	<0.002-<0.020	<0.002-<0.020	<0.002-<0.020	NA	NA	NA	NA	<0.002-<0.020
PCBs	0.020	0.020	10	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	NA	NA	NA	NA	<0.020

□ CT&E Data.
NA Not analyzed.
J Result is an estimate.
a The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
c The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 3-1. OLD LANDFILL/DUMP SITE EAST ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Old Landfill/Dump Site East (LF06)
Matrix: Soil/Sediment
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples							Field Blanks			Lab Blanks
					S02	SD01							EB01		
Laboratory Sample ID Numbers					4123-8	4123-9							4121-7		4123 4121
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg							µg/L		µg/L
Aluminum	0.35	2		1,500-25,000	2,400	1,700							<100		<100
Antimony	N/A	53-58		<7.8-<230	<53J	<58J							<100		<100
Arsenic	0.11	5.3-5.8		<4.9-8.5	<5.3	<5.8							<100		<100
Barium	0.024	1		27-390	19	32							<50		<50
Beryllium	N/A	2.6-2.9		<2.6-6.4	<2.6	<2.9							<50		<50
Cadmium	0.33	2.6-2.9		<3.0-<36	<2.6	<2.9							<50		<50
Calcium	0.69	4		360-59,000	16,000J	34,500							<200		<200
Chromium	0.066	1		<4.3-47	18	6.7							<50		<50
Cobalt	N/A	53-58		<5.1-12	<53	<58							<100		<100
Copper	0.045	1		<2.7-45	13	6.2							<50		<50
Iron	0.50	2		5,400-35,000	7,400	7,000							<100		<100
Lead	0.13	2-5.8		<5.1-22	40	<5.8							<100		<100
Magnesium	0.96	4		360-7,400	1,680	1,600							<200		<200
Manganese	0.025	1		25-290	76	50.5							<50		<50
Molybdenum	N/A	2.6-2.9		<2.5-<11	<2.6	<2.9							<50		<50
Nickel	0.11	1		4.2-46	6.7	7.5							<50		<50
Potassium	23	260-2,900		<300-2,200	<260	<2,900R							<5,000		<5,000

☐ CT&E Data.
N/A Not available.
J Result is an estimate.
R Result has been rejected.

TABLE 3-1. OLD LANDFILL/DUMP SITE EAST ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Old Landfill/Dump Site East (LF06)
Matrix: Soil/Sediment
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples							Field Blanks			Lab Blanks
					S02	SD01							EB01		
Laboratory Sample ID Numbers					4123-8	4123-9							4121-7		4123 4121
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg							µg/L		µg/L
Selenium	1.2	53-58		<7.8-<170	<53	<58							<100		<100
Silver	0.53	2.6-2.9		<3-<110	<2.6	<2.9							<50		<50
Sodium	0.55	5		<160-680	690	<150							340		<250
Thallium	0.011	0.3		<0.2-<1.2	<0.3	<0.3							<5		<5
Vanadium	0.036	1		6.3-59	8.0	6.5							<50		<50
Zinc	0.16	1		9.2-95	34	30							<50		<50

☐ CT&E Data.

TABLE 3-1. OLD LANDFILL/DUMP SITE EAST ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Old Landfill/Dump Site East (LF06)
Matrix: Surface Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks
					SW01 & SW03 (Duplicates)		SW02			AB01	EB01	TB01	
Laboratory Sample ID Numbers					4121-3 4204-3 4122-3	4204-5	4204-4			4180-3	4204-9 4121-7 4122-7	4122-8 4204-8	4204/4180 4122/4121
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L			µg/L	µg/L	µg/L	µg/L
DRPH	100	100		<200	1,840J[ac]	1,450J[ac]	1,870[ac]			NA	NA	NA	<100
GRPH	20	20-125		<20	<20	<20	<125			NA	<20	NA	<20
BTEX (8020/8020 Mod.)													
Benzene	1	1	5	<1	<1	<1	<1			NA	<1	<1	<1
Toluene	1	1	1,000	<1	<1	<1	1.2			NA	<1	<1	<1
Ethylbenzene	1	1	700	<1	<1	<1	7.6			NA	<1	<1	<1
Xylenes (Total)	2	2	10,000	<2	<2	<2	19.2			NA	<2	<2	<2
VOC 8010	1	1		<1	<1	<1-4U	<1			NA	<1-7	<1	<1
VOC 8260													
1,2-Dichloroethane	1	1	5	1.9B-4.5B	<1	1.6B	NA			<1	1.1	<1	<1
SVOC 8270	10	10		<10	<10	<10	NA			NA	<10	NA	<10
Pesticides	0.05	0.1-3		<0.1-<2	<0.1-<2	<0.2-<3	<1			NA	NA	NA	<0.1
PCBs	1	1-3	0.5	<2	<2	<3	<1			NA	NA	NA	<1
TOC	5,000	5,000		17,000-30,700	12,500	13,100	NA			NA	NA	NA	<5,000
TSS	100	200		13,000-19,000	34,000	28,000	NA			NA	NA	NA	<200
TDS	10,000	10,000		241,000-1,853,000	419,000	359,000	NA			NA	NA	NA	<10,000

☐ CT&E Data.
NA Not analyzed.
B The analyte was detected in the associated blank.
J Result is an estimate.
U Compound is not present above the concentration listed.
a Total hydrocarbons in these water samples exceed the 15 µg/L stated for fresh water in ADEC's Water Quality Criteria 18AAC70 (ADEC 1989).
c EPH pattern is not consistent with an unweathered middle distillate fuel.

TABLE 3-1. OLD LANDFILL/DUMP SITE EAST ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Old Landfill/Dump Site East (LF06)

Matrix: Surface Water
Units: µg/L

METALS ANALYSES: TOTAL
(DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples							Field Blank			Lab Blank
					SW01 & SW03 (Duplicates)								EB01		
Laboratory Sample ID Numbers					4121-3	4121-4							4121-7		4121
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L							µg/L		µg/L
Aluminum	17.4	100		<100-350 (<100-340)	610 (<100)	<100 (<100)							<100 (<100)		<100 (<100)
Antimony	N/A	100	6	<100 (<100)	<100 (<100)	<100 (<100)							<100 (<100)		<100 (<100)
Arsenic	5.3	100	50	<100 (<100)	<100 (<100)	<100 (<100)							<100 (<100)		<100 (<100)
Barium	1.2	50	2,000	<50-93 (<50-91)	74 (52)	59 (52)							<50 (<50)		<50 (<50)
Beryllium	N/A	50	4	<50 (<50)	<50 (<50)	<50 (<50)							<50 (<50)		<50 (<50)
Cadmium	1.7	50	5	<50 (<50)	<50 (<50)	<50 (<50)							<50 (<50)		<50 (<50)
Calcium	34.5	200		4,500-88,000 (4,100-86,000)	50,000 (47,000)	48,000 (47,000)							<200 (<200)		<200 (<200)
Chromium	3.29	50	100 50	<50 (<50)	<50 (<50)	<50 (<50)							<50 (<50)		<50 (<50)
Cobalt	N/A	100		<100 (<100)	<100 (<100)	<100 (<100)							<100 (<100)		<100 (<100)
Copper	2.3	50	1,300	<50 (<50)	<50 (<50)	<50 (<50)							<50 (<50)		<50 (<50)
Iron	25	100		180-2,800 (<100-1,600)	3,600 (120)	2,100 (120)							<100 (<100)		<100 (<100)
Lead	6.6	100	15	<100 (<100)	<100 (<100)	<100 (<100)							<100 (<100)		<100 (<100)

☐ CT&E Data.
N/A Not available.

TABLE 3-1. OLD LANDFILL/DUMP SITE EAST ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Old Landfill/Dump Site East (LF06)
Matrix: Surface Water
Units: µg/L
METALS ANALYSES: TOTAL (DISSOLVED)

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples						Field Blank			Lab Blank
					SW01 & SW03 (Duplicates)							EB01		
Laboratory Sample ID Numbers					4121-3	4121-4						4121-7		4121
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L						µg/L		µg/L
Magnesium	47.8	200		2,900-53,000 (2,600-54,000)	18,000 (18,000)	18,000 (18,000)						<200 (<200)		<200 (<200)
Manganese	1.24	50		<50-510 (<50-120)	130 (<50)	<50 (<50)						<50 (<50)		<50 (<50)
Molybdenum	N/A	50		<50 (<50)	<50 (<50)	<50 (<50)						<50 (<50)		<50 (<50)
Nickel	5.5	50	100	<50 (<50)	<50 (<50)	<50 (<50)						<50 (<50)		<50 (<50)
Potassium	1,154	5,000		<5,000-5,000 (5,000-5,000)	<5,000 (<5,000)	<5,000 (<5,000)						<5,000 (<5,000)		<5,000 (<5,000)
Selenium	62.4	100	50	<100 (<100)	<100 (<100)	<100 (<100)						<100 (<100)		<100 (<100)
Silver	2.6	50	50	<50 (<50)	<50 (<50)	<50 (<50)						<50 (<50)		<50 (<50)
Sodium	27.7	250		8,400-410,000 (8,200-450,000)	73,000 (75,000)	71,000 (78,000)						340 (330)		<250 (<250)
Thallium	0.57	5-10	2	<5 (<5)	<5 (<5)	<5 (<10)						<5 (<5)		<5 (<5)
Vanadium	1.8	50		<50 (<50)	<50 (<50)	<50 (<50)						<50 (<50)		<50 (<50)
Zinc	8.2	50		<50-160 (<50)	<50 (<50)	<50 (<50)						<50 (<50)		<50 (<50)

☐ CT&E Data.
N/A Not available.

TABLE 3-2. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE OLD LANDFILL/DUMP SITE EAST (LF06)

SITE	MATRIX	CHEMICAL DETECTED	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[a]		ARAR[b]	CHEMICAL OF CONCERN
						CANCER	NON-CANCER		
Old Landfill/Dump Site East (LF06)	Soil/Sediment	DRPH	219	mg/kg	<4-157	--	--	500[c]	No
		bis(2-Ethylhexyl)phthalate	0.447	mg/kg	<0.240-<1.00	4.57	540	50[d]	No
		4-Methylphenol	0.58	mg/kg	<0.240-<1.00	--	135	--	No
		di-n-Butylphthalate	0.74	mg/kg	<0.240-<1.00	--	2,700	8,000[d]	No
		Aluminum	2,400	mg/kg	1,500-25,000	--	--	--	No
		Barium	32	mg/kg	27-390	--	1,890	--	No
		Calcium	34,500	mg/kg	360-59,000	--	--	--	No
		Chromium	18	mg/kg	<4.3-47	--	135	--	No
		Copper	13	mg/kg	<2.7-45	--	999	--	No
		Iron	7,400	mg/kg	5,400-35,000	--	--	--	No
		Lead	40	mg/kg	<5.1-22	--	--	500[e]	No
		Magnesium	1,680	mg/kg	360-7,400	--	--	--	No
		Manganese	76	mg/kg	25-290	--	3,780	--	No
		Nickel	7.5	mg/kg	4.2-46	--	540	--	No
		Sodium	690	mg/kg	<160-680	--	--	--	No
		Vanadium	8	mg/kg	6.3-59	--	189	--	No
		Zinc	34	mg/kg	9.2-95	--	8,100	--	No
	Surface water[h]	DRPH	1,870	µg/L	<200	--	292	--	**Yes**
		Toluene	1.2	µg/L	<1	--	96.5	1,000[f]	No
		Ethylbenzene	7.6	µg/L	<1	--	158	700[f]	No
		Xylenes (Total)	19.2	µg/L	<2	--	7,300	10,000[f]	No
		Aluminum	610	µg/L	<100-350	--	--	--	**Yes***
		Barium	74	µg/L	<50-93	--	256	2,000[g]	No
		Calcium	50,000	µg/L	4,100-88,000	--	--	--	No

TABLE 3-2. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE OLD LANDFILL/DUMP SITE EAST (LF06) (CONTINUED)

SITE	MATRIX	CHEMICAL DETECTED	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[a]		ARAR[b]	CHEMICAL OF CONCERN
						CANCER	NON-CANCER		
Old Landfill/Dump Site East (LF06) (Continued)	Surface water[h] (Continued)	Iron	3,600	µg/L	<100-28,000	--	--	--	No
		Magnesium	18,000	µg/L	<5,000-54,000	--	--	--	No
		Manganese	130	µg/L	<50-510	--	18.3	--	No
		Sodium	78,000	µg/L	8,200-450,000	--	--	--	No

* Chemicals without an RBSL or ARAR are considered chemicals of potential concern and are discussed in the Final Bullen Point Risk Assessment, Section 2.1.5. (U.S. Air Force 1996).

a Risk-Based Screening Level.

b Applicable or Relevant and Appropriate Requirement.

c ADEC 1991.

d 55 FR 30798, Proposed Rule RCRA Corrective Action for SWMUs 40 CFR [Section 264.521 (a)(2)(i-iv)], Health-Based Criteria for Systematic Toxicants and Carcinogens.

e EPA 1991.

f MCL, 56 FR 3526 (30 January 1991).

g MCL, 56 FR 30266 (01 July 1991).

h The concentrations reported for metals in surface water are total metals.

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3.2 DRUM STORAGE AREA (SS10)

3.2.1 Site Background

The Drum Storage Area site (SS10) is located approximately 100 feet northeast of the POL Tanks site (ST05). The site was used to stockpile drummed fluids such as solvents, antifreeze, and lube oil, and consists of a gravel pad area elevated approximately three feet above the tundra. Posts remain that supported a platform used to store drums off the ground surface. The site was deactivated with the installation in 1971.

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 3.2.3.

3.2.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Drum Storage Area (SS10) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

3.2.2.1 Summary of Samples Collected. A total of three soil samples was collected from the gravel pad area at the site. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Drum Storage Area (SS10) site are presented in Figure 3-2.

The three soil samples were analyzed for DRPH, GRPH, BTEX, HVOC, VOCs, SVOCs, and PCBs. In addition, one sample was analyzed for total metals.

3.2.2.2 Analytical Results. The data summary table (Table 3-4) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are listed for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds and inorganic analytes with samples collected from the site. Sample locations and analytical results for the samples at the site are illustrated in Figure 3-2. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or field decontamination procedures. Only metals detected above background levels that exceed an RBSL or ARAR are presented on Figure 3-2. The exceptions are presented on the data summary table.

The following section presents a discussion of organic compounds and inorganic analytes detected above background levels at the site.

Organics. Organic compounds detected in soil and sediment samples collected at the site are limited to DRPH and GRPH. DRPH were detected in two samples at 430 and 775 mg/kg (samples SS10-S01-1.6 and SS10-S02-1.5, respectively). GRPH were detected in the same two samples at 1.72 and 14.3 mg/kg.

Inorganics. No metals were detected above background concentrations in the soil sample collected at the site.

3.2.2.3 Summary of Site Contamination. Sampling and analysis have determined that low levels of petroleum hydrocarbons (DRPH and GRPH) exist at the Drum Storage Area site (SS10). No previous sampling has been conducted at the site.

The suspected source of the petroleum compounds detected during sampling conducted at the Drum Storage Area site (SS10) is migration from the POL Tanks (ST05) site. Petroleum compounds were detected in samples, collected in conjunction with the investigation of the POL Tanks site, that encompass the Drum Storage Area site. The compounds detected at the Drum Storage Area were detected at similar levels in the surrounding POL Tanks site samples. There were no contaminant sources identified or visual signs of source areas associated with the Drum Storage Area.

3.2.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

3.2.3.1 Topography and Stratigraphy. The Drum Storage Area (SS10) area consists of a gravel pad placed upon relatively flat tundra (Figure 3-2). The gravel pad is approximately three feet deep, and slopes to the north and west at the angle of repose. The site is bordered to the south and east by the continuing gravel pad, and to the north and west by tundra.

During the 1993 RI, the active layer at the site was approximately two feet thick in tundra areas and four feet thick under gravel pads. Gravel pad materials at this site were of the typical gravels and sands associated with these features, and subsurface tundra materials were of the typical stratigraphy found at Bullen Point (Section 2.4.4.2).

3.2.3.2 Migration Potential.

Subsurface Migration. Subsurface flow may be a migration pathway at the site. The presence of petroleum compounds, associated with the nearby POL Tanks (ST05), at depth indicates that these compounds may have impacted active layer water quality, and surface soils that have been affected may continue to impact the active layer water. Topographic information indicates that the general active layer water flow at the site should be generally to the north where it radiates out from the site. Seasonal water flow within the site it is suspected to be very sluggish due to the flat topography.

Surface Migration. There are no distinct surface water bodies associated with this site. Surface water migration at the site occurs as sheet flow. However, significant migration is probably restricted to the spring thaw when large quantities of meltwater are available and the frozen ground prevents subsurface migration. Topography indicates that surface migration will be generally to the north where it radiates out from the site and into the tundra.

Air Transport. Air transportation is not considered to be a significant mode of migration at the site (Section 2.4.4.2).

Summary of the Migration Potential. The Drum Storage Area (SS10) site is believed to have been affected by surface and active layer water from the POL Tanks (ST05) site. Petroleum compounds (DRPH and GRPH) detected in soil samples collected at the Drum Storage Area site were also detected at elevated levels in soil/sediment and water samples collected at the upgradient POL Tanks site. Topography and analytical data suggest that contaminants have migrated from the POL Tanks site to the Drum Storage Area site.

3.2.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the Drum Storage Area site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in soils/sediments at the site. The primary routes of potential exposures at the site are direct contact with soil/sediments and incidental ingestion of soils/sediments. Surface water was not considered a route of exposure at the site because there were no surface water bodes associated with the site. Because groundwater and air at the Bullen Point sites are not considered complete pathways of exposure, these media are not evaluated as potential pathways to human receptors.

The Bullen Point Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers, and native adults and children that may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with chemicals detected at the Drum Storage Area are presented in Section 3.2.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Bullen Point Risk Assessment (U.S. Air Force 1996) to determine if chemicals detected at the Bullen Point installation could potentially be affected by the plants and animals. Because of the diversity of the plants and animals in the area of the installation, a set of representative species was selected in the ERA for detailed evaluation. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based primarily on their likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches in order to achieve the best characterization of the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Bullen Point. The potential ecological risks associated with the chemicals detected at the site are presented in Section 3.2.5.

3.2.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the Drum Storage Area site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the chemicals detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

3.2.4.1 Chemicals of Concern. DRPH were identified as a COC for the soil matrix at the Drum Storage Area. The maximum concentration of DRPH exceeded the background concentration and the ARAR concentration for petroleum hydrocarbon contamination of soil (ADEC 1991). No surface water bodies were associated with the site; therefore, no surface water COCs were identified.

Table 3-4, Identification of COCs at the Drum Storage Area, presents the maximum concentrations of chemicals detected at the site, associated background concentrations, RBSLs, and ARARs, and identifies COCs selected in the risk evaluation.

3.2.4.2 Potential Receptors and Exposure Pathways. Because no surface water bodies were associated with the Drum Storage Area, only soil/sediment ingestion pathways were considered in the risk assessment.

Three potential receptor groups were evaluated in the human health risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native), and a child living in a North Slope community (child).

3.2.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. The noncancer hazard associated with the ingestion of soil at the Drum Storage Area by a hypothetical native northern adult/child is 0.01, and by a DEW Line worker is <0.001. This is based on the maximum concentration of the DRPH, which accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations.

No carcinogenic COCs were identified for the soil at the Drum Storage Area; therefore, the excess lifetime cancer risk associated with ingestion of soil cannot be quantified.

Noncancer Hazard and Cancer Risk Associated with Surface Water. No surface water bodies were associated with the Drum Storage Area (SS10). Therefore, there is no apparent surface water pathway, and no evaluation of noncancer hazard or excess lifetime cancer risk associated with ingestion of surface water at this site was conducted.

3.2.4.4 Summary of Human Health Risk Assessment. The risks and hazards associated with the soil/sediment at the Drum Storage Area site are limited to the low noncancer hazards (hazard indices of 0.01 and <0.001). The hazards were estimated based on an ingestion rate for soil associated with a residential scenario. It is very unlikely that the soil at this location would be ingested at the conservative rate used in the risk calculation, so the hazards at the site are likely to be overestimated. There were no carcinogenic COCs identified in soils at the Drum Storage Area. Therefore, the noncancer and cancer risks associated with soil/sediment at the site are minimal. Remedial action is generally not warranted at sites where the excess lifetime cancer risk is less than 1×10^{-6} or noncancer hazards are less than one (EPA 1991b), and on the basis of cancer risk and noncancer hazard, remediation of the site is not necessarily warranted.

In conclusion, under current uses and future residential scenarios, the COC identified in soil at the Drum Storage Area site poses minimal, if any, potential threat to human health. Based on the human health risk assessment, remediation is not warranted at the site.

3.2.5 Ecological Risk Assessment

The objective of the ERA was to estimate the potential impacts of chemicals detected at the installation to aquatic and terrestrial plants and animals. A summary of the methods used to assess potential ecological impacts is presented in Section 2.4.2.

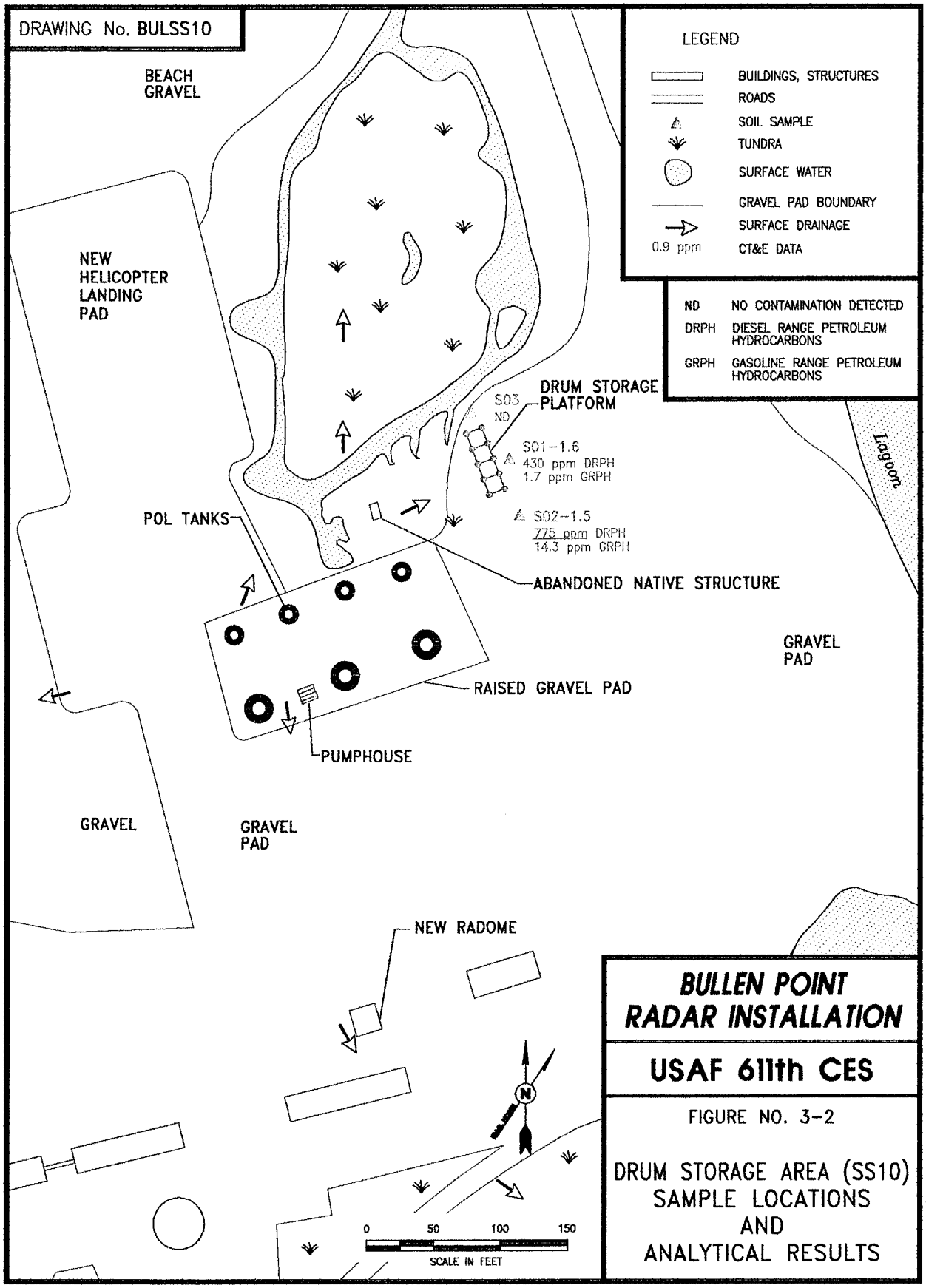
3.2.5.1 Chemicals of Concern. COCs were selected based on criteria presented in Section 3.1 of the ERA. The average installation-wide concentrations of COCs were used to calculate the risk estimates. All sites at the installation were considered as potentially usable habitat because the installation has been inactive and/or unmanned since 1971. The COC selection process only considered the soil/sediment samples that were at or less than 1.5 feet deep. The soil/sediment samples were screened for depth because it is unlikely that any of the representative species will be exposed to soil/sediments deeper than 1.5 feet. Of the chemicals detected in soils/sediments at the Drum Storage Area, DRPH was the only chemical selected as a COC. DRPH was not associated with any potential risks for ecological receptors at this site.

3.2.5.2 Summary of Ecological Risk Assessment. Based on the calculated HQs, there is little or no ecological risk to terrestrial species associated with COCs at the Drum Storage Site. Aquatic organisms were not evaluated at the site because no surface water bodies are associated with the site.

3.2.6 Conclusions and Recommendations

Sampling and analyses have determined that the Drum Storage Area (SS10) site is not significantly contaminated. Only relatively low levels of DRPH and GRPH were detected in soils at the site. It is suspected that low levels of DRPH and GRPH are due to migration of affected surface and active layer water from the POL Tanks (ST05) site. Similar compounds were detected at elevated levels in the soil/sediment and surface water samples collected at the upgradient POL Tanks site.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current and future site uses. Based on the RI sampling and analyses, risk assessment, and current and future site uses, remedial actions are not warranted at the site. No significant human health or ecological risks were identified at the site. Therefore, the Drum Storage Area (SS10) site is recommended for no further action.


DRAWING No. BULSS10
BEACH GRAVEL
NEW HELICOPTER LANDING PAD
POL TANKS
PUMPHOUSE
GRAVEL
GRAVEL PAD
GRAVEL PAD
RAISED GRAVEL PAD
ABANDONED NATIVE STRUCTURE
DRUM STORAGE PLATFORM
S03 ND
S01-1.6 430 ppm DRPH 1.7 ppm GRPH
S02-1.5 775 ppm DRPH 14.3 ppm GRPH
Lagoon
NEW RADOME
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
TUNDRA
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
0.9 ppm CT&E DATA
ND NO CONTAMINATION DETECTED
DRPH DIESEL RANGE PETROLEUM HYDROCARBONS
GRPH GASOLINE RANGE PETROLEUM HYDROCARBONS
N
0 50 100 150
SCALE IN FEET
BULLEN POINT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 3-2
DRUM STORAGE AREA (SS10) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 3-3. DRUM STORAGE AREA ANALYTICAL DATA SUMMARY

Installation: Bullen Point
Site: Drum Storage Area (SS10)
Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks	
					S01-1.6	S02-1.5	S03			AB01	EB02	TB02		
Laboratory Sample ID Numbers					4201-4	4177-5 4201-7	4201-8			4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4177 4201
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg			µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4.00-157	430[d]	775J	<4.00			NA	<200	NA	<200	<4.00
GRPH	0.400	0.400	100	<0.500-1.03	1.72	14.3	<0.400			NA	<20	NA	<20	<0.400
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.125-<0.20	<0.100	<0.100	<0.100							
Benzene	0.020	0.020	0.5	<0.025-<0.040	<0.020	<0.020	<0.020			<1[c]	<1	<1	<1	<0.020
Toluene	0.020	0.020		<0.025-<0.040	<0.020	<0.020	<0.020			<1[c]	<1	<1	<1	<0.020
Ethylbenzene	0.020	0.020		<0.025-<0.040	<0.020	<0.020	<0.020			<1[c]	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.040		<0.050-<0.080	<0.040	<0.040	<0.040			<2[c]	<2	<2	<2	<0.040
VOC 8010	0.020	0.020		<0.025-<0.040	<0.020	<0.020	<0.020			NA	NA	NA	NA	<0.020
VOC 8260	0.020	0.100		<0.025-<0.035	NA	<0.100J	NA			<1	<1	<1	<1	<0.020
SVOC 8270	0.200	0.210		<0.240-<1.00	NA	<0.210	NA			NA	<11.2	NA	<10	<0.200
PCBs	0.020	0.030-0.200	10	<0.020	<0.100	<0.200	<0.030			NA	<2	NA	<1	<0.020

☐ CT&E Data.
NA Not analyzed.
J Result is an estimate.
a The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
c BTEX determined by 8260 method analysis.
d The laboratory reported that 119 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 3-3. DRUM STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Drum Storage Area (SS10)
Matrix: Soil
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Sample							Field Blank			Lab Blanks
					S02								EB02		
Laboratory Sample ID Numbers					4177-5								4180-1		4177 4180
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg								µg/L		µg/L
Aluminum	0.35	2		1,500-25,000	1,400								<100		<100
Antimony	N/A	51		<7.8-<230	<51								<100		<100
Arsenic	0.11	5.1		<4.9-8.5	<5.1								<100		<100
Barium	0.024	1		27-390	19								<50		<50
Beryllium	N/A	2.6		<2.6-6.4	<2.6								<50		<50
Cadmium	0.33	2.6		<3.0-<36	<2.6								<50		<50
Calcium	0.69	4		360-59,000	1,900J								290		<200
Chromium	0.066	1		<4.3-47	2.7								<50		<50
Cobalt	N/A	51		<5.1-12	<51								<100		<100
Copper	0.045	1		<2.7-45	3.4								<50		<50
Iron	0.50	2		5,400-35,000	4,300								<100		<100
Lead	0.13	5.1		<5.1-22	<5.1								<100		<100
Magnesium	0.96	4		360-7,400	1,100J								<200		<200
Manganese	0.025	1		25-290	45J								<50		<50
Molybdenum	N/A	2.6		<2.5-<11	<2.6								<50		<50
Nickel	0.11	1		4.2-46	4.7								<50		<50
Potassium	23	250		<300-2,200	<250								<5,000		<5,000

☐ CT&E Data.
N/A Not available.
J Result is an estimate.

TABLE 3-3. DRUM STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Drum Storage Area (SS10)
Matrix: Soil
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Sample							Field Blank			Lab Blanks
					S02								EB02		
Laboratory Sample ID Numbers					4177-5								4180-1		4177 4180
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg								µg/L		µg/L
Selenium	1.2	51		<7.8-<170	<51								<100		<100
Silver	0.53	2.6		<3-<110	<2.6								<50		<50
Sodium	0.55	5		<160-680	52								540J		<250
Thallium	0.011	0.25		<0.2-<1.2	<0.25								<5		<5
Vanadium	0.036	1		6.3-59	4.1								<50		<50
Zinc	0.16	1		9.2-95	14								<50		<50

☐ CT&E Data.
N/A Not available.
J Result is an estimate.

TABLE 3-4. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE DRUM STORAGE AREA (SS10)

SITE	MATRIX	CHEMICAL DETECTED	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[a]		ARAR[b]	CHEMICAL OF CONCERN
						CANCER	NON-CANCER		
Drum Storage Area (SS10)	Soil	DRPH	775	mg/kg	<4.00-157	--	--	500[c]	**Yes**
		GRPH	14.3	mg/kg	<0.500-1.03	--	--	100[c]	No
		Aluminum	1,400	mg/kg	1,500-25,000	--	--	--	No
		Barium	19	mg/kg	27-390	--	1,890	--	No
		Calcium	1,900J	mg/kg	360-59,000	--	--	--	No
		Chromium	2.7	mg/kg	<4.3-47	--	135	--	No
		Copper	3.4	mg/kg	<2.7-45	--	999	--	No
		Iron	4,300	mg/kg	5,400-35,000	--	--	--	No
		Magnesium	1,100J	mg/kg	360-7,400	--	--	--	No
		Manganese	45J	mg/kg	25-290	--	3,780	--	No
		Nickel	4.7	mg/kg	4.2-46	--	540	--	No
		Sodium	52	mg/kg	<160-680	--	--	--	No
		Vanadium	4.1	mg/kg	6.03-59	--	189	--	No
		Zinc	14	mg/kg	9.2-95	--	8,100	--	No

a Risk-Based Screening Level.
b Applicable or Relevant and Appropriate Requirement.
c ADEC 1991.
J Result is an estimate.

4.0 REMEDIAL INVESTIGATION - REMEDIAL ACTION SITES

This section of the RI/FS presents results from RI sampling and analysis activities for each of the three Bullen Point sites where remedial action may be warranted. The three sites considered for remedial action and discussed in this section are the Inside Transformer (OT04), POL Tanks (ST05), and Fuel Storage Area (ST09). Each of the sites is presented individually in Sections 4.1 through 4.3. (Note: figures and tables are presented at the end of each section.) The information presented for each site includes site background, field sampling and analytical results, potential migration pathways, human health and ecological risk assessment summaries, and conclusions and recommendations. The site-by-site discussions in this section are intended to provide the reader with all information needed to understand the site conditions and make decisions regarding appropriate action for each of the sites.

Photographs of the Bullen Point installation and the sites investigated during the RI are presented in Appendix B. Data tables in this section list analytical results from samples in which chemicals were detected above quantitation limits. Complete laboratory analytical data sheets for each sample, including quantitation limits for non-detected analytes, are presented in Appendix F.

4.1 INSIDE TRANSFORMER (OT04)

4.1.1 Site Background

The Inside Transformer (OT04) site consists of the southwest section of the module train where the "inside transformer" was previously located and the associated soil and gravel below the transformer location. A 1986 field reconnaissance trip by a previous contractor indicated that the transformer had leaked onto the surrounding floor tiles (Dames and Moore 1986). The transformer and oil-covered floor tiles were removed in approximately 1989, but the transformer pad and some floor tiles were not removed.

Previous sampling, conducted in 1990 by Air Force contractors, detected Aroclor 1254 (a group of PCBs) in soil at the site. A detailed list of source areas and concentrations previously detected is presented in the RI/FS Work Plan (U.S. Air Force 1993a).

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 4.1.3.

4.1.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Inside Transformer (OT04) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

4.1.2.1 Summary of Samples Collected. A total of seven samples was collected from gravel pad and module train at the site. These consisted of four soil samples below the module

train and three wipe samples from floor materials surrounding the former transformer location. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Inside Transformer (OT04) site are presented in Figure 4-1.

Four soil samples were analyzed for PCBs. In addition, three soil samples were analyzed for pesticides.

The three wipe samples collected inside the building were analyzed for PCBs.

4.1.2.2 Analytical Results. The data summary table (Table 4-1) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds with samples collected from the site. Sample locations and analytical results for the samples at the site are illustrated in Figure 4-1. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or field decontamination procedures. The exceptions are presented on the data summary table.

The following section presents a discussion of organic compounds detected above background levels at the site.

Organics. Organic compounds detected in soil samples collected at the site are limited to PCBs (Aroclor 1254). PCBs were detected in two soil samples at 0.9 and 0.63 mg/kg (samples OT04-S02 and OT04-S04/S05, respectively).

PCBs (Aroclor 1254) were detected in all three of the wipe samples at concentrations ranging from 18.9 to 391.1 $\mu g/100\ cm^2$.

Inorganics. Metals were not a concern at the site, and no metals analyses were performed.

4.1.2.3 Summary of Site Contamination. Previous sampling conducted at the Inside Transformer (OT04) detected Aroclor 1254 at low concentrations in the gravel below the module train and near the transformer pad inside the building. The source of contaminants detected during sampling conducted at the Inside Transformer (OT04) is suspected to be from dielectric fluids containing PCBs that spilled or leaked during maintenance of facility equipment.

PCBs were previously detected at 3.9 and 5.9 mg/kg in soil samples collected in 1990 (Woodward-Clyde 1990). Current results (0.63 - 0.9 mg/kg) indicate very low levels of PCBs in the soil similar to previous site conditions. This is expected because PCBs are relatively insoluble, tend not to break down, and tend to bind to soil particles. Current results also indicate, however, that PCBs exist on the floor tiles near the transformer pad inside the module train. The human health and ecological risks associated with the chemicals detected at the site are presented in Sections 4.1.4 and 4.1.5.

Based on field data, source of contamination, and concentration of the contaminants, contaminated media appear to be limited to inside the transformer room in the module train of the site. This area includes approximately 15 square feet of floor material. Low levels of PCBs detected below the module train indicate that minimal migration of contaminants has occurred.

4.1.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

4.1.3.1 Topography and Stratigraphy. The topography in this area consists of a gravel pad placed on relatively flat tundra. The gravel pad, which surrounds the site, is approximately four feet in height but drops a half a foot below the module train. Gravel pad material consisted of the typical gravels and sands associated with these features, and subsurface tundra materials were of the typical stratigraphy found at Bullen Point (Section 2.4.4.2). During the 1993 RI, the active layer at the site was approximately 2-1/2 feet thick in tundra areas and 4 feet thick under gravel pads.

4.1.3.2 Migration Potential.

Subsurface Migration. Topography at the site indicates that the general subsurface drainage should be west into Mikkelsen Bay. Seasonal flow may occur within the site. Because PCBs are relatively insoluble and were detected in only the shallow samples adjacent to the module train, however, the potential for subsurface migration is considered to be minimal.

Surface Migration. The Inside Transformer site is surrounded by a gravel pad that lacks distinct drainage features. Surface water adjacent to the module train probably flows to the gravels below the module train. However, because PCBs were detected only adjacent to and below the module train and are relatively insoluble, the potential for surface migration is considered to be minimal. The very low levels of PCBs detected in the soil around the module train indicate that migration from the floor material inside the building is minimal.

Air Transport. Air transportation is not considered to be a significant mode of migration at the site (Section 2.4.4.2).

Summary of Migration Potential. The occurrence of PCBs at the site is extremely limited and confined to the module train and the very low levels in the gravel adjacent to the module train. Because PCBs are relatively insoluble and tend to bind to particles, the potential for transport is considered to be minimal. Analytical data indicate there has been minimal migration of PCBs at the site.

4.1.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the Inside Transformer (OT04) site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local

visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in soil/sediments at the site. The primary routes of potential exposures at the site are direct contact with, and incidental ingestion of, soil/sediment. Surface water was not considered a route of exposure because no surface waters are associated with the site. Because ground water and air at the Bullen Point sites are not considered complete pathways of exposure, these media are not evaluated as potential pathways to human receptors.

The Bullen Point Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers at the installation, and native adults and children that may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with site chemicals at Bullen Point are presented in Section 4.1.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Bullen Point Risk Assessment (U.S. Air Force 1996) to determine if plants and animals could potentially be affected by the chemicals detected at the Bullen Point installation. Because of the diversity of the plants and animals in the area of the Bullen Point installation, a set of representative species was selected in the ERA for detailed evaluation. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based on their likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches to best characterize the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Bullen Point. The potential ecological risks associated with the chemicals at detected at the site are presented in Section 4.1.5.

4.1.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the Inside Transformer (OT04) site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the chemicals detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

4.1.4.1 Chemicals of Concern. At the Inside Transformer (OT04), the only COC identified in soil/sediment at the site was Aroclor 1254 (a group of PCBs). The concentration of Aroclor 1254 exceeded the background concentration and the RBSLs based on cancer risk and noncancer hazard. The ARAR based on TSCA, however, was not exceeded. The RBSL for cancer risk was based on the cancer slope factor for PCBs. Although it is a member of the PCB family, Aroclor 1254 has not been assigned to an EPA carcinogen weight-of-evidence group.

Three wipe samples were collected from the floor of the transformer building to evaluate the presence of PCBs. Aroclor 1254 was detected in these samples at concentrations ranging from 18.9 to 391.1 $\mu g/100\ cm^2$. The assessment of noncancer hazard and cancer risk that may be associated with exposure to the PCB at this site will, however, be limited to the potential ingestion of soil. The remediation of PCBs present on the floor of the transformer building will be discussed in the Bullen Point FS.

No surface water bodies were associated with the site; therefore, no surface water samples were collected.

Table 4-2, Identification of COCs at the Inside Transformer, presents the maximum concentrations of chemicals detected at the site, the associated background concentrations, RBSLs, and ARARs, and identifies COCs selected in the risk evaluation.

4.1.4.2 Exposure Pathways and Potential Receptors. Because no surface water bodies are associated with the Inside Transformer site, only soil/sediment ingestion pathways were evaluated in the risk assessment.

Three potential receptor groups were evaluated in the risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native), and a child living in a North Slope community (child).

4.1.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. The noncancer hazard associated with the ingestion of soil by a hypothetical native northern adult/child is 0.06, and by a DEW Line worker is 0.001, based on the maximum concentrations of Aroclor 1254. The presence of Aroclor 1254 accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations.

The excess lifetime cancer risk associated with the ingestion of soil by a hypothetical native northern adult/child is 1×10^{-6}, and by a DEW Line worker is 3×10^{-8}, based on the maximum concentration of Aroclor 1254. The presence of Aroclor 1254 accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

Noncancer Hazard and Cancer Risk Associated with Surface Water. No surface water bodies were identified at the Inside Transformer (OT04) site; therefore, no evaluation of noncancer hazard or excess lifetime cancer risk associated with ingestion of surface water was conducted.

4.1.4.4 Summary of Human Health Risk Assessment. The potential risks and hazards associated with the soil/sediment at the Inside Transformer are the low noncancer hazards (hazard indices of 0.06 and 0.001), and very low cancer risk associated with Aroclor 1254. The hazards and risks are below the threshold value at which remediation is recommended [noncancer hazards are below one and cancer risks are less than 1×10^{-4} (EPA 1991)]. The hazards and risks were calculated conservatively based on a residential scenario. Therefore, the noncancer and cancer risks associated with soil/sediment at the site are minimal.

4.1.5 Ecological Risk Assessment

The objective of the ERA is to estimate the potential impacts of chemicals detected at the installation on aquatic and terrestrial plants and animals. A summary of the methods used to assess potential ecological impacts is presented in Section 2.4.2.

4.1.5.1 Chemicals of Concern. COCs for the ERA were selected based on the average installation-wide concentration of chemicals detected at the Bullen Point sites. All sites at the installation were considered as potentially usable habitat because the installation has been inactive since 1971. The COC selection process only considered the soil/sediment samples that were at or less than 1.5 feet deep. The soil/sediment samples were screened for depth because it is unlikely that any of the representative species will be exposed to soil/sediments deeper than 1.5 feet. The wipe samples taken inside the transformer structure are not believed to be in potential exposure pathways for ecological receptors. The soil samples were analyzed for pesticides and PCBs. PCBs were selected as COCs based on this analysis. PCBs are not associated with elevated HQs under current conditions, although potential risk may exist in the future.

4.1.5.2 Exposure Pathways and Potential Receptors. Potential exposure pathways for terrestrial organisms include direct contact with, and ingestion of, contaminated soil/sediment. The most significant route of exposure for plants is direct contact with soil. Terrestrial organisms may also be exposed to COCs through ingestion of plant and animal items in their diet, and incidental ingestion of soil/sediment while foraging, although these pathways are considered less significant and are not used to calculate HQs. Birds and mammals may be exposed to COCs through ingestion of surface water, ingestion of plant and animal diet items (although only ingestion of plant matter was quantified in the estimated exposure equation), and incidental ingestion of soil/sediment.

The potential ecological receptors evaluated in the risk assessment include plants, aquatic organisms, birds, and mammals. These receptors were selected based on the species' likelihood of exposure, preferred habitat, and feeding habits. Species that may be particularly sensitive to environmental impacts, such as threatened and endangered species, are considered on an individual basis if present at or near the installation. The spectacled eider (federally listed as a threatened species) may be present on or near the Bullen Point installation and is evaluated in the ERA. The species evaluated in the ERA are listed in Table 2-6.

4.1.5.3 Risk Characterization. The PCB HQs, based on soil sample concentrations, are below 1.0 for all the terrestrial representative species. Because PCBs have a high potential to bioaccumulate, however, it is possible that risk may be present in the future.

4.1.5.4 Summary of Ecological Risk Assessment. The risk from PCBs at current concentrations is low. But the possibility of bioaccumulation indicates caution because there is potential for magnification of PCB concentrations through the food chain. Based on the low concentrations and limited areas of PCB contamination, however, the potential for biomagnification from PCBs in soil is low.

4.1.6 Conclusions and Recommendations

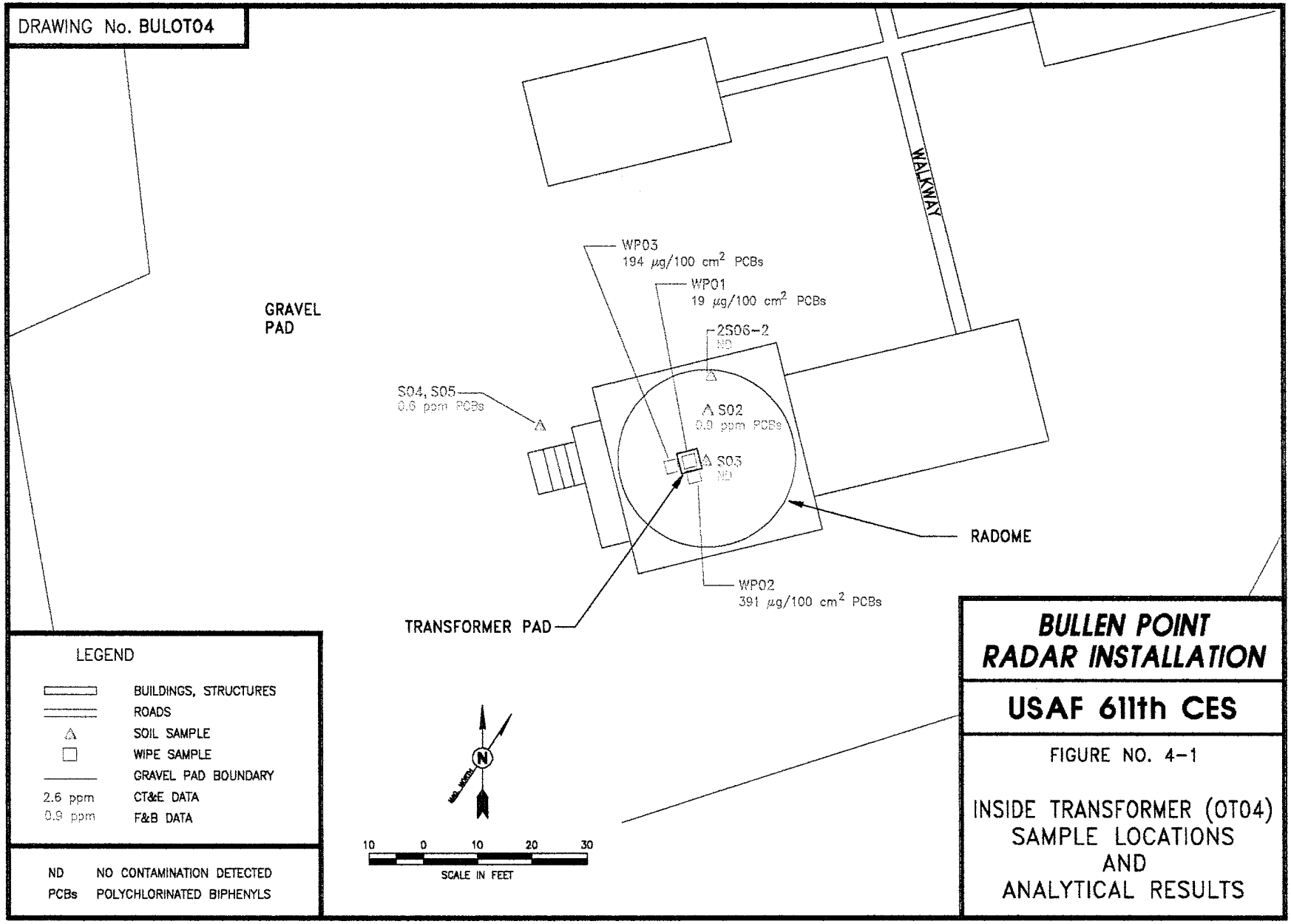
Sampling and analyses have determined that the Inside Transformer (OT04) site is contaminated with low levels of Aroclor 1254, a group of PCBs. The contaminated media at the site include the building floor materials and the soils below the module train building. The source of contamination is likely to be dielectric fluids containing PCBs that were suspected to have spilled and/or leaked in small quantities during maintenance of the facility equipment. The site is deactivated, and the transformers have been removed from this site.

Migration of contaminants from the site appears to have been minimal. Affected media is limited to approximately 15 square feet of the building floor materials where the transformer was previously located and a small gravel area below the module train. Analytical data suggest that migration of PCBs from the building floor materials to the surrounding soil is minimal. The potential for migration of PCBs is not anticipated as the site is relatively flat, and PCBs tend to bind tightly with soil particles.

The risk assessment concluded that risks posed to human health or ecological receptors by site contaminants are minimal given current and future site uses. Potential noncancer hazards and cancer risks were identified in soil from Aroclor 1254. The risks and hazards are based on a conservative future scenario and are not of a magnitude that normally requires remedial action.

Levels of PCBs detected on the floor materials inside the transformer building could pose a direct contact exposure route to PCBs which can potentially bioaccumulate in the environment. Therefore, the site is being recommended for remedial action. The contaminated area at the site consists of approximately 15 square feet of floor material. The remedial action alternative recommended for the site is removal and offsite incineration. A complete description and evaluation of the remedial alternatives considered for this site are presented in the FS, Section 5.0.

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DRAWING No. BULOT04
WALKWAY
GRAVEL PAD
WP03
194 µg/100 cm² PCBs
WP01
19 µg/100 cm² PCBs
2S06-2
ND
S04, S05
0.6 ppm PCBs
S02
0.9 ppm PCBs
S03
ND
RADOME
WP02
391 µg/100 cm² PCBs
TRANSFORMER PAD
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
WIPE SAMPLE
GRAVEL PAD BOUNDARY
2.6 ppm CT&E DATA
0.9 ppm F&B DATA
ND NO CONTAMINATION DETECTED
PCBs POLYCHLORINATED BIPHENYLS
N
10 0 10 20 30
SCALE IN FEET
BULLEN POINT
RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 4-1
INSIDE TRANSFORMER (OT04)
SAMPLE LOCATIONS
AND
ANALYTICAL RESULTS

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TABLE 4-1. INSIDE TRANSFORMER ANALYTICAL DATA SUMMARY

Installation: Bullen Point
Site: Inside Transformer (OT04)
Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples						Field Blank	Lab Blanks	
					S01	S02	S03	S04 & S05 (Replicates)		2S06-2	EB02		
Laboratory Sample ID Numbers					127	128	129	130	131	1862	4180-1 4180-2 4205-1	4180 4205	#5-81993 #5-9393
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	mg/kg
Pesticides	0.001-0.05	0.01-0.5		<0.002-<0.02	<0.01R-<0.5R	<0.01J-<0.5J	<0.01J-<0.5J	<0.01J-<0.5J	<0.01J-<0.5J	NA	<0.1-<2	<0.1-<1.0	<0.01J-<0.5J
PCBs													
Aroclor 1254	0.01	0.1	10	<0.2	<0.1R	0.9J	<0.1J	0.31J	0.63J	<0.1J	<2	<1	<0.1J

□ CT&E Data.
▒ F&B Data.
NA Not analyzed.
J Result is an estimate.
R Result has been rejected.

TABLE 4-1. INSIDE TRANSFORMER ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Inside Transformer (OT04)
Matrix: Wipe
Units: µg/100cm^2

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples				Field Blank				Lab Blank
					WP01	WP02	WP03						
Laboratory Sample ID Numbers					Wipe Sample 4124-1	Wipe Sample 4124-2	Wipe Sample 4124-3						4124
ANALYSES	µg	µg	µg	µg	µg/100 cm^2	µg/100 cm^2	µg/100 cm^2						µg/L
PCBs													
Aroclor 1254	1.0	1.0		NA	18.9	391.1	194						<0.01

☐ CT&E Data.
NA Not analyzed.

TABLE 4-2. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE INSIDE TRANSFORMER (OT04)

SITE	MATRIX	CHEMICAL DETECTED	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[a]		ARAR[b]	CHEMICAL OF CONCERN
						CANCER	NON-CANCER		
Inside Transformer (OT04)	Soil	Aroclor 1254	0.9J	mg/kg	<0.2	0.00831[c]	0.540	10[d]	**Yes**

a Risk-Based Screening Level.
b Applicable or Relevant and Appropriate Requirement.
c RBSL for Aroclor 1254 based on cancer risk is derived from the PCB slope factor.
d TSCA Cleanup Level.
J Result is an estimate.

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4.2 POL TANKS (ST05)

4.2.1 Site Background

The POL Tanks are located approximately 300 feet northwest of the module train. The POL Tanks site consists of seven POL tanks and the associated pumphouse placed on a gravel pad. The three southern tanks are approximately 20,000 gallons each, and the four northern tanks are approximately 10,000 gallons each. A fill pipe extends from the northwest corner of the gravel pad to a disturbed tundra area to the north. The tanks were abandoned in 1971 when the installation closed. Liquid level depth gauge readings indicate one of the tanks contains water and a sheen, and the other six tanks are empty.

Previous sampling, conducted in 1992 by an Air Force contractor, detected diesel, gasoline, and BTEX in soil at the site. A detailed list of contaminants, source areas, and concentrations previously detected is presented in the RI/FS Work Plan (U.S. Air Force 1993a).

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 4.2.3.

4.2.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the POL Tanks (ST05) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

4.2.2.1 Summary of Samples Collected. A total of 38 samples was collected during the RI from gravel pads, tundra, ponds, and streams at the site. These consisted of 34 soil, 2 surface water, and 2 active layer water samples. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the POL Tanks (ST05) site are presented in Figure 4-2.

Thirty-four soil samples were analyzed for DRPH. In addition, 24 samples were analyzed for GRPH and BTEX. Ten samples were analyzed for residual range petroleum hydrocarbons (RRPH), and three samples were analyzed for VOCs and SVOCs. Two samples were analyzed for total metals, pesticides, and PCBs.

Two surface water samples were analyzed for DRPH, GRPH, and BTEX.

Two active layer water samples were analyzed for DRPH, GRPH, BTEX, VOCs, SVOCs, TOC, TSS, and TDS.

4.2.2.2 Analytical Results. The data summary table (Table 4-2) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds and inorganic analytes with samples collected from the site. Sample

locations and analytical results for the samples at the site are illustrated in Figure 4-2. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or decontamination procedures. Only metals detected above background levels that exceed an RBSL or ARAR are presented in Figure 4-2. The exceptions are presented on the data summary table.

The following section presents a discussion of organic compounds and inorganic analytes detected above background levels at the site. A discussion of TDS, TSS, and TOC is included.

Organics. Organic compounds detected in soil and sediment samples at the site include DRPH, GRPH, BTEX compounds, five other VOCs, and SVOCs. DRPH were detected in 30 samples ranging from 4.05 to 5,860 mg/kg. GRPH were detected in 11 samples ranging from 0.701 to 170 mg/kg. BTEX compounds were detected in 11 soil/sediment samples. Total BTEX ranged from 0.06 to 5.8 mg/kg; xylenes were the primary component. Five other VOCs (n-butylbenzene, p-isopropylbenzene, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene) were detected at low concentrations ranging from 0.025 to 5.82 mg/kg in four soil samples. Four SVOCs (di-n-butylphthalate, bis(2-ethylhexyl)phthalate, naphthalene, and 2-methylnaphthalene) were detected at low concentrations ranging from 0.306 to 1.2 mg/kg.

In active layer water samples collected from the site, organic compounds detected include DRPH, GRPH, BTEX, five other VOCs, and one SVOC. DRPH were detected in two active layer water samples at concentrations of 423,000 and 899 µg/L (samples ST05-GW01 and ST05-GW02, respectively). GRPH were detected in the same respective samples at 723 and 53 µg/L. Benzene was detected at 1.8 µg/L in active layer water sample ST05-GW02. Toluene, ethylbenzene, and xylenes were detected at 4, 13, and 34 µg/L, respectively, in active layer water sample ST05-GW01. Five other VOCs were detected in the two active layer water samples ranging from 2.6 to 62 µg/L. The primary VOCs include p-isopropyltoluene (15 µg/L), 1,2,4-trimethylbenzene (35 µg/L), and 1,3,5-trimethylbenzene (62 µg/L). One SVOC, 2-methylnaphthalene, was detected in sample ST05-GW01 at 6,500 µg/L.

In surface water samples collected from the site, organic compounds detected were limited to DRPH. DRPH were detected at 298 µg/L in surface water sample ST05-SW02.

Inorganics. Metals were not detected above background levels in soil samples collected at this site. TOC, TDS, and TSS were reported at respective concentrations of 409,000; 850,000; and 1,680,000 µg/L in active layer water sample ST05-GW01, and 63,500; 926,000; and 2,700,000 µg/L in ground water sample ST05-GW02.

4.2.2.3 Summary of Site Contamination. Previous sampling conducted at the POL Tanks (ST05) detected petroleum hydrocarbons [diesel range organics (DRO) and gasoline range organics (GRO)] and BTEX. The results and locations of previous sampling efforts are presented in the RI/FS Work Plan (U.S. Air Force 1993a). The quality of the previous IRP sampling data is unknown as is the data validation, if any, that these data have undergone.

DRO were previously detected in soil samples at concentrations ranging from 814 to 16,000 mg/kg. GRO were previously detected in soil samples at concentrations ranging from 46

to 592 mg/kg. Ethylbenzene, toluene, and xylenes were previously detected in soil samples ranging from 0.1 to 5.9 mg/kg, 0.2 to 0.5 mg/kg, and 0.4 to 15.3 mg/kg, respectively.

During the 1993 RI investigation, similar petroleum hydrocarbon compounds were detected in soil samples but at lower concentrations. DRPH and GRPH were detected at up to 5,860 and 170 mg/kg, respectively. Ethylbenzene, toluene, and xylenes were detected at up to 1.29, 0.4, and 4.4 mg/kg, respectively. Other VOCs and one SVOC that are components of diesel fuel were also detected in soil samples during the 1993 RI investigation. Similar compounds were detected in active layer and surface water samples. Because the active layer water collected and analyzed from the site was obtained from a hand-augured borehole in gravel, it may have been cross-contaminated and may not be indicative of the level of contaminants in the active layer at the site.

A comparison of historical and current project data indicates the organic analytical concentrations are lower now than during previous investigations. The detections of the SVOC and VOCs during the current investigation are due to more extensive sampling during the RI. The human health and ecological risks associated with the chemicals detected at the site are presented in Sections 4.2.4 and 4.2.5.

The primary contaminants at the site are petroleum hydrocarbons (DRPH, GRPH, and RRPH) and associated VOCs. The suspected source of contaminants detected during sampling conducted at the POL Tanks site is spills and/or leaks from the abandoned POL Tanks and associated piping. Inspection of the tanks during the 1993 field investigation established that the tanks no longer contain fuel; however, there was a sheen on the water surface in one of the tanks. The tanks have been inactive since 1971.

4.2.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

4.2.3.1 Topography and Stratigraphy. The topography at the site consists of a gravel pad of varying elevations placed upon relatively flat tundra (Figure 4-2). The topographic high at the site is the gravel pad area adjacent the POL Tanks, which is raised approximately two feet above the surrounding gravel pad. The gravel pad extends approximately 400 feet south of the site with an approximately 100 feet diameter, one foot deep depression in the gravel pad 50 feet south of the tanks. The gravel pad extends to the lagoon to the east of the site and to Mikkelsen Bay west of the site. To the north of the POL Tanks, the gravel pad extends around a tundra area where it grades into the natural beach gravels.

During the 1993 RI, permafrost was located at a depth of approximately four feet under the gravel pads and at a depth of two and a half feet under tundra areas. Gravel pads consisted of the typical gravels and sands associated with these features, and subsurface tundra materials were of the typical stratigraphy found at Bullen Point (Section 2.4.4.2).

4.2.3.2 Migration Potential.

Subsurface Migration. The site topography indicates that active layer water flow should be very sluggish. It should generally follow the surface contours and flow radially out from the gravel pad to the tundra. Because the site is located on a point between Mikkelsen Bay and a lagoon, all subsurface migration from the POL Tanks should eventually flow west to Mikkelsen Bay or to the east towards the lagoon.

At the north and southeast edge of the gravel pad at the site are large tundra ponds that should receive active layer water from the site at those locations. Contaminated active layer water that enters these water bodies no longer presents a potential for subsurface migration, but a potential for surface migration is then created. Analytical data indicate that subsurface migration of contaminants is occurring. Contaminated soil/sediment and surface water samples collected at the Old Landfill/Dump Site East (LF06) and the Drum Storage Area (SS10) may be the result of subsurface migration.

Surface Migration. The primary route of surface migration over most of the site is overland sheet flow. Significant surface migration over the gravel pad area is probably restricted to the spring thaw when large quantities of meltwater are available and the frozen ground prevents active layer flow. Surface migration on the gravel pad will follow surface contours, which are generally radial from the gravel pad out to the tundra and surface water bodies that border the site.

Bordering the site to the north are tundra areas where surface water migrates through a series of tundra ponds connected by sluggish ephemeral streams. Surface water in the north tundra area migrates north until it reaches the beach gravels. A surface water sample collected from a pond in the north section of the tundra confirms that this is likely to be an active contaminant migration pathway.

Air Transport. Air transportation is not considered to be a significant mode of migration at the site (Section 2.4.4.2).

Summary of Migration Potential. Analytical results indicate that contaminant migration is occurring in the surface and subsurface water at the site. The topography indicates that any affected active layer water will be sluggish but will generally migrate radially out from the site. Surface water will also migrate radially out from the site. Significant surface migration occurs primarily in spring when large quantities of meltwater are available. The POL Tanks are believed to have been the main source of the affected gravel pad, surrounding tundra, active layer water, and surface water.

4.2.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the POL Tanks site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in surface water and soil/sediments at the site. The

primary routes of potential exposures at the site are direct contact with soil/sediment, incidental ingestion of soil/sediment, and ingestion of surface water. Because ground water and air at the Bullen Point sites are not considered complete pathways of exposure, these media are not evaluated as potential pathways to human receptors.

The Bullen Point Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers at the installation, and native adults and children that may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with chemicals at Bullen Point are presented in Section 4.2.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Bullen Point Risk Assessment (U.S. Air Force 1996) to determine if plants and animals could potentially be impacted by the chemicals detected at the Bullen Point installation. Because of the diversity of the plants and animals in the area of the Bullen Point installation, a set of representative species was selected in the ERA for detailed evaluation. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based on the species' likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches in order to achieve the best characterization of the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Bullen Point. The potential ecological risks associated with the chemicals detected at the site are presented in Section 4.2.5.

4.2.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the POL Tanks (ST05) site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the chemicals detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

4.2.4.1 Chemicals of Concern. At the POL Tanks (ST05), COCs identified for the soil/sediment matrix included DRPH and GRPH. The maximum concentrations of DRPH and GRPH exceeded their background concentrations and the ARAR concentrations for petroleum

hydrocarbon contamination of soil (ADEC 1991). DRPH was identified as a COC in surface water at the site. DRPH was selected as a COC because the maximum concentration detected slightly exceeded the RBSL. GRPH and benzene were observed in shallow boreholes and identified as COCs because their maximum concentrations exceeded the RBSLs based on cancer risk.

Table 4-4, Identification of COCs at the POL Tanks, presents the maximum concentrations of chemicals detected at the site, the associated background concentrations, RBSLs, and ARARs, and identifies COCs selected in the risk evaluation.

4.2.4.2 Exposure Pathways and Potential Receptors. Because COCs were identified for soil/sediment and surface water at the site, the potential risks associated with ingestion of soil/sediment and surface water were evaluated in the risk assessment.

Three potential receptor groups were evaluated in the risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native), and a child living in a North Slope community (child).

4.2.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. The noncancer hazard associated with the ingestion of soil at the POL Tanks (ST05) by hypothetical native northern adult/child is 0.09, and by a DEW Line worker is 0.002, based on the maximum concentrations of the COCs. The presence of DRPH and GRPH accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations. The excess lifetime cancer risk associated with the ingestion of soil at the site by a hypothetical native northern adult/child is 5×10^{-8}, and by a DEW Line worker is 1×10^{-9}, based on the maximum concentrations of the COC. The presence of GRPH accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

Noncancer Hazard and Cancer Risk Associated with Surface Water. The noncancer hazard associated with the ingestion of surface water at the POL Tanks site by a hypothetical native northern adult is 0.1, and by a DEW Line worker is 0.008, based on the maximum concentrations of the COCs. The presence of DRPH and GRPH accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations. The excess lifetime cancer risk associated with the ingestion of surface water at the site by a native northern adult is 1×10^{-5}, and by a DEW Line worker is 2×10^{-7}, based on the maximum concentrations of the COCs. The presence of GRPH and benzene accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

4.2.4.4 Summary of Human Health Risk Assessment. The potential risks and hazards associated with the soil/sediment at the POL Tanks site are the very low noncancer hazard (hazard indices of 0.09 and 0.002), and low cancer risk associated with the GRPH. These risks and hazards were calculated conservatively based on ingestion of soil at a rate associated with a residential scenario. It is very unlikely that the soil at this location would be ingested at the conservative rate used in the risk calculation, and the hazards and risks at the site are likely to be overestimated. Remedial action is generally not warranted at sites where the excess lifetime

cancer risk is less than 1×10^{-4} or the noncancer hazards are less than one (EPA 1991b), and on the basis of the risk assessment, remediation of the site is not necessarily warranted.

The potential risks and hazards associated with the surface water at the POL Tanks site are the low hazard indices of 0.1 and 0.008 and low cancer risks (2×10^{-6} and 1×10^{-5}) for both the adult worker and native. The noncancer hazard is associated with the levels of DRPH and GRPH detected in surface water. The cancer risks (2×10^{-7} and 1×10^{-5}) are associated with GRPH and benzene detected in surface water at the site. The noncancer hazards and cancer risks in surface water were calculated assuming the affected surface water would be used as a sole-source water supply for 180 days per year. Based on site-specific information, the above mentioned chemicals detected in surface water do not currently pose a health hazard nor are they likely to pose a hazard in the future. The surface water expressions at the site are frozen most of the year; many are only intermittently filled with water during the summer months. The surface water at the site is not known to be used as a water supply now, nor has it been used in the past.

In conclusion, under current and future uses the COCs identified in soil/sediment and surface water at the POL Tanks site pose only a minimal, if any, potential threat to human health. Based on the human health risk assessment, remedial actions are not warranted at the site. In the unlikely event that surface water at the site is used as a sole-source drinking water supply in the future, a potential noncancer hazard to human health could exist if current conditions remain constant.

4.2.5 Ecological Risk Assessment

The objective of the ERA is to estimate the potential impacts of chemicals detected at the installation on aquatic and terrestrial plants and animals. A summary of the methods used to assess potential ecological impacts is presented in Section 2.4.2.

4.2.5.1 Chemicals of Concern. COCs for the ERA were selected based on the average installation-wide concentration of chemicals detected at the Bullen Point sites. All sites at the installation were considered as potentially usable habitat because the installation has been inactive since 1971. It should be noted that the COC selection process only considered the soil/sediment samples that were at or less than 1.5 feet deep. The soil/sediment samples were screened for depth because it is unlikely that any of the representative species will be exposed to soils/sediments deeper than 1.5 feet. Of the chemicals detected in soils/sediments and surface water at the POL Tanks site, DRPH and xylenes were identified as COCs. Neither of these COCs is associated with elevated risk estimates for ecological receptors.

4.2.5.2 Summary of Ecological Risk Assessment. Based on the calculated HQs, which are below 1.0 for all COCs and representative species, ecological risk estimates are minimal at the POL Tanks. Based on the ERA, remediation of the site is not necessarily warranted.

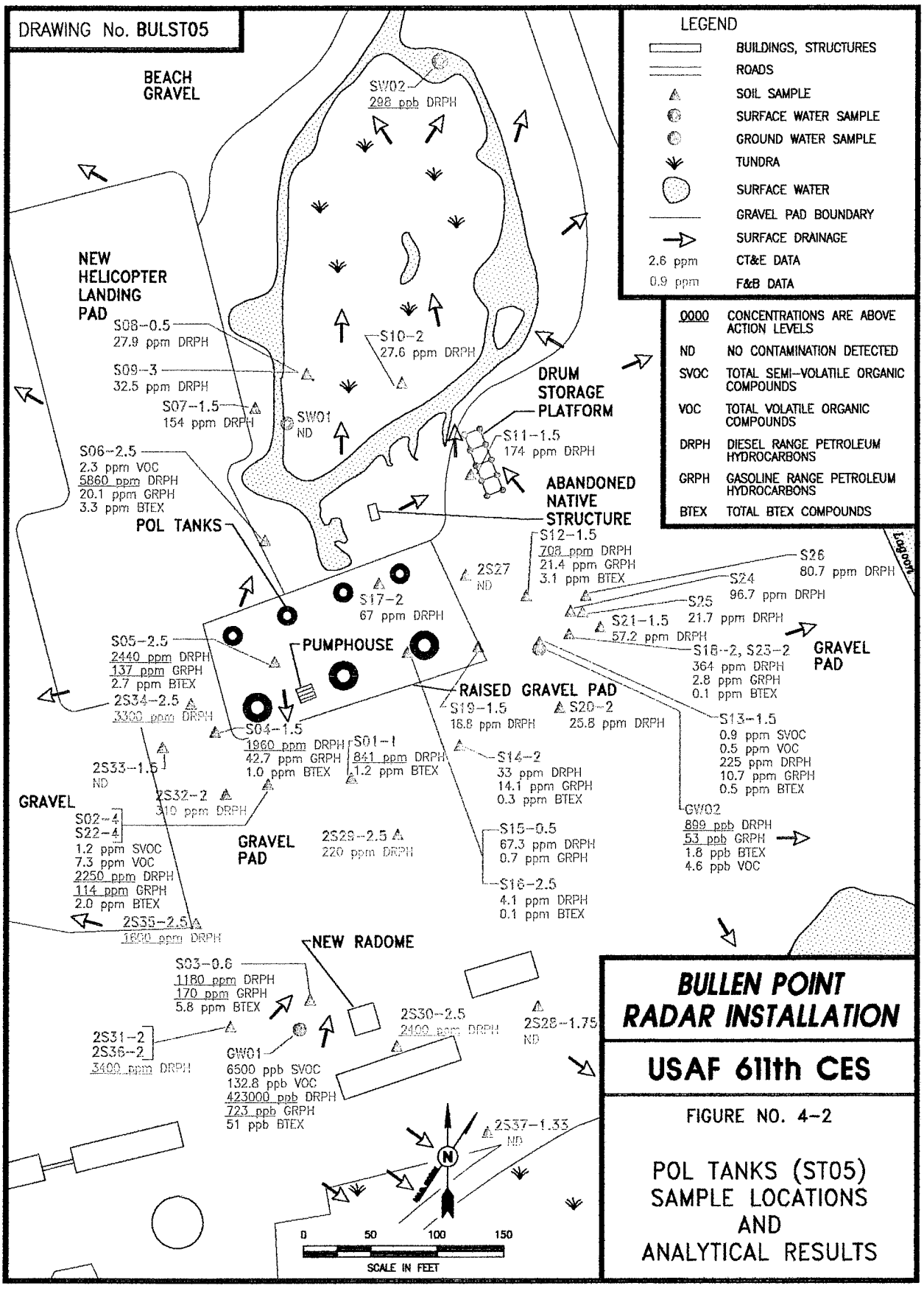
4.2.6 Conclusions and Recommendations

Sampling and analyses have determined that the POL Tanks (ST05) site is contaminated with petroleum hydrocarbons (DRPH and GRPH), BTEX compounds, and other VOCs and SVOCs that are components of diesel fuel. The contaminated areas at the site are soil/sediment and surface water. The area beneath the west POL Tanks has the highest concentrations of affected soil. Contaminant concentrations decrease with distance from the POL Tanks. The suspected source of contamination is spills and/or leaks from the POL Tanks and associated piping. The POL Tanks no longer contain fuel. The tanks have been inactive since 1971.

Migration of contaminants from the site appears to have occurred via surface and subsurface pathways from the gravel pad below the POL Tanks to the surrounding gravel and tundra areas. Contaminants detected in soil/sediment and surface water at downgradient sites, the Old Landfill/Dump Site East (LF06) and the Drum Storage Area (SS10), were similar to those detected below the gravel pad below the POL Tanks; however, concentrations were lower.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current site uses. Under a future scenario, using the surface water in the drainage pathways from the site as a drinking water supply results in a low potential risk to human health. The human health risk, however, is not of a magnitude that normally requires remedial action. The ERA concluded that the overall potential risks presented by site contaminants are minimal. Therefore, under current site conditions and considering the findings of the risk assessment, remediation of the site is not necessarily warranted.

Levels of petroleum compounds (primarily diesel) detected in soil/sediment at the site significantly exceed ADEC guidance cleanup levels. In addition, site contaminants have migrated downgradient of the site and have impacted soil/sediment and surface water. Therefore, the site is being recommended for remedial action. The affected areas at the site are the gravel pad area on the west portion of the site, gravel pad area to the south of the POL Tanks, and a small tundra area north of the POL Tanks site near the inactive fuel fill port. The remedial action alternative recommended for these areas is enhanced bioremediation. A complete description and evaluation of the remedial alternatives recommended for this site are presented in the FS, Section 5.0.


DRAWING No. BULST05
BEACH GRAVEL
SW02
298 ppb DRPH
NEW HELICOPTER LANDING PAD
S08-0.5
27.9 ppm DRPH
S09-3
32.5 ppm DRPH
S07-1.5
154 ppm DRPH
SW01
ND
S10-2
27.6 ppm DRPH
DRUM STORAGE PLATFORM
S11-1.5
174 ppm DRPH
S06-2.5
2.3 ppm VOC
5860 ppm DRPH
20.1 ppm GRPH
3.3 ppm BTEX
POL TANKS
ABANDONED NATIVE STRUCTURE
S12-1.5
708 ppm DRPH
21.4 ppm GRPH
3.1 ppm BTEX
2S27
ND
S26
80.7 ppm DRPH
S24
96.7 ppm DRPH
S25
21.7 ppm DRPH
S21-1.5
57.2 ppm DRPH
S17-2
67 ppm DRPH
S05-2.5
2440 ppm DRPH
137 ppm GRPH
2.7 ppm BTEX
PUMPHOUSE
S16-2, S23-2
364 ppm DRPH
2.8 ppm GRPH
0.1 ppm BTEX
GRAVEL PAD
2S34-2.5
3300 ppm DRPH
RAISED GRAVEL PAD
S19-1.5
18.8 ppm DRPH
S20-2
25.8 ppm DRPH
S04-1.5
1960 ppm DRPH
42.7 ppm GRPH
1.0 ppm BTEX
S01-1
841 ppm DRPH
1.2 ppm BTEX
S13-1.5
0.9 ppm SVOC
0.5 ppm VOC
225 ppm DRPH
10.7 ppm GRPH
0.5 ppm BTEX
2S33-1.5
ND
S14-2
33 ppm DRPH
14.1 ppm GRPH
0.3 ppm BTEX
2S32-2
310 ppm DRPH
GRAVEL
S02-4
S22-4
1.2 ppm SVOC
7.3 ppm VOC
2250 ppm DRPH
114 ppm GRPH
2.0 ppm BTEX
GRAVEL PAD
2S29-2.5
220 ppm DRPH
S15-0.5
67.3 ppm DRPH
0.7 ppm GRPH
GW02
899 ppb DRPH
53 ppb GRPH
1.8 ppb BTEX
4.6 ppb VOC
S18-2.5
4.1 ppm DRPH
0.1 ppm BTEX
2S35-2.5
1600 ppm DRPH
NEW RADOME
S03-0.6
1180 ppm DRPH
170 ppm GRPH
5.8 ppm BTEX
2S30-2.5
2400 ppm DRPH
2S28-1.75
ND
2S31-2
2S36-2
3400 ppm DRPH
GW01
6500 ppb SVOC
132.8 ppb VOC
423000 ppb DRPH
723 ppb GRPH
51 ppb BTEX
2S37-1.33
ND
N
0
50
100
150
SCALE IN FEET
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
SURFACE WATER SAMPLE
GROUND WATER SAMPLE
TUNDRA
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
2.6 ppm CT&E DATA
0.9 ppm F&B DATA
0000 CONCENTRATIONS ARE ABOVE ACTION LEVELS
ND NO CONTAMINATION DETECTED
SVOC TOTAL SEMI-VOLATILE ORGANIC COMPOUNDS
VOC TOTAL VOLATILE ORGANIC COMPOUNDS
DRPH DIESEL RANGE PETROLEUM HYDROCARBONS
GRPH GASOLINE RANGE PETROLEUM HYDROCARBONS
BTEX TOTAL BTEX COMPOUNDS
Logpost
BULLEN POINT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 4-2
POL TANKS (ST05) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY

Installation: Bullen Point
Site: POL Tanks (ST05)
Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blanks	
					S01-1	S02-4 & S22-4 (Replicates)		S03-0.6	S04-1.5	S05-2.5	S06-2.5	AB01	EB02	TB02		
Laboratory Sample ID Numbers					4200-1	4177-1 4200-4	4177-4 4200-28	4200-5	4200-8	4200-9	4177-2 4200-10	4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4177 4200
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4.00-157	841	2,250	1,940	1,180	1,960	2,440	5,860[d]	NA	<200	NA	<200	<4.00
GRPH	0.400	0.400	100	<0.500-1.03	17.0	114J	12.6J	170	42.7	137	20.1	NA	<20	NA	<20	<0.400
BTEX (8020/ 8020 Mod.)			10 Total BTEX	<0.125-<0.20	1.242	1.993	0.499J	5.801	1.045	2.725	3.333N					
Benzene	0.020	0.020-0.350	0.5	<0.025-<0.040	<0.020	<0.020	<0.020	<0.020	<0.025	<0.020	<0.350	<1[c]	<1	<1	<1	<0.020
Toluene	0.020	0.020-0.350		<0.025-<0.040	0.031	0.026	<0.020J	0.081	0.060	0.056	0.423N	<1[c]	<1	<1	<1	<0.020
Ethyl-benzene	0.020	0.020-0.350		<0.025-<0.040	0.261	0.356	0.096J	1.29	0.463	1.14	<0.350	<1[c]	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.040-0.700		<0.050-<0.080	0.950	1.611	0.403J	4.43	0.522	1.529	2.910N	<2[c]	<2	<2	<2	<0.040
VOC 8260																
n-Butyl-benzene	0.020	0.100		<0.025-<0.035	NA	<0.1J	<0.100	NA	NA	NA	0.174J	<1	<1	<1	<1	<0.020
p-Isopropyl-toluene	0.020	0.100		<0.025-<0.035	NA	<0.1J	<0.100	NA	NA	NA	0.112J	<1	<1	<1	<1	<0.020
Naphthalene	0.020	0.100		<0.025-<0.035	NA	<0.1J	<0.100	NA	NA	NA	0.902J	<1	<1	<1	<1	<0.020
1,2,4-Trimethyl-benzene	0.020	0.100		<0.025-<0.035	NA	0.837J	0.944	NA	NA	NA	0.672J	<1	<1	<1	<1	<0.020
1,3,5-Trimethyl-benzene	0.020	0.100		<0.025-<0.035	NA	5.04J	5.82	NA	NA	NA	0.262J	<1	<1	<1	<1	<0.020

□ CT&E Data.
NA Not analyzed.
J Result is an estimate.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative indentification".
a The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
c BTEX determined by 8260 method analysis.
d The laboratory reported that 1,200 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)
Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blanks	
					S01-1	S02-4 & S22-4 (Replicates)		S03-0.6	S04-1.5	S05-2.5	S06-2.5	AB01	EB02	TB02		
Laboratory Sample ID Numbers					4200-1	4177-1 4200-4	4177-4 4200-28	4200-5	4200-8	4200-9	4177-2 4200-10	4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4177 4200
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
Xylenes (Total)	0.040	0.200		<0.050-<0.070	NA	0.791J	0.501[d]	NA	NA	NA	0.194J[c]	<2	<2	<2	<2	<0.040
SVOC 8270																
2-Methyl-naphthalene	0.200	0.210-0.640		<0.240-<1.00	NA	0.488	1.20	NA	NA	NA	0.946	NA	<11.2	NA	<10	<0.200
Naphthalene	0.200	0.210-0.640		<0.240-<1.00	NA	<0.210	<0.210	NA	NA	NA	0.457J	NA	<11.2	NA	<10	<0.200
Pesticides	0.001	0.002-0.020		<0.002-<0.020	NA	NA	NA	<0.003-<0.03	NA	NA	NA	NA	<0.1-<2	NA	<0.1-<1	<0.001-<0.020
PCBs	0.020	0.020-0.030	10	<0.020	NA	NA	NA	<0.030	NA	NA	NA	NA	<2	NA	<1	<0.020

□ CT&E Data.
NA Not analyzed.
J Result is an estimate.
c This result is indicative of p&m xylenes.
d This result is indicative of o-xylene.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)

Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples						Field Blanks			Lab Blanks	
					S07-1.5	S08-0.5	S09-3	S10-2	S11-1.5	S12-1.5	AB01	EB02	TB02		
Laboratory Sample ID Numbers					4200-11	4200-12	4200-13	4200-14	4200-15	4200-16	4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4200
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4.00-157	154[c]	27.9[c]	32.5[c]	27.6[c]	174[c]	708[d]	NA	<200	NA	<200	<4.00
GRPH	0.400	0.400-1.00	100	<0.500-1.03	<1.00	<0.600	<0.800	<0.600	<0.500	21.4	NA	<20	NA	<20	<0.400
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.125-<0.20	<0.300	<0.150	<0.200	<0.150	<0.125	3.065					
Benzene	0.020	0.025-0.060	0.5	<0.025-<0.040	<0.060	<0.030	<0.040	<0.030	<0.025	<0.035	NA	<1	<1	<1	<0.020
Toluene	0.020	0.025-0.060		<0.025-<0.040	<0.060	<0.030	<0.040	<0.030	<0.025	0.091	NA	<1	<1	<1	<0.020
Ethylbenzene	0.020	0.025-0.060		<0.025-<0.040	<0.060	<0.030	<0.040	<0.030	<0.025	0.084	NA	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.050-0.120		<0.050-<0.080	<0.12	<0.060	<0.080	<0.060	<0.050	2.89	NA	<2	<2	<2	<0.040

☐ CT&E Data.
NA Not analyzed.
a The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
c The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.
d The laboratory reported that 155 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)

Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blanks	
					S13-1.5	S14-2	S15-0.5	S16-2.5	S17-2	S18-2 & S23-2 (Replicates)		AB01	EB02	TB02		
Laboratory Sample ID Numbers					4177-3 4200-17	4200-18	4200-19	4200-20	4200-21	4200-22	4200-29	4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4200 4177
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4.00-157	225J[d]	33.0	67.3	4.05[d]	67.0	71.5[d]	364[d]	NA	<200	NA	<200	<4.00
GRPH	0.400	0.400-1.00	100	<0.500-1.03	10.7	14.1	0.701	<0.400	<0.400	2.82	<1.00	NA	<20	NA	<20	<0.400
BTEX (8020/ 8020 Mod.)			10 Total BTEX	<0.125-<0.20	0.497N	0.288	<0.100	0.056	<0.100	0.138	<0.275					
Benzene	0.020	0.020-0.055	0.5	<0.025-<0.040	0.031N	<0.020	<0.020	<0.020	<0.020	<0.020	<0.055	<1[c]	<1	<1	<1	<0.020
Toluene	0.020	0.020-0.055		<0.025-<0.040	0.040N	<0.020	<0.020	0.023	<0.020	<0.020	<0.055	<1[c]	<1	<1	<1	<0.020
Ethylbenzene	0.020	0.020-0.055		<0.025-<0.040	0.069N	0.073	<0.020	<0.020	<0.020	0.033	<0.055	<1[c]	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.040-0.110		<0.050-<0.080	0.357N	0.215	<0.040	0.033[e]	<0.040	0.105	<0.110	<2[c]	<2	<2	<2	<0.040
VOC 8260																
Ethylbenzene	0.020	0.100		<0.025-<0.035	0.059J	NA	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
Toluene	0.020	0.100		<0.025-<0.035	0.033J	NA	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
1,2,4-Trimethyl-benzene	0.020	0.100		<0.025-<0.035	0.072J	NA	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
1,3,5-Trimethyl-benzene	0.020	0.100		<0.025-<0.035	0.025J	NA	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.200		<0.050-<0.070	0.299J	NA	NA	NA	NA	NA	NA	<2	<2	<2	<2	<0.020
SVOC 8270																
di-n-Butyl-phthalate	0.200	0.210-0.640	8,000	<0.240-<1.00	0.571	NA	NA	NA	NA	NA	NA	NA	<11.2	NA	<10	<0.200

☐ CT&E Data.
NA Not analyzed.
J Result is an estimate.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
a The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
c BTEX determined by 8260 method analysis.
d The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.
e The result is indicative of p & m xylenes.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)

Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blanks	
					S13-1.5	S14-2	S15-0.5	S16-2.5	S17-2	S18-2 & S23-2 (Replicates)		AB01	EB02	TB02		
Laboratory Sample ID Numbers					4177-3 4200-17	4200-18	4200-19	4200-20	4200-21	4200-22	4200-29	4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4200 4177
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
bis (2-Ethyl-hexyl) phthalate	0.200	0.210-0.640	50	<0.240-<1.00	0.306	NA	NA	NA	NA	NA	NA	NA	<11.2	NA	<10	<0.200
Pesticides	0.001	0.002-0.020		<0.002-<0.020	<0.002-<0.020	NA	NA	NA	NA	NA	NA	NA	<0.1-<2	NA	<0.1-<1.0	<0.0010-<0.0200
PCBs	0.020	0.020-0.030	10	<0.020	<0.020	NA	NA	NA	NA	NA	NA	NA	<2	NA	<1.0	<0.020

☐ CT&E Data.
NA Not analyzed.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)

Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples						Field Blanks			Lab Blanks	
					S19-1.5	S20-2	S21-1.5	S24	S25	S26	AB01	EB02	TB02		
Laboratory Sample ID Numbers					4200-23	4200-24	4200-25	4201-1	4201-2	4201-3	4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4200
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4.00-157	18.8	25.8[c]	57.2[c]	96.7[d]	21.7[e]	80.7[f]	NA	<200	NA	<200	<4.00
GRPH	0.400	0.400-1.00	100	<0.500-1.03	<0.400	<0.400	<0.400	<0.400	<0.400	<0.400	NA	<20	NA	<20	<0.400
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.125-<0.20	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100					
Benzene	0.020	0.020	0.5	<0.025-<0.040	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	NA	<1	<1	<1	<0.020
Toluene	0.020	0.020		<0.025-<0.040	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	NA	<1	<1	<1	<0.020
Ethylbenzene	0.020	0.020		<0.025-<0.040	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	NA	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.040		<0.050-<0.080	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	NA	<2	<2	<2	<0.040

□ CT&E Data.
NA Not analyzed.
a The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
c The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.
d The laboratory reported that 11.4 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.
e The laboratory reported that 7.15 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.
f The laboratory reported that 76.8 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)

Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blank
					2S27-1	2S28-1.75	2S29-2.5	2S30-2.5	2S31-2 & 2S36-2 (Replicates)		2S32-2	AB01	2EB03	2TB03	
Laboratory Sample ID Numbers					1850	1851	1852	1853	1854	1859	1868	4180-3	1864	1866	#6-9893
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	mg/kg
DRPH	5-6	50-60	500[a]	<4.00-157	<50[b]	<60[b]	220J[b]	2,400J[b]	3,400J[b]	3,000J[b]	310J[b]	NA	NA	NA	NA
RRPH	10-16	100-160	2,000[a]	NA	<100	<120	<150	<120	<120	<120	<120	NA	NA	NA	NA

□ CT&E Data.
▓ F&B Data.
NA Not analyzed.
J Result is an estimate.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b The DRPH concentrations reported for these samples are equivalent to diesel range organics (DRO) as defined by ADEC.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)
Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples							Field Blanks			Lab Blank
					2S33-1.5	2S34-2.5	2S35-2.5	2S37-1.33				AB01	2EB03	2TB03	
Laboratory Sample ID Numbers					1856	1857	1858	1868				4180-3	1864	1866	#6-9893
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg				µg/L	µg/L	µg/L	mg/kg
DRPH	6	60	500[a]	<4.00-157	<60[b]	3,300J[b]	1,600J[b]	<60[b]				NA	NA	NA	NA
RRPH	12	120	2,000[a]	NA	<120	<120	<120	<120				NA	NA	NA	NA

□ CT&E Data.
▓ F&B Data.
NA Not analyzed.
J Result is an estimate.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH concentrations reported for these samples are equivalent to diesel range organics (DRO) as defined by ADEC.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)
Matrix: Soil
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples							Field Blank			Lab Blank
					S02-4 & S22-4 (Replicates)		S13-1.5						EB02		
Laboratory Sample ID Numbers					4177-1	4177-4	4177-3						4180-1		4180 4711
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg						µg/L		µg/L
Aluminum	0.35	2		1,500-25,000	1,300	1,000	11,000						<100		<100
Antimony	N/A	52-58		<7.8-<230	<52	<52	<58						<100		<100
Arsenic	0.11	5.2-5.8		<4.9-<8.5	<5.2	<5.2	<5.8						<100		<100
Barium	0.024	1		27-390	17	14	130						<50		<50
Beryllium	N/A	1-2.6		<2.6-6.4	<2.6	<2.6	3.8						<50		<50
Cadmium	0.33	2.6-2.9		<3.0-<36	<2.6	<2.6	<2.9						<50		<50
Calcium	0.69	4		360-59,000	55,000J	19,000	5,800J						290		<200
Chromium	0.066	1-2.6		<4.3-47	2.8	<2.6	18						<50		<50
Cobalt	N/A	52-58		<5.1-12	<52	<52	<58						<100		<100
Copper	0.045	1-3.0		<2.7-45	3.7	<3.0	12						<50		<50
Iron	0.50	2		5,400-35,000	4,100	3,700	15,000						<100		<100
Lead	0.13	5.2-5.8		<5.1-22	<5.2	<5.2	<5.8						<100		<100
Magnesium	0.96	4		360-7,400	1,500J	1,600	3,000J						<200		<200
Manganese	0.025	1		25-290	56J	49	73J						<50		<50
Molybdenum	N/A	2.6-2.9		<2.5-<11	<2.6	<2.6	<2.9						<50		<50
Nickel	0.11	1		4.2-46	4.5	3.7	16						<50		<50

☐ CT&E Data.
N/A Not available.
J Result is an estimate.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)
Matrix: Soil
Units: mg/kg
METALS ANALYSES

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Range from 7 DEW Line Installations	Environmental Samples							Field Blank			Lab Blank
					S02-4 & S22-4 (Replicates)		S13-1.5						EB02		
Laboratory Sample ID Numbers					4177-1	4177-4	4177-3						4180-1		4180 4711
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg						µg/L		µg/L
Potassium	23	100-260		<300-2,200	<260	<260	950						<5,000		<5,000
Selenium	1.2	52-58		<7.8-<170	<52	<52	<58						<100		<100
Silver	0.53	2.6-2.9		<3-<110	<2.6	<2.6	<2.9						<50		<50
Sodium	0.55	5		<160-680	32	30	220						540J		<250
Thallium	0.011	0.25-0.30		<0.2-<1.2	<0.25	<0.26	<0.30						<5		<5
Vanadium	0.036	1		6.3-59	4.0	3.3	28						<50		<50
Zinc	0.16	1		9.2-95	16	10	29						<50		<50

☐ CT&E Data.
N/A Not available.
J Result is an estimate.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)
Matrix: Surface / Ground Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks
					SW01	SW02	GW01	GW02		AB01	EB02	TB02	
Laboratory Sample ID Numbers					4205-3	4205-4	4180-6 4205-2	4180-8 4205-6		4180-3	4180-2 4180-1 4205-1	4180-9 4205-7	4180 4205
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		µg/L	µg/L	µg/L	µg/L
DRPH	100	200		<200	<200	298[ad]	423,000[a]	899[ad]		NA	<200	NA	<200
GRPH	20	20		<20	<20	<20	723[a]	53[a]		NA	<20	NA	<20
BTEX (8020/8020 Mod.)													
Benzene	1	1	5	<1	<1	<1	<1	1.8		<1[c]	<1	<1	<1
Toluene	1	1	1,000	<1	<1	<1	4N	<1		<1[c]	<1	<1	<1
Ethylbenzene	1	1	700	<1	<1	<1	13N	<1		<1[c]	<1	<1	<1
Xylenes (Total)	2	2	10,000	<2	<2	<2	34N	<2		<2[c]	<2	<2	<2
VOC 8260													
Benzene	1	1	5	<1	NA	NA	<1	2		<1	<1	<1	<1
1,2-Dichloroethane	1	1	5	1.9B-4.5B	NA	NA	<1	2.6		<1	<1	<1	<1
p-Isopropyltoluene	1	1		<1	NA	NA	15	<1		<1	<1	<1	<1
Naphthalene	1	1		<1	NA	NA	8.7	<1		<1	<1	<1	<1
Toluene	1	1	2,000	<1	NA	NA	1.4	<1		<1	<1	<1	<1
1,2,4-Trimethylbenzene	1	1		<1	NA	NA	35	<1		<1	<1	<1	<1
1,3,5-Trimethylbenzene	1	1		<1	NA	NA	62	<1		<1	<1	<1	<1

☐ CT&E Data.
NA Not analyzed.
B The analyte was detected in the associated blank.
N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification".
a Total hydrocarbons in these water samples exceed the 15 µg/L stated for fresh water in ADEC's Water Quality Criteria 18AAC70 (ADEC 1989).
c BTEX determined by 8260 method analysis.
d The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 4-3. POL TANKS ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: POL Tanks (ST05)

Matrix: Surface / Ground Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks
					SW01	SW02	GW01	GW02		AB01	EB02	TB02	
Laboratory Sample ID Numbers					4205-3	4205-4	4180-6 4205-2	4180-8 4205-6		4180-3	4180-2 4180-1 4205-1	4180-9 4205-7	4180 4205
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		µg/L	µg/L	µg/L	µg/L
Xylenes (Total)	2	2	10,000	<2	NA	NA	10.7	<2		<2	<2	<2	<2
SVOC 8270													
2-Methylnaphthalene	10	10-1,000		<10	NA	NA	6,500J	<10		NA	<11.2	NA	<10
TOC	5,000	5,000		17,000-30,700	NA	NA	409,000	63,500		NA	NA	NA	<5,000
TSS	100	200		13,000-19,000	NA	NA	1,680,000	2,700,000		NA	NA	NA	<200
TDS	10,000	10,000		241,000-1,853,000	NA	NA	850,000	926,000		NA	NA	NA	<10,000

☐ CT&E Data.
NA Not analyzed.
J Result is an estimate.

TABLE 4-4. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE POL TANKS (ST05)

SITE	MATRIX	CHEMICAL DETECTED	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[a]		ARAR[b]	CHEMICAL OF CONCERN
						CANCER	NON-CANCER		
POL Tanks (ST05)	Soil	DRPH	5,860	mg/kg	<4.00-157	--	--	500[c]	**Yes**
		GRPH	170	mg/kg	<0.500-1.03	--	--	100[c]	**Yes**
		Benzene	0.031N	mg/kg	<0.025-<0.04	2.21	--	0.5[c]	No
		Toluene	0.423N	mg/kg	<0.025-<0.04	--	5,400	--	No
		Ethylbenzene	1.29	mg/kg	<0.025-<0.04	--	2,700	--	No
		Xylenes (total)	4.43	mg/kg	<0.050-<0.080	--	54,000	--	No
		n-Butylbenzene	0.174J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		p-Isopropyltoluene	0.112J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		Naphthalene	0.902J	mg/kg	<0.025-<0.035	--	1,100	--	No
		1,2,4-Trimethylbenzene	0.944	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		1,3,5-Trimethylbenzene	5.82	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		2-Methylnaphthalene	1.2	mg/kg	<0.240-<1.00	--	--	--	**Yes***
		di-n-Butylphthalate	0.571	mg/kg	<0.240-<1.00	--	2,700	8,000[d]	No
		bis-(2Ethylhexyl)phthalate	0.306	mg/kg	<0.240-<1.00	4.57	540	50[d]	No
		Aluminum	11,000	mg/kg	1,500-25,000	--	--	--	No
		Barium	130	mg/kg	27-390	--	1,890	--	No
		Beryllium	3.8	mg/kg	<2.6-6.4	0.0149	135	--	No
		Calcium	55,000J	mg/kg	350-59,000	--	--	--	No
		Chromium	18	mg/kg	<4.3-47	--	135	--	No
		Copper	12	mg/kg	<2.7-45	--	999	--	No
		Iron	15,000	mg/kg	5,400-35,000	--	--	--	No
		Magnesium	3,000J	mg/kg	360-7,400	--	--	--	No
		Manganese	73J	mg/kg	25-290	--	3,780	--	No
		Nickel	16	mg/kg	4.2-46	--	540	--	No
		Potassium	950	mg/kg	<300-2,200	--	--	--	No

TABLE 4-4. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE POL TANKS (ST05) (CONTINUED)

SITE	MATRIX	CHEMICAL DETECTED	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[a]		ARAR[b]	CHEMICAL OF CONCERN
						CANCER	NON-CANCER		
POL Tanks (ST05) (Continued)	Soil (Continued)	Sodium	220	mg/kg	<160-680	--	--	--	No
		Vanadium	28	mg/kg	6.3-59	--	189	--	No
		Zinc	29	mg/kg	9.2-95	--	8,100	--	No
	Water	DRPH[g]	423,000	µg/L	<200	--	292	--	Yes
		DRPH in surface water	298						Yes
		GRPH[g]	723	µg/L	<20	50	730	--	Yes
		Benzene[g]	2	µg/L	<1	0.617	--	5[e]	Yes
		Toluene[g]	4N	µg/L	<1	--	96.5	1,000[f]	No
		Ethylbenzene[g]	13N	µg/L	<1	--	158	700[f]	No
		Xylenes (total)[g]	34N	µg/L	<2	--	7,300	10,000[f]	No
		1,2-Dichloroethane[g]	2.6	µg/L	1.9B-4.5B	0.934	--	5[e]	No
		p-Isopropyltoluene[g]	15	µg/L	<1	--	--	--	Yes*
		Naphthalene[g]	8.7	µg/L	<1	--	150	--	No
		1,2,4-Trimethylbenzene[g]	35	µg/L	<1	--	--	--	Yes*
		1,3,5-Trimethylbenzene[g]	62	µg/L	<1	--	--	--	Yes*
		2-Methylnaphthalene[g]	6,500J	µg/L	<10	--	--	--	Yes*

* Chemicals without an RBSL or ARAR are considered chemicals of potential concern and are discussed in the Final Bullen Point Risk Assessment, Section 2.1.5 (U.S. Air Force 1996).

a Risk-Based Screening Level.

b Applicable or Relevant and Appropriate Requirement.

c ADEC 1991.

d 55 FR 30798, Proposed Rule RCRA Corrective Action for SWMUs 40 CFR [Section 264.521 (a)(2)(i-iv)], Health-Based Criteria for Systematic Toxicants and Carcinogens.

e MCL, 52 FR 25690.

f MCL, 56 FR 3526 (30 January 1991).

g These analytes were detected in water samples collected from shallow bore holes. They are not indicative of analytes present in surface water at the site.

B The analyte was detected in the associated blank.

J Result is an estimate.

N The analysis indicates the presence of analyte for which there is presumptive evidence to make a "tentative identification":

4.3 FUEL STORAGE AREA (ST09)

4.3.1 Site Background

The Fuel Storage Area (ST09) is located approximately 100 feet west of the POL Tanks (ST05) site, and consists of a gravel pad that has been reworked and has an uneven surface. The Fuel Storage Area is deactivated and no structures exist at the site. The site is believed to have been used for storage of drummed fuel products. It was deactivated in 1971 with the rest of the installation.

The site-specific environmental setting describing the topography, surface water drainage, and soil types is presented in the discussion of potential migration pathways, Section 4.3.3.

4.3.2 Field Sampling and Analytical Results

This section describes the RI sampling and analytical results for samples collected at the Fuel Storage Area (ST09) site. The discussion presents a review of laboratory data, data summary tables, contaminants identified, contaminant trends, and information on suspected source areas.

4.3.2.1 Summary of Samples Collected. A total of seven samples was collected at the site. These consisted of five soil samples, one sediment sample, and one surface water sample. Table 2-2 presents a detailed summary of the samples collected and the analyses performed during the 1993 RI field activities. Locations of all samples collected at the Fuel Storage Area (ST09) site are presented in Figure 4-3.

The five soil samples were analyzed for DRPH, GRPH, and BTEX. In addition, one sample was analyzed for RRPH, VOCs, and SVOCs.

One sediment sample was analyzed for DRPH, GRPH, and BTEX.

One surface water sample was analyzed for DRPH, GRPH, BTEX, VOCs, SVOCs, TOC, TSS, and TDS.

4.3.2.2 Analytical Results. The data summary table (Table 4-6) presents analytical results for all samples collected at the site. Detection and quantitation limits, action levels, associated laboratory and field blanks, and background analytical results are presented for each of the analyses. Background levels are listed to allow direct comparison of naturally occurring organic compounds with samples collected from the site. Sample locations and analytical results for the samples at the site are illustrated in Figure 4-3. All organic compounds detected are presented on the figure except when they were a result of laboratory contamination or field decontamination procedures. The exceptions are presented on the data summary table.

The following section presents a discussion of organic compounds detected above background levels at the site. A discussion of TDS, TSS, and TOC is included.

Organics. Organic compounds detected in soil and sediment samples collected at the site include DRPH, GRPH, BTEX compounds, eight other VOCs, and three SVOCs. DRPH were detected in five samples ranging from 32.5 to 3,830 mg/kg. GRPH were detected in the same five samples ranging from 2.24 to 406 mg/kg. BTEX compounds were also detected in the same five samples. Total BTEX ranged from 0.183 to 8.8 mg/kg; xylenes were the primary component. Eight other VOCs were detected in soil sample ST09-S01 at very low concentrations ranging from 0.170 to 2.71 mg/kg. The VOCs include common components of diesel fuel. Three SVOCs were detected at low levels in the same sample ranging from 0.534 to 3.32 mg/kg.

In the surface water sample, organic compounds detected include DRPH and one VOC. DRPH were detected at 554 µg/L, and 1,2-dichloroethane was detected at 1.7 µg/L. The 1,2-dichloroethane detected in the surface water at 1.7 µg/L was also detected in the background samples at concentrations ranging from 1.9 to 4.5 µg/L . These detections are assumed to be the result of field decontamination procedures. The hexane and methanol used in the decontamination procedures may have contained impurities including 1,2-dichloroethane.

Inorganics. Metals were not a concern at the site, and no metals analyses were performed. TOC, TSS, and TDS were reported in surface water sample ST09-SW01 at 31,100; 18,000; and 1,036,000 µg/L, respectively.

4.3.2.3 Summary of Site Contamination. The source of contaminants detected during sampling conducted at the Fuel Storage Area (ST09) is suspected to be spills and/or leaks from the POL Tanks and associated piping. The primarily contaminants detected at both the Fuel Storage Area (ST09) and the POL Tanks (ST05) were petroleum hydrocarbons (DRPH and GRPH) and VOCs associated with diesel fuel. The petroleum hydrocarbons were detected at both sites at similar concentrations. The petroleum hydrocarbon concentrations decrease with distance from the west side of the POL Tanks. In addition, the Fuel Storage Area is downgradient of the POL Tanks.

4.3.3 Migration Pathways

This section describes the topography and stratigraphy of the site and the migration potential of contaminants from the site. A discussion of receptors and chemical concentrations at receptors is included.

4.3.3.1 Topography and Stratigraphy. Topography at the site consists of a gravel pad placed upon relatively flat tundra (Figure 4-3). The gravel pad has been reworked and has an uneven surface. The new helicopter landing pad is adjacent to the north and east side of the site. To the west the gravel pad grades into the beach gravels.

During the 1993 RI, permafrost was located at a depth of approximately four feet under gravel pads. Gravel pads consisted of the typical gravels and sands associated with these features (Section 2.4.4.2).

4.3.3.2 Migration Potential.

Subsurface Migration. Subsurface flow may be a migration pathway at the site. The presence of petroleum compounds associated with the nearby POL Tanks (ST05) indicates that these compounds may have affected active layer water quality. Contaminated surface soils may continue to affect the active layer water. Topographic information indicates that the general active layer water flow at the site should be towards the west where it would infiltrate through the beach gravels to Mikkelsen Bay. Although seasonal flow may occur within the site it is suspected to be very sluggish due to the flat topography.

Surface Migration. There are no distinct surface water drainage features associated with the site. There were several small depressed areas in the reworked gravel where water had collected during the 1993 RI. The areas may have continued to be reworked during the 1993 short range radar construction activities. A water sample from one of the small depressed areas indicated the presence of DRPH, suggested that surface migration is potentially an active contaminant migration pathway at the site. However, significant migration is probably restricted to spring thaw when large quantifies of meltwater are available and the frozen ground prevents subsurface migration.

Air Transport. Air transportation is not considered to be a significant mode of migration at the site (Section 2.4.4.2).

Summary of Migration Potential. Analytical results indicate that contaminant migration is occurring in the surface and subsurface water at the site. The topography and analytical data indicate that affected surface and active layer water migrate west from the POL Tanks site through the Fuel Storage Area site to Mikkelsen Bay. However, the migration of active layer water is expected to be sluggish due to the relatively flat topography.

4.3.3.3 Receptors and Chemical Concentrations at Receptors.

Human Receptors. Potential human receptors at the POL Tanks site include Air Force contractor personnel working at the station, visitors to the station, and an occasional local visitor passing the site to get to recreational or subsistence lands. Human receptors could potentially be exposed to the chemicals detected in surface water and soil/sediments at the site. The primary routes of potential exposures at the site are direct contact with soil/sediment, incidental ingestion of soil/sediment, and ingestion of surface water. Because ground water and air at the Bullen Point sites are not considered complete pathways of exposure, these media are not evaluated as potential pathways to human receptors.

The Bullen Point Risk Assessment (U.S. Air Force 1996) evaluates in detail the risks to human health from all COCs detected at the site. The potential receptor groups were selected based on their likelihood of exposure to contaminants at the site and include DEW Line workers at the installation, and native adults and children that may visit the site. The estimated exposure point concentrations for human receptors are based on the maximum concentration of each chemical detected at the site. The potential risks to human health associated with chemicals at the site are presented in Section 4.3.4.

Ecological Receptors. Ecological receptors were evaluated in detail in the Bullen Point Risk Assessment (U.S. Air Force 1996) to determine if plants and animals could potentially be impacted by the chemicals detected at the Bullen Point installation. Because of the diversity of the plants and animals in the area of the Bullen Point installation, a set of representative species was selected in the ERA for detailed evaluation. The species include plants, aquatic invertebrates, fish, birds, and mammals. These receptors were selected based on the species' likelihood of exposure given their preferred habitat and feeding habits. The representative species encompass a range of ecological niches in order to achieve the best characterization of the ecosystems being examined and are presented in Table 2-6.

The estimate of chemical concentrations at the ecological receptors was based on the average site-wide concentration of each COC. This approach was appropriate because few of the representative species would inhabit only one distinct site at the installation; they are more likely to be exposed to the mix of chemicals and concentrations detected on all the sites at Bullen Point. The potential ecological risks associated with the chemicals detected at the site are presented in Section 4.3.5.

4.3.4 Human Health Risk Assessment

This section presents a summary of the potential human health risks associated with the chemicals detected at the Fuel Storage Area (ST09) site. The purpose of the human health risk assessment is to quantify the excess lifetime cancer risk and/or the noncancer hazard (reported as hazard index) from the contaminants detected at the site.

This summary presents the COCs at the site, the pathways by which human receptors may be exposed to site chemicals, potential risks to human health posed by each chemical through each exposure pathway, the significance of the risk and/or hazard estimate, and a comparison of site chemical concentrations to ARARs. The methods and assumptions used in calculating hazards and risks are presented in Section 2.4.1.

4.3.4.1 Chemicals of Concern. At the Fuel Storage Area (ST09), COCs identified for the soil/sediment matrix were DRPH and GRPH. The maximum concentrations of DRPH and GRPH exceeded the background concentrations and the ARAR concentrations for petroleum hydrocarbons contamination of soil. DRPH was identified as a COC for the surface water at the site. The maximum concentration of DRPH exceeds the RBSL based on the noncancer hazard associated with drinking surface water contaminated with petroleum hydrocarbons.

Table 4-5, Identification of COCs at the Fuel Storage Area, presents the maximum concentrations of chemicals detected at the site, the associated background concentrations, RBSLs, and ARARs, and identifies COCs selected in the risk evaluation.

4.3.4.2 Exposure Pathways and Potential Receptors. Because COCs were identified for soil/sediment and surface water at the site, the potential risks associated with ingestion of soil/sediment and surface water were evaluated in the risk assessment.

Three potential receptor groups were evaluated in the risk assessment: an adult assigned to a DEW Line installation (worker), an adult inhabitant of communities in the North Slope of Alaska (native), and a child living in a North Slope community (child).

4.3.4.3 Risk Characterization.

Noncancer Hazard and Cancer Risk Associated with Soils and Sediments. The noncancer hazard associated with the ingestion of soil at the Fuel Storage Area by a hypothetical native northern adult/child is 0.06 and by a DEW Line worker is 0.001, based on the maximum concentrations of the COCs. The presence of DRPH and GRPH accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations. The excess lifetime cancer risk associated with the ingestion of soil at the site by the hypothetical native northern adult/child is 1×10^{-7}, and by a DEW Line worker is 3×10^{-9}, based on the maximum concentrations of the COC. The presence of GRPH accounts entirely for the quantifiable excess lifetime cancer risk for these receptor/pathway combinations.

Noncancer Hazard and Cancer Risk Associated with Surface Water. The noncancer hazard associated with the ingestion of surface water at the Fuel Storage Area by a hypothetical native northern adult is 0.1, and by a DEW Line worker is <0.008, based on the maximum concentration of DRPH. The presence of DRPH accounts entirely for the quantifiable noncancer hazard for these receptor/pathway combinations.

Summary of Human Health Risk Assessment. The potential risks and hazards associated with the soil/sediment at the Fuel Storage Area are the very low noncancer hazard (hazard indices of 0.06 and 0.001), and very low cancer risk associated with the GRPH. The noncancer hazards are below one and were calculated conservatively based on a residential scenario. Therefore, the noncancer hazards associated with soil/sediment at the site are minimal. The cancer risks are well below threshold value of 1×10^{-6} and are also considered minimal.

The low hazard indices (0.1 and <0.008) associated with DRPH in surface water at the site indicate minimal noncancer risk. This potential hazard was calculated assuming the affected surface water would be used as a sole-source water supply for 180 days per year. Based on site-specific information, the chemicals in surface water do not currently pose a health hazard nor are they likely to pose a hazard in the future. The surface water expressions at the site are frozen most of the year; many are only intermittently filled with water during the summer months. The surface water at the site is not known to be used as a water supply now, nor has it been used in the past. In conclusion, under current uses the COCs identified in surface water at the Fuel Storage Area site pose only a minimal, if any, potential threat to human health. In the unlikely event that surface water at the site is used as a sole-source drinking water supply in the future, a potential noncancer hazard to human health could exist if conditions remain constant.

In conclusion, under current uses, the COCs identified in soil/sediment and surface water at the Fuel Storage Area site pose only a minimal, if any, potential threat to human health. Based on the human health risk assessment, remedial actions are not warranted at the site.

4.3.5 Ecological Risk Assessment

The objective of the ERA was to estimate the potential impacts of chemicals detected at the installation on aquatic and terrestrial plants and animals. A summary of the methods used to assess potential ecological impacts is presented in Section 2.4.2.

4.3.5.1 Chemicals of Concern. COCs for the ERA were selected based on the average installation-wide concentration of chemicals detected at the Bullen Point sites. All sites at the installation were considered as potentially usable habitat because the installation has been inactive since 1971. Of the chemicals detected in soil/sediments and surface water at the Fuel Storage Area, DRPH, xylenes, and naphthalene were identified as COCs. None of the COCs at this site was associated with any potential risks to ecological receptors.

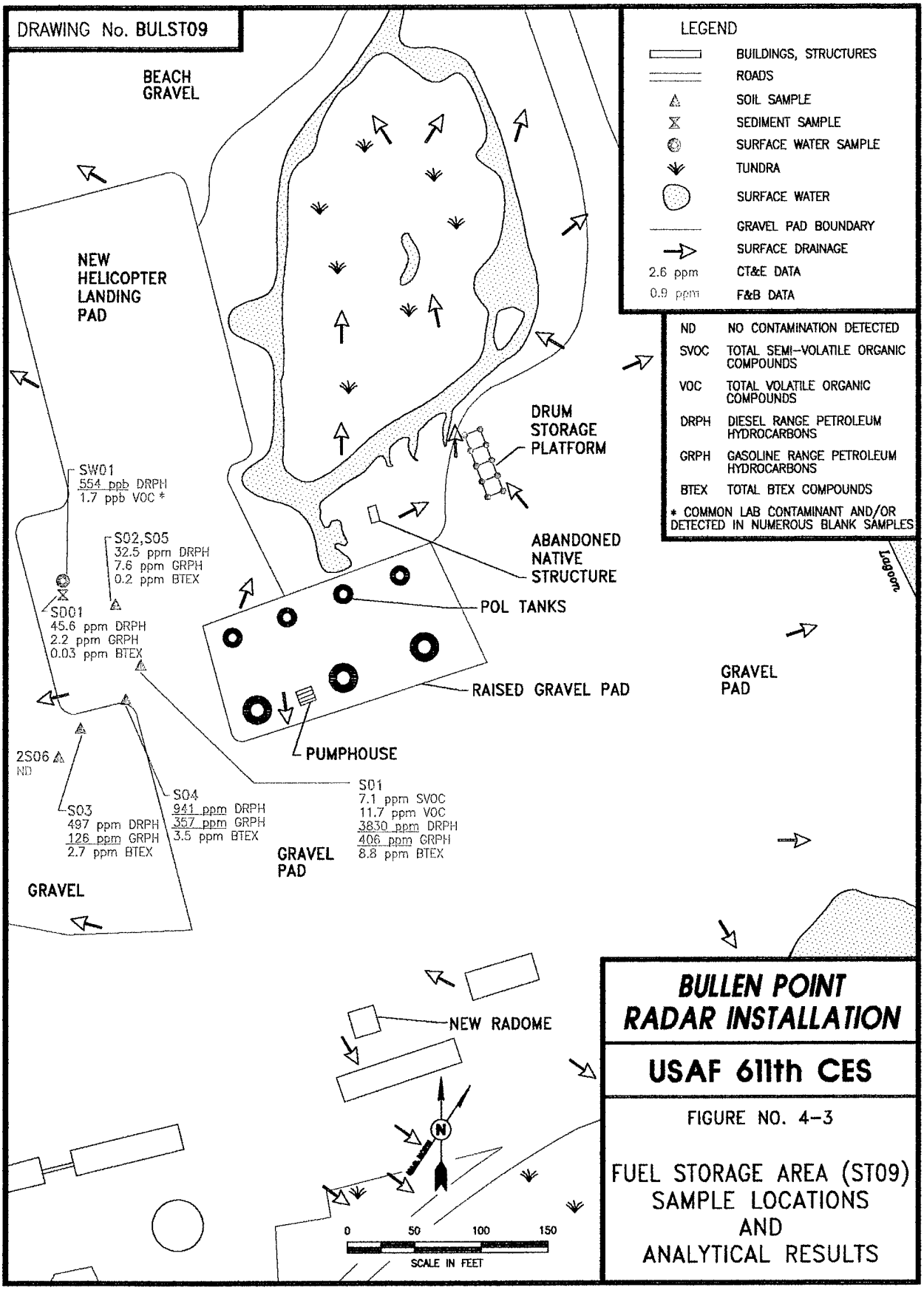
4.3.5.2 Summary of Ecological Risk Assessment. Potential risks to ecological receptors at the Fuel Storage Area site are estimated to be minimal based on the evaluation of the representative terrestrial and aquatic species. Based on the ERA, remediation of the site is not necessarily warranted.

4.3.6 Conclusions and Recommendations

Sampling and analyses have determined that the Fuel Storage Area (ST09) site is contaminated with petroleum hydrocarbons (DRPH and GRPH), and volatile and semi-volatile organics, most of which are common components of diesel fuel. The affected area at the site is the gravel adjacent to, and west of, the affected area at the POL Tanks site. The suspected source of contamination is spills and/or leaks from the POL Tanks that have migrated to the site via surface and active layer water.

The risk assessment concluded that risks posed to human health and ecological receptors by site contaminants are minimal given current site uses. The potential human health risks at the site are not of a magnitude that normally requires remedial action. The ERA concluded that the overall potential risks presented by site contaminants are minimal. Therefore, under current and future site conditions and considering the findings of the risk assessment, remediation of the site is not necessarily warranted.

Levels of petroleum compounds (primarily diesel) detected in soil/sediment at the site exceed ADEC guidance cleanup levels. In addition, site contaminants have migrated downgradient of the site, and have impacted gravel areas and surface water. Therefore, the site is being recommended for remedial action. The affected area at the site is the gravel area adjacent to, and west of, the POL Tanks. The remedial action alternative recommended for the site is enhanced bioremediation. A complete description and evaluation of the remedial alternatives considered for this site are presented in the FS, Section 5.0.


DRAWING No. BULST09
BEACH GRAVEL
NEW HELICOPTER LANDING PAD
DRUM STORAGE PLATFORM
ABANDONED NATIVE STRUCTURE
POL TANKS
RAISED GRAVEL PAD
PUMPHOUSE
GRAVEL PAD
GRAVEL PAD
GRAVEL
Lagoon
NEW RADOME
SW01
554 ppb DRPH
1.7 ppb VOC *
S02,S05
32.5 ppm DRPH
7.6 ppm GRPH
0.2 ppm BTEX
SD01
45.6 ppm DRPH
2.2 ppm GRPH
0.03 ppm BTEX
2S06
ND
S03
497 ppm DRPH
126 ppm GRPH
2.7 ppm BTEX
S04
941 ppm DRPH
357 ppm GRPH
3.5 ppm BTEX
S01
7.1 ppm SVOC
11.7 ppm VOC
3830 ppm DRPH
406 ppm GRPH
8.8 ppm BTEX
LEGEND
BUILDINGS, STRUCTURES
ROADS
SOIL SAMPLE
SEDIMENT SAMPLE
SURFACE WATER SAMPLE
TUNDRA
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
2.6 ppm CT&E DATA
0.9 ppm F&B DATA
ND NO CONTAMINATION DETECTED
SVOC TOTAL SEMI-VOLATILE ORGANIC COMPOUNDS
VOC TOTAL VOLATILE ORGANIC COMPOUNDS
DRPH DIESEL RANGE PETROLEUM HYDROCARBONS
GRPH GASOLINE RANGE PETROLEUM HYDROCARBONS
BTEX TOTAL BTEX COMPOUNDS
* COMMON LAB CONTAMINANT AND/OR DETECTED IN NUMEROUS BLANK SAMPLES
N
0 50 100 150
SCALE IN FEET
BULLEN POINT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 4-3
FUEL STORAGE AREA (ST09) SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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TABLE 4-5. FUEL STORAGE AREA ANALYTICAL DATA SUMMARY

Installation: Bullen Point
Site: Fuel Storage Area (ST09)
Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples						Field Blanks			Lab Blanks	
					S01	S02 & S05 (Replicates)		S03	S04	SD01	AB01	EB02	TB02		
Laboratory Sample ID Numbers					4177-6 4201-9	4201-10	4201-13	4201-11	4201-12	4201-14	4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4201 4177
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
DRPH	4.00	4.00	500[a]	<4-157	3,830J	32.5[d]	28.9[e]	497	941	45.6[f]	NA	<200	NA	<200	<4.00
GRPH	0.400	0.400	100	<0.5-1.03	406	7.58	4.94	126	357	2.24	NA	<20	NA	<20	<0.400
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.125-<0.2	8.768J	0.183	0.073	2.666	3.523	0.028					
Benzene	0.020	0.020-0.030	0.5	<0.025-<0.04	0.035	<0.030	<0.020	<0.020	<0.020	<0.020	<1[c]	<1	<1	<1	<0.020
Toluene	0.020	0.020-0.030		<0.025-<0.04	0.533J	<0.030	<0.020	0.029	0.073	<0.020	<1[c]	<1	<1	<1	<0.020
Ethylbenzene	0.020	0.020-0.030		<0.025-<0.04	1.57	0.039	<0.020	0.608	0.485	<0.020	<1[c]	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.040-0.060		<0.05-<0.08	6.63	0.144	0.073	2.029	2.965	0.028[b]	<2[c]	<2	<2	<2	<0.040
VOC 8260															
n-Butylbenzene	0.020	0.120		<0.025-<0.035	0.857J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
sec-Butylbenzene	0.020	0.120		<0.025-<0.035	0.303J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
Ethylbenzene	0.020	0.120		<0.025-<0.035	0.182J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
Isopropylbenzene	0.020	0.120		<0.025-<0.035	0.170J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
p-Isopropyltoluene	0.020	0.120		<0.025-<0.035	0.581J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
Naphthalene	0.020	0.120		<0.025-<0.035	4.37J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
n-Propylbenzene	0.020	0.120		<0.025-<0.035	0.259J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
1,2,4-Trimethylbenzene	0.020	0.120		<0.025-<0.035	2.71J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020

☐ CT&E Data.
NA Not analyzed.
J Result is an estimate.
a The action level for DRPH is based on conversations with ADEC; a final action level has not yet been determined.
b Result is indicative of p&m-xylenes only.
c BTEX determined by 8260 method analysis.
d The laboratory reported that 10.9 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.
e The laboratory reported that 11.9 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.
f The laboratory reported that 18.7 mg/kg of the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 4-5. FUEL STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Fuel Storage Area (ST09)
Matrix: Soil/Sediment
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Samples					Field Blanks			Lab Blanks	
					S01	S02 & S05 (Replicates)		S03	S04	SD01	AB01	EB02	TB02		
Laboratory Sample ID Numbers					4177-6 4201-9	4201-10	4201-13	4201-11	4201-12	4201-14	4180-3	4180-1 4180-2 4205-1	4180-9 4205-7	4180 4205	4201 4177
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	µg/L	µg/L	µg/L	µg/L	mg/kg
1,3,5-Trimethylbenzene	0.020	0.120		<0.025-<0.035	0.848J	NA	NA	NA	NA	NA	<1	<1	<1	<1	<0.020
Xylenes (Total)	0.040	0.240		<0.050-<0.070	1.427J	NA	NA	NA	NA	NA	<2	<2	<2	<2	<0.040
SVOC 8270															
Naphthalene	0.200	0.230		<0.240-<1.00	3.20	NA	NA	NA	NA	NA	NA	<11.2	NA	<10	<0.200
2-Methylnaphthalene	0.200	0.230		<0.240-<1.00	3.32	NA	NA	NA	NA	NA	NA	<11.2	NA	<10	<0.200
di-n-Butylphthalate	0.200	0.230	8,000	<0.240-<1.00	0.534	NA	NA	NA	NA	NA	NA	<11.2	NA	<10	<0.200

☐ CT&E Data.
NA Not analyzed.
J Result is an estimate.

TABLE 4-5. FUEL STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Fuel Storage Area (ST09)
Matrix: Soil
Units: mg/kg

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Sample						Field Blanks		Lab Blanks	
					2S06						2EB03	2TB03		
Laboratory Sample ID Numbers					1860						1864	1866	#1&2-9793	#1&2-9793 #5-9693
ANALYSES	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg						µg/L	µg/L	µg/L	mg/kg
DRPH	6	60	500[a]	<4-157	<60[b]						NA	NA	NA	<50
GRPH	0.1	1	100	<0.5-1.03	<1J[b]						<50J[b]	<50J[b]	<50J	<1J
RRPH	12	120	2,000[a]	NA	<120						NA	NA	NA	<100
BTEX (8020/8020 Mod.)			10 Total BTEX	<0.125-<0.2	<0.16									
Benzene	0.002	0.02	0.5	<0.025-<0.04	<0.02						<1	<1	<1	<0.02
Toluene	0.002	0.02		<0.025-<0.04	<0.02						<1	<1	<1	<0.02
Ethylbenzene	0.003	0.03		<0.025-<0.04	<0.03						<1	<1	<1	<0.02-<0.03
Xylenes (Total)	0.009	0.09		<0.05-<0.08	<0.09						<2	<2	<2	<0.04-<0.09

□ CT&E Data.
▒ F&B Data.
NA Not analyzed.
J Result is an estimate.
a The action levels for DRPH and RRPH are based on conversations with ADEC; final action levels have not yet been determined.
b DRPH and GRPH concentrations reported for these samples are equivalent to diesel and gasoline range organics (DRO and GRO) as defined by ADEC.

TABLE 4-5. FUEL STORAGE AREA ANALYTICAL DATA SUMMARY (CONTINUED)

Installation: Bullen Point
Site: Fuel Storage Area (ST09)
Matrix: Surface Water
Units: µg/L

Parameters	Detect. Limits	Quant. Limits	Action Levels	Bkgd. Levels	Environmental Sample						Field Blanks			Lab Blanks
					SW01						AB01	EB02	TB02	
Laboratory Sample ID Numbers					4205-5 4180-7						4180-3	4180-2 4180-1 4205-1	4180-9 4205-7	4180 4205
ANALYSES	µg/L	µg/L	µg/L	µg/L	µg/L						µg/L	µg/L	µg/L	µg/L
DRPH	100	100		392[ad]-457[ad]	554[ad]						NA	<200	NA	<200
GRPH	20	20		<20	<20						NA	<20	NA	<20
BTEX (8020/8020 Mod.)														
Benzene	1	1	5	<1	<1						NA	<1	<1	<1
Toluene	1	1	1,000	<1	<1						NA	<1	<1	<1
Ethylbenzene	1	1	700	<1	<1						NA	<1	<1	<1
Xylenes (Total)	2	2	10,000	<2	<2						NA	<2	<2	<2
VOC 8260														
1,2-Dichloroethane	1	1	5	1.9B-4.5B	1.7						<1	<1	<1	<1
SVOC 8270	10	10		<10	<10						NA	<11.2	NA	<10
TOC	5,000	5,000		17,000-30,700	31,100						NA	NA	NA	<5,000
TSS	100	200		13,000-19,000	18,000						NA	NA	NA	<200
TDS	10,000	10,000		241,000-1,853,000	1,036,000						NA	NA	NA	<10,000

☐ CT&E Data.
NA Not analyzed.
B The analyte was detected in the associated blank.
a Total petroleum hydrocarbons in these water samples exceed the 15 µg/L stated for fresh water in ADEC's Water Quality Criteria 18AAC70 (ADEC 1989).
d The laboratory reported that the EPH pattern in this sample was not consistent with a middle distillate fuel.

TABLE 4-6. IDENTIFICATION OF CHEMICALS OF CONCERN AT THE FUEL STORAGE AREA (ST09)

SITE	MATRIX	CHEMICAL DETECTED	MAXIMUM CONCENTRATION	UNITS	BACKGROUND RANGE	RBSL[a]		ARAR[b]	CHEMICAL OF CONCERN
						CANCER	NON-CANCER		
Fuel Storage Area (ST09)	Soil/Sediment	DRPH	3,830J	mg/kg	<4-157	--	--	500[e]	**Yes**
		GRPH	406	mg/kg	<0.5-1.03	--	--	100[e]	**Yes**
		Benzene	0.035	mg/kg	<0.025-<0.04	2.2	--	0.5[e]	No
		Toluene	0.533J	mg/kg	<0.025-<0.04	--	5,400	--	No
		Ethylbenzene	1.57	mg/kg	<0.025-<0.04	--	2,700	--	No
		Xylenes (Total)	6.63	mg/kg	<0.05-<0.08	--	54,000	--	No
		n-Butylbenzene	0.857J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		sec-Butylbenzene	0.303J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		Naphthalene	4.37J	mg/kg	<0.025-<0.035	--	1,100	--	No
		1,2,4-Trimethylbenzene	2.71J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		1,3,5-Trimethylbenzene	0.848J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		Isopropylbenzene	0.170J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		p-Isopropyltoluene	0.581J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		n-Propylbenzene	0.259J	mg/kg	<0.025-<0.035	--	--	--	**Yes***
		2-Methylnaphthalene	3.32	mg/kg	<0.240-<1.00	--	--	--	**Yes***
		di-n-Butylphthalate	0.534	mg/kg	<0.240-<1.00	--	2,700	8,000[f]	No
	Surface water	DRPH	554	µg/L	392-457	--	292	--	**Yes**
		1,2-Dichloroethane	1.7	µg/L	1.9B-4.5B	0.934	--	5[j]	No

* Chemicals without an RBSL or ARAR are considered chemicals of potential concern and are discussed in the Final Bullen Point Risk Assessment, Section 2.1.5 (U.S. Air Force 1996).

a Risk-Based Screening Level.

b Applicable or Relevant and Appropriate Requirement.

e ADEC 1991.

f 55 FR 30798, Proposed Rule RCRA Corrective Action for SWMUs 40 CFR [Section 264.521 (a)(2)(i-iv)], Health-Based Criteria for Systematic Toxicants and Carcinogens.

B The analyte was detected in the associated blank.

J Result is an estimate.

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5.0 FEASIBILITY STUDY

The purpose of this section is to present the FS of remedial alternatives for the sites at Bullen Point radar installation (Bullen Point) recommended for remedial action. These sites were identified based on the findings of the RI, reported in Sections 1.0 through 4.0 of this document, and the Bullen Point Risk Assessment (U.S. Air Force 1996). The Bullen Point sites recommended for remedial action and covered by this FS are:

- Inside Transformer (OT04);
- POL Tanks (ST05); and
- Fuel Storage Area (ST09).

Complete RI results for these sites are presented in Section 4.0. This FS describes the evaluation of remedial alternatives used as the basis for the selection of the proposed remedial actions for the sites presented in Section 4.0.

Sites requiring no further action based on the RI and risk assessment are not included in this section. The proposed no further action sites are the Old Landfill/Dump Site East (LF06) and the Drum Storage Area (SS10). RI results for these sites are presented in Section 3.0.

This FS complies with the NCP. It has been streamlined as described in the following section. The remainder of the introduction consists of the approach used in development of the FS, including risk management decisions, and an outline of the organization of the FS.

5.0.1 Approach To Feasibility Study

This FS is streamlined as follows to minimize unnecessary evaluation of remedial alternatives for the sites at Bullen Point.

- Screening and detailed evaluation of remedial alternatives were not conducted for sites where a completely protective presumptive remedy will be employed.

  A presumptive remedy has been selected for the Inside Transformer (OT04) because wipe samples taken on the floor of the building near the former location of a transformer show contamination by PCBs (Aroclor 1254). The contaminated tiles and boards will be removed and incinerated offsite. No further analysis of alternatives is necessary. A cost estimate and estimated project duration are presented in Attachments A and B, respectively, and the cost is included in the estimated remediation cost for the entire installation in Section 5.4.

- The FS was conducted with the focus on contaminated media instead of individual sites, specifically gravel. There is DRPH-contaminated gravel at the POL Tanks (ST05) and the adjacent Fuel Storage Area (ST09). There is also a small area of DRPH-contaminated tundra north of the POL Tanks (ST05).

It is most practical to remediate these sites together because each is similarly contaminated. The installation is also too remote to mobilize cost effectively for different remedial technologies that result in comparable cleanup levels.

- Repetition of information presented in the RI (Sections 1.0 through 4.0 of this report) and the Bullen Point Risk Assessment is minimized. Data essential to evaluating remedial alternatives are presented in summary tables.

  Characterization tables (presented in Section 5.1) have been adapted from the Air Force Center for Environmental Excellence (AFCEE) Handbook (U.S. Air Force 1991) to focus on the data essential to the evaluation of remedial alternatives. Wherever possible, reference is made to the RI and Risk Assessment for detailed site information, and assumptions used in calculating risk and identifying COCs.

- General response actions (GRAs) and applicable technologies are screened together, and the alternatives are limited to no more than five conventional and innovative methods including the required no action alternative.

- Landspreading is not included as a remedial alternative for gravel principally due to space limitations at the installation. Landspreading would require approximately 37 acres to spread the affected soil in two inch lifts, which is more area than is available. The runway is only approximately 10 acres. Ex situ bioremediation is presented as an alternative to landspreading.

5.0.2 Risk Management Decisions

Two risk management decisions have been made in writing the FS based on a thorough review of the data. One relates to surface water at the contaminated sites and the other to benzene at the Fuel Storage Area (ST09). These decisions are necessary to focus the results of the risk assessment into workable and protective remedial alternatives.

- Surface water in tundra areas has been impacted by sources of contamination at the installation. Methods for remediating surface water directly are not feasible because the surface water is extremely shallow, covers a wide area, is frozen for over half the year, and is intimately associated with tundra. ADEC recognizes that physical remedial actions in tundra are often more ecologically damaging than the petroleum hydrocarbons released to it (Interim Guidance for Non-UST Contaminated Soil Cleanup Levels, Guidance Number 001 - Revision Number 1, July 17, 1991, Page 10). Instead of evaluating direct remedial alternatives for surface water in otherwise natural tundra areas, we have taken the approach that remediation of the source will improve the quality of surface water over time. COCs identified in surface water, therefore, are not considered in the preparation of this FS. The preferred remedial alternatives include a provision for sampling surface water to confirm the effectiveness of remedial actions.

- Benzene was detected in the soils/sediment at the Fuel Storage Area (ST09) and identified in the risk assessment as a COC based on a maximum concentration of 2 mg/kg. Because this concentration does not represent a significant cancer risk or noncancer HQ and falls below the ADEC Non-UST soil cleanup level of 5 mg/kg, it is not included in the FS as a COC. Benzene will, in any event, be remediated with DRPH and GRPH.

This risk management decision permits the focus of the FS to be cleaning up the sources of contamination at Bullen Point. The primary COC in site soils/sediments at the installation is DRPH. Other COCs include GRPH and PCBs.

5.0.3 Organization

The FS is organized as follows:

- Introduction;
- Site characterization for remediation (considers COCs, concentrations of chemicals detected, estimated areas and volumes of affected media, ARARs, and target cleanup levels or proposed remediation goals for each site);
- Screening of GRAs and presentation of representative remedial technologies;
- Development of remedial alternatives;
- Detailed evaluation of remedial alternatives (the detailed analysis is based on the AFCEE guidance and includes the nine NCP criteria). The detailed evaluation also includes a comparative analysis of alternatives, and identification of preferred alternatives);
- Siting study; and
- Detailed cost estimates and estimates of project duration in Attachments A and B, respectively.

5.1 SITE CHARACTERIZATION FOR REMEDIATION

Information relevant to the screening and evaluation of remedial alternatives for the three sites at Bullen Point is summarized in Tables 5-1 through 5-3. The tables include COCs, concentrations of chemicals detected, estimated volumes of affected media, and the basis for listing each as a COC.

TABLE 5-1. REMEDIAL ACTION CHARACTERIZATION FOR THE INSIDE TRANSFORMER (OT04)

MEDIA	COC	RANGE OF ENVIRONMENTAL CONTAMINATION	TARGET CLEANUP LEVEL	BASIS FOR LISTING AS COC	VOLUME OF CONTAMINATED MEDIA	DESIGN PARAMETERS
Floor Boards and Tiles	Aroclor 1254	19 - 391 $\mu g/100\ cm^2$ in wipe samples	10 $\mu g/100\ cm^2$	TSCA Cleanup Level	<1 cy (7.4 cf)	• transportability • volume • size and shape of debris

TABLE 5-2. REMEDIAL ACTION CHARACTERIZATION FOR THE POL TANKS (ST05)

MEDIUM	COCs	RANGE OF ENVIRONMENTAL CONTAMINATION	TARGET CLEANUP LEVEL[a]	BASIS FOR LISTING AS COC	VOLUME OF CONTAMINATED MEDIA	DESIGN PARAMETERS
Gravel	DRPH	ND - 5,860 mg/kg	500 mg/kg	ADEC Non-UST Action Level	8,650 cy	• microbial activity • oxygen diffusion • contaminant concentration • solubility • volume • grain size • seasonality
	GRPH	ND - 170 mg/kg	100 mg/kg	ADEC Non-UST Action Level		

TABLE 5-3. REMEDIAL ACTION CHARACTERIZATION FOR THE FUEL STORAGE AREA (ST09)

MEDIUM	COCs	RANGE OF ENVIRONMENTAL CONTAMINATION	TARGET CLEANUP LEVEL[a]	BASIS FOR LISTING AS COC	VOLUME OF CONTAMINATED MEDIA	DESIGN PARAMETERS
Gravel	DRPH	ND - 3,830 mg/kg	500 mg/kg	ADEC Non-UST Action Level	1,330 cy	• microbial activity • oxygen diffusion • contaminant concentration • solubility • volume • grain size • seasonality
	GRPH	ND - 406 mg/kg	100 mg/kg	ADEC Non-UST Action Level		

[a] Target cleanup levels for DRPH and GRPH in soil are based on ADEC Non-UST guidance and do not necessarily correspond to final site-specific cleanup goals.

5.1.1 Summary of Site Information

The information considered for each site includes:

- medium;
- COCs;
- range of chemicals detected;
- target cleanup level (or proposed remediation goal - the lowest applicable action level based on the risk assessment, including cancer risk, noncancer HQ, and chemical-specific ARARs);
- basis for the target cleanup level (chemical-specific ARAR, cancer risk or noncancer HQ); and
- design parameters for remedial action.

5.1.2 Estimated Areas, Volumes, and Masses of Contaminated Media

The approximate areas, volumes, and mass of the contaminated media are presented in Table 5-4. Areas and depths are estimated based on the RI; actual areas and depths of contamination may differ from the estimates, which will affect the cost of remediation. The density of gravel is estimated to be 1.8 tons/cubic yard; the same estimate is used for the floor materials at the Inside Transformer (OT04) site. The true density of all of the media will vary depending on the nature of the materials. The locations and estimated volumes of contaminated media are illustrated in Figure 5-1. The estimated total volume of each is:

- gravel - 9,980 cubic yards and
- floor materials - 7.4 cubic feet (0.27 cubic yards).

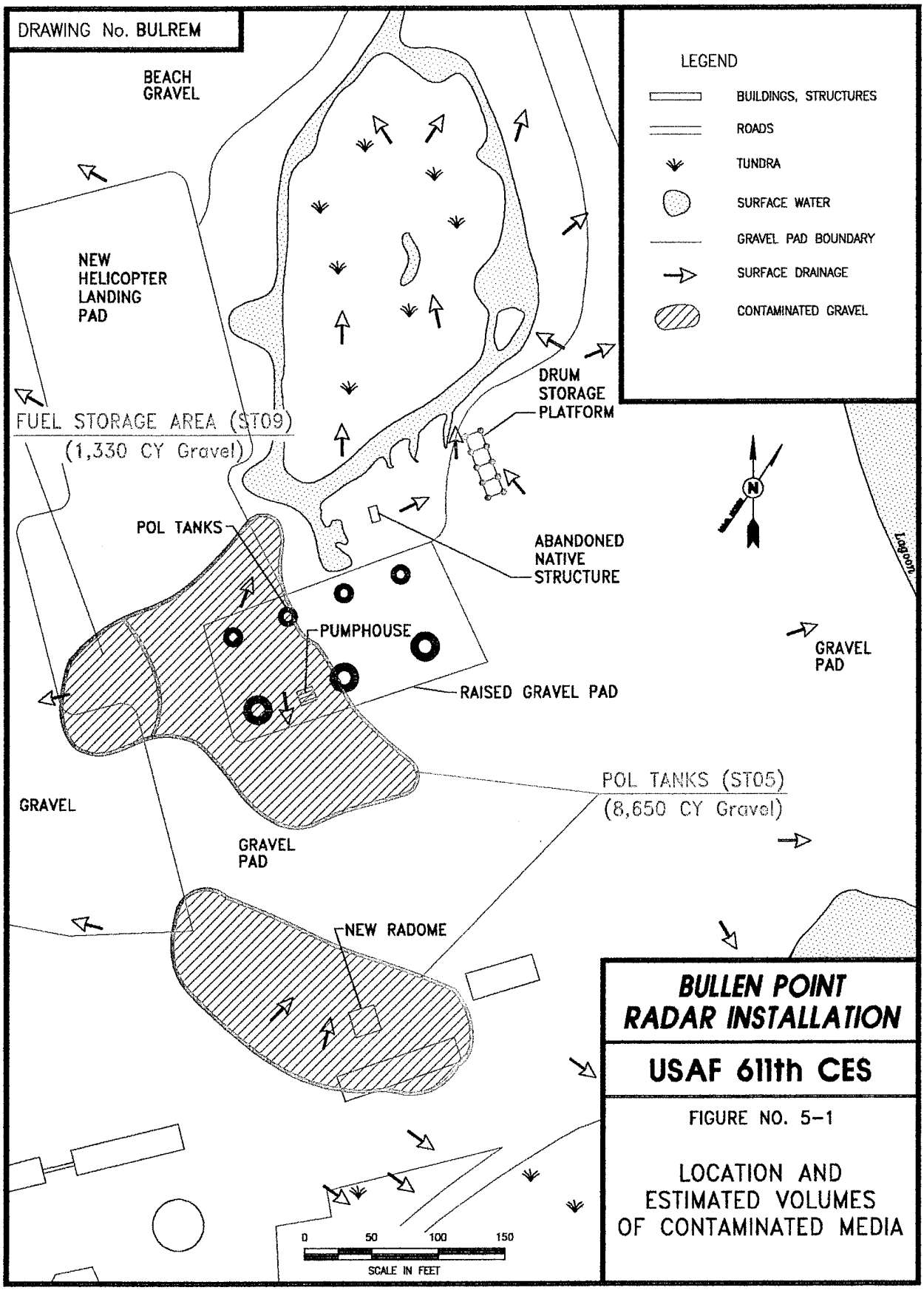
GRAs and remedial alternatives are screened and evaluated for gravel in Sections 5.2 through 5.4. The PCB-contaminated floor material will be remediated by the presumptive remedy described in Section 5.0.1.

Estimates of cost and project duration are provided in Attachments A and B, respectively. These attachments are located at the end of Section 5.0.

5.1.3 ARARs

According to the NCP, ARARs must be identified and evaluated to determine all of the requirements for remedial actions. There are three categories of ARARs:

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DRAWING No. BULREM
BEACH GRAVEL
NEW HELICOPTER LANDING PAD
FUEL STORAGE AREA (ST09)
(1,330 CY Gravel)
DRUM STORAGE PLATFORM
POL TANKS
ABANDONED NATIVE STRUCTURE
PUMPHOUSE
RAISED GRAVEL PAD
GRAVEL PAD
POL TANKS (ST05)
(8,650 CY Gravel)
GRAVEL
GRAVEL PAD
NEW RADOME
Lagoon
LEGEND
BUILDINGS, STRUCTURES
ROADS
TUNDRA
SURFACE WATER
GRAVEL PAD BOUNDARY
SURFACE DRAINAGE
CONTAMINATED GRAVEL
N
0 50 100 150
SCALE IN FEET
BULLEN POINT RADAR INSTALLATION
USAF 611th CES
FIGURE NO. 5-1
LOCATION AND ESTIMATED VOLUMES OF CONTAMINATED MEDIA

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TABLE 5-4. APPROXIMATE AREAS, VOLUMES AND MASSES OF CONTAMINATED MEDIA BY SITE AT BULLEN POINT

SITE	MEDIUM	AREA (sq ft)	DEPTH (ft)	VOLUME (cy)	MASS (tons)
Inside Transformer (OT04)	floor material	15	0.5	0.27	0.5
POL Tanks (ST05)	gravel (includes small area of tundra)	58,390	4	8,650	15,570
Fuel Storage Area (ST09)	gravel	8,980	4	1,330	2,400

- Chemical-specific;
- Action-specific; and
- Location-specific.

Chemical-specific ARARs are action levels that may apply in addition to risk or hazard-based remediation goals. Chemical-specific ARARs are identified in the RI and included in the risk assessment. The target cleanup levels or proposed remediation goals represent the lowest applicable action level.

Action-specific ARARs are requirements that relate to how remedial actions must be conducted. For example, offsite transportation of hazardous waste must be manifested in compliance with Department of Transportation (DOT) and RCRA requirements.

Location-specific ARARs impose requirements on a remedial action based on the location of the site. For example, there are specific requirements that pertain to wetlands. It should be noted that ADEC's Interim Guidance for Non-UST contaminated soil target cleanup levels are intended as guidance and do not necessarily correspond to final site-specific cleanup levels. The ARARs for the sites at the Bullen Point installation are presented in Table 5-5.

5.2 SCREENING OF GENERAL RESPONSE ACTIONS

5.2.1 Presentation and Screening of General Response Actions

GRAs are general approaches for remedial actions. GRAs can be active or passive measures. Active measures involve removal or active treatment of the contaminated medium. Passive measures rely on natural processes to reduce the toxicity, mobility or volume of contamination, or on controls put in place to limit exposure. GRAs apply to contaminants in all of the environmental media separately, or in any combination. Screening GRAs streamlines the FS process by establishing the feasibility of entire classes of remedial responses, thereby enabling the selection of a focused set of viable alternatives for detailed evaluation. GRAs have been evaluated for gravel which is the predominant medium that is contaminated at the Bullen Point installation.

TABLE 5-5. ARARS FOR SITES AT THE BULLEN POINT INSTALLATION

AUTHORITY	CITATION	TYPE OF ARAR	BASIS	CATEGORY OF ARAR
Toxic Substances Control Act	40 CFR 761.60(a)(4)	Action-specific	Disposal Requirements	Applicable
RCRA	40 CFR 268	Action-specific	Land Disposal Restrictions	Relevant and Appropriate
RCRA	40 CFR Part 263	Action-specific	Standards Applicable to Generators of Hazardous Waste	Relevant and Appropriate
Clean Air Act	42 U.S.C. 7401-7642, 40 CFR 60, 61, and 63	Action-specific	National Ambient Air Quality Standards (Treatment technology standards for fugitive emissions and landfills)	Applicable
SDWA	52 FR 25690 56 FR 3526	Chemical-specific	Maximum Contaminant Level for drinking water	Relevant and Appropriate
ADEC, Interim Guidance for Surface and Groundwater Cleanup Levels	AS 46.03.070 AS 46.09.020 AS 46.04.020 18 AAC 70.020 18 AAC 75.140	Chemical-specific	Standards applicable for water used for drinking and surface water important to the growth and propagation of aquatic life	Relevant and Appropriate
RCRA	55 FR 30798	Chemical-specific	Standard for Solid Waste Management Units, SWMUs, in the RCRA Corrective Action Program	Relevant and Appropriate
ADEC, Interim Guidance for Non-UST Action Levels	18 AAC 75.140	Chemical-specific	Standards for general guidance	Relevant and Appropriate
Toxic Substances Control Act	40 CFR 761.125	Chemical-specific	Requirements for PCB spill cleanup	Applicable
ADEC, Interim Guidance for Surface and Groundwater Cleanup Levels	AS 46.03.070, AS 46.09.020, 18 AAC 70.020 (b), AS 46.04.020, 18 AAC 75.140, 18 AAC 70.025, 18 AAC 70.030 18 AAC 70.010, and 18 AAC 70.040	Location-specific	Standards applicable for water used for drinking and surface water important to the growth and propagation of aquatic life	Relevant and Appropriate

The criteria for screening GRAs are implementability, duration, effectiveness, and cost. Implementability is estimated in terms of technical and administrative barriers. For example, containment is generally less acceptable to regulatory agencies than removal or treatment. Additionally, an innovative technology that has proven to be effective in the continental U.S. may not be technically implementable on the North Slope if it cannot be transported there.

Duration is the estimate of the time necessary to attain the projected treatment efficiency. Treatment efficiency is estimated from applicable case studies and the literature. The estimated duration of no action where it includes passive biodegradation is long even though the time necessary to implement no action is short.

Effectiveness is the relative success of the response action in reducing contamination and risk to acceptable levels.

Cost is the estimated capital, operating, and administrative costs necessary to attain the projected treatment efficiency. This estimate is presented in relative terms (low, medium, and high).

The GRAs considered for the three sites at the Bullen Point installation are:

- No action;
- Institutional controls and monitoring;
- Containment;
- Onsite treatment; and
- Removal.

These GRAs are defined as follows:

No Action. Under no action, contaminants are left in place and only natural processes, such as biodegradation, lower the concentrations of COCs.

Institutional Controls and Monitoring. The institutional control GRA is a passive response in which steps are taken to minimize the possibility of accidental exposure of humans and the environment to COCs. Institutional controls may include fences to minimize exposure, and public education to show people how to avoid exposure. Institutional control of sites contaminated by petroleum hydrocarbons minimizes the chances of accidental exposure while passive biodegradation occurs. Monitoring is included to determine if migration of contaminants is occurring and if natural processes are lowering the concentrations of the COCs.

Containment. The containment GRA limits the potential for accidental exposure to contaminants by physical means. Examples include soil caps and solidification. Objectives can include one or more of the following: 1) minimize the risk of direct exposure to contaminated soils; 2) eliminate the possibility of contaminants or contaminated soils becoming airborne and migrating; and 3) prevent water from entering the contaminated area and transporting contaminants to other areas.

Onsite Treatment. Onsite treatment may be used to reduce the toxicity, mobility, or volume of a contaminant and may be accomplished in situ or ex situ. In situ treatment involves active treatment with the medium in place. Ex situ treatment involves the removal of the contaminated medium to a location in the installation for aboveground treatment. The medium may be replaced in the original excavation after treatment. Treatment efficiencies vary depending on the technique used and the type of contaminant present.

Removal. Removal involves excavating the contaminated medium and shipping it offsite for treatment or disposal. Removal reduces the risk of exposure to the contaminant, because it no longer remains at the installation.

The applicability of these GRAs at Bullen Point is determined using AFCEE screening criteria: implementability, project duration, effectiveness, and cost. Representative technologies for the GRAs retained are presented and screened in Section 5.2.2. Screening is performed as follows.

5.2.1.1 Screening of GRAs for Contaminated Gravel. GRAs considered for remediation of gravel are presented in Table 5-6. No action, institutional controls and monitoring, and onsite treatment are retained for evaluation.

5.2.2 Presentation of Technologies

This section describes remedial technologies considered for use at Bullen Point based on the retained GRAs. The selected technologies have all been effective in the arctic environment. Conditions at the Bullen Point installation, including the arctic climate and remote location, exclude many technologies that could be considered for sites in a more temperate location.

The remedial technologies under consideration for the contaminated gravel at Bullen Point are presented in this section by GRA as follows:

No Action

- No action

Institutional Controls and Monitoring

- Periodic monitoring, public education, and fencing

Onsite Treatment

- Steam-enhanced soil washing
- Ex situ bioremediation
- Enhanced bioremediation

All of the technologies presented above have been applied effectively at sites on the North Slope or elsewhere in Alaska. In addition to being effective in cold climates, they are well-suited to the short summer season, the only favorable time for outdoor remedial activities, and the remote

TABLE 5-6. SCREENING OF GENERAL RESPONSE ACTIONS FOR REMEDIAL ALTERNATIVES EVALUATED FOR GRAVEL

GENERAL RESPONSE ACTION	REPRESENTATIVE TECHNOLOGIES	PROJECTED TREATMENT EFFICIENCY	RETAINED OR REJECTED	RATIONALE
No action	• No action	50 percent	Retained	Implementability: Moderate (high technical, low administrative) Duration: Short project duration, long to achieve goal of passive bioremediation. Effectiveness: Low to Moderate Cost: Low Retained/Rejected: Retained (requirement of NCP).
Institutional controls and monitoring	• Monitoring • Public education • Fencing	50 percent	Retained	Implementability: High Duration: Moderate project duration, long to achieve goal of passive bioremediation. Effectiveness: Low to Moderate Cost: Low Retained/Rejected: Retained due to high implementability and low cost.
Containment	• Solidification • Capping	80 percent reduction in mobility	Rejected	Implementability: Low Duration: Long Effectiveness: Low Cost: Moderate Retained/Rejected: Rejected due to low implementability, low effectiveness, and long duration.
Onsite treatment	• Steam-enhanced soil wash • Ex situ bioremediation • Enhanced bioremediation	94 - 98 percent	Retained	Implementability: High Duration: Short to Moderate Effectiveness: High Cost: Moderate to High Retained/Rejected: Retained due to high implementability, high effectiveness, and short to moderate duration.
Removal	• Offsite treatment/disposal	100 percent	Rejected	Implementability: High Duration: Short Effectiveness: High Cost: High Retained/Rejected: Rejected due to high cost.

location where there is little or no manpower for year-round operation and maintenance of remedial systems. Specifically, these remedial technologies are either short-term actions that can be completed in one season (approximately 100 days) with imported labor, or longer term actions that are self-sustaining and require minimal labor.

Several of the retained remedial technologies involve bioremediation, which can be accomplished on the North Slope with psychrophilic (i.e., cold weather) microorganisms and fungi, both indigenous and imported. Bioremediation has been documented on the North Slope and elsewhere in Alaska, but is subject to several limiting factors including:

- availability of nutrients and oxygen;
- short period of thaw; and
- percentage of fine-grained materials.

Biodegradation can generally be estimated in terms of first order kinetics where the only rate limiting factor is the biodegradation potential, which is a function of the factors listed above. Theoretically, with first order kinetics a given target cleanup level will eventually be reached regardless of the initial concentration. As the gap between initial and target concentrations widens, however, or rate limiting factors become more significant, the time necessary to reach the target increases exponentially because the function plots asymptotically with concentration. A more detailed discussion of the estimates of biodegradation is presented in Section 5.4.

Descriptions of the selected technologies are presented in the following subsections.

5.2.2.1 No Action. No action is a required alternative of the NCP, the purpose of which is to provide a baseline for assessment of other alternatives.

5.2.2.2 Institutional Controls and Monitoring. Institutional controls and monitoring involves no active treatment, rather it takes advantage of the natural biodegradation that occurs in the arctic soil (Atlas 1985). Natural bioremediation typically takes longer than enhanced bioremediation. The rate of biodegradation, especially in the North Slope region, is reduced because of short warm seasons and prolonged harsh winters. Public education and fencing off the affected area would constitute institutional controls, and monitoring would include sampling and analysis of associated surface water and soil/sediment.

Institutional controls and monitoring is being evaluated for the petroleum-related contaminants in gravel at the Bullen Point installation. The case studies used to support biodegradation-based alternatives are used to estimate potential rates of natural bioremediation.

5.2.2.3 Steam-Enhanced Soil Washing. This technology consists of the physical removal of contaminants from soils, gravels, or sediments by steam in an aboveground treatment unit. According to vendors, steam most effectively removes hydrocarbons with chain lengths between C_4 and C_{28}. DRPH include hydrocarbons between C_{10} and C_{24} (DRO analysis) or between C_{10} and C_{28} (DRPH analysis). GRPH include hydrocarbons between C_5 and C_{12} (GRO analysis) or between C_6 and C_{10} (GRPH analysis). BTEX compounds range from C_6 to C_8. DRPH is the predominant COC at the sites for which steam-enhanced soil washing is proposed.

Figure 5-2 is a process flow diagram of the steam-enhanced soil washing technology. Excavated gravel is loaded on an enclosed conveyor belt or screw auger by backhoe and sprayed with jets of high pressure super-heated steam. The steam volatilizes low molecular weight hydrocarbons and washes non-volatile hydrocarbons from the gravel. Volatile hydrocarbons are condensed out of the steam and bioremediated in a wastewater recirculation tank. Non-volatile hydrocarbons are conveyed from the mixing chamber in a separate water stream to the same tank for bioremediation. The process ultimately produces little wastewater because of evaporative losses and bioremediation. Waste streams resulting from the process include sludges from washing and wastewater treatment processes. The sludges and spent filters will be tested and disposed offsite. The wash water is bioremediated on site and recycled back into the system. The clean gravel is replaced after treatment and testing. Particles too large for the process are separated and spray washed. Soil washing units are generally mobile, and have a capacity of 10 to 25 tons/hr.

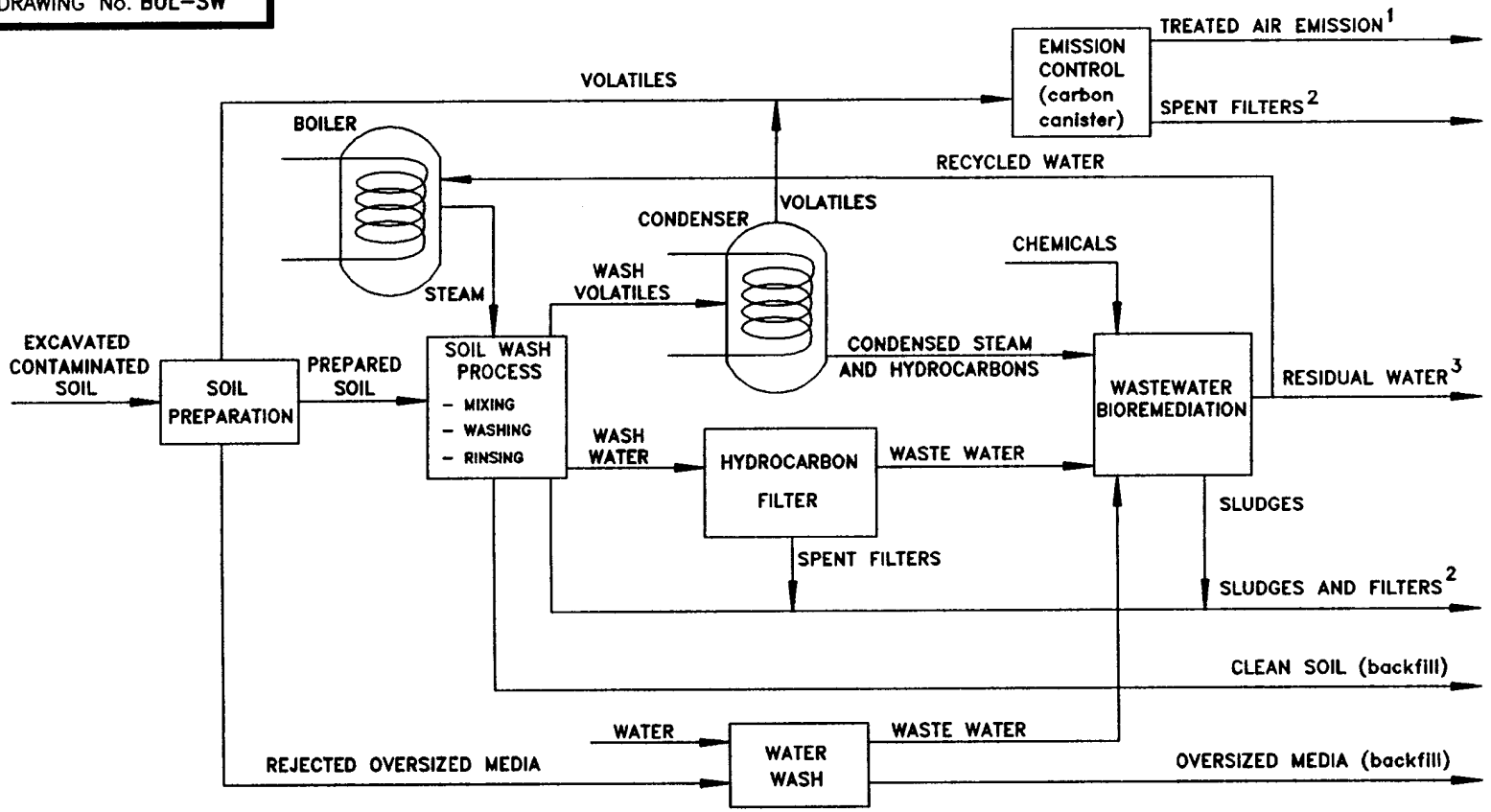
5.2.2.4 Ex Situ Bioremediation. Ex situ bioremediation involves placing contaminated gravel into a vessel or cell where conditions for biodegradation are optimized. It has been used effectively on GRPH, DRPH, RRPH, and crude oil in gravel, soil, and sediment. Indigenous or imported microbes are combined with oxygen, water, and nutrients to treat the medium. An advantage of ex situ bioremediation over enhanced bioremediation is that it allows for greater climate control (cells may be located inside a building and externally heated for example). Cells may contain a layer of affected soil up to four or five feet thick. Periodically, additional water and nutrients must be added and the medium oxygenated by either turning, tilling, or supplying oxygen directly. A process flow diagram of ex situ bioremediation is shown in Figure 5-3.

5.2.2.5 Enhanced Bioremediation. Enhanced bioremediation in this FS is the same as ex situ bioremediation except that oxygen, water, and nutrients are delivered to the contaminated gravel in place to assist natural bioremediation. Although indigenous or imported microbes may be used, indigenous, psychrophilic microbes are recommended on the North Slope. Several aerobic microbes that can utilize the carbon in petroleum occur on the North Slope, including: *Bacillus cereus*, *Bacillus polymixa*, *Arthrobacter globiformis*, and *Alcaligenes poradoxus* (Ratliff 1993). Several strains of *Pseudomonas* bacteria (psychrophilic genera) decreased TPH concentration in tundra during the summer season in the Prudhoe Bay area (Jorgenson et al. 1992). A case study conducted at Point Thompson, Alaska suggests that this approach is feasible for remediation of gravel if a cultured population of microbes is used (Liddell et al. 1991). A treatability study will be necessary to determine how best to bioremediate the gravel.

Variations in temperature affect the rate of biodegradation by bacteria. In the arctic environment, bacteria remain active enough to consume petroleum hydrocarbon molecules from June through August when temperatures are warmest. A study at Surfcote Pad in the Prudhoe Bay area (Evans, Elder, and Hoffman 1992) indicates that native microbial populations are capable of bioremediating diesel contaminated gravel at an appreciable rate during the short summer season. In the arctic environment at the depth of three feet, microbial populations can effectively consume hydrocarbon products (Atlas 1985), however the number and activity of bacteria decrease with an increase in depth, because of lower temperatures and reduced levels of oxygen and nutrients.

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DRAWING No. BUL-SW



NOTES

1. No Air Permit is required by ADEC since no hydrocarbon vapors are released.
2. Sludges and spent filters will be tested and disposed of offsite.
3. Small volumes of residual waters may be produced from waste water bioremediation. Bioremediation will reduce hydrocarbon levels such that ADEC could allow them to be poured on concrete to evaporate.

BULLEN POINT RADAR INSTALLATION

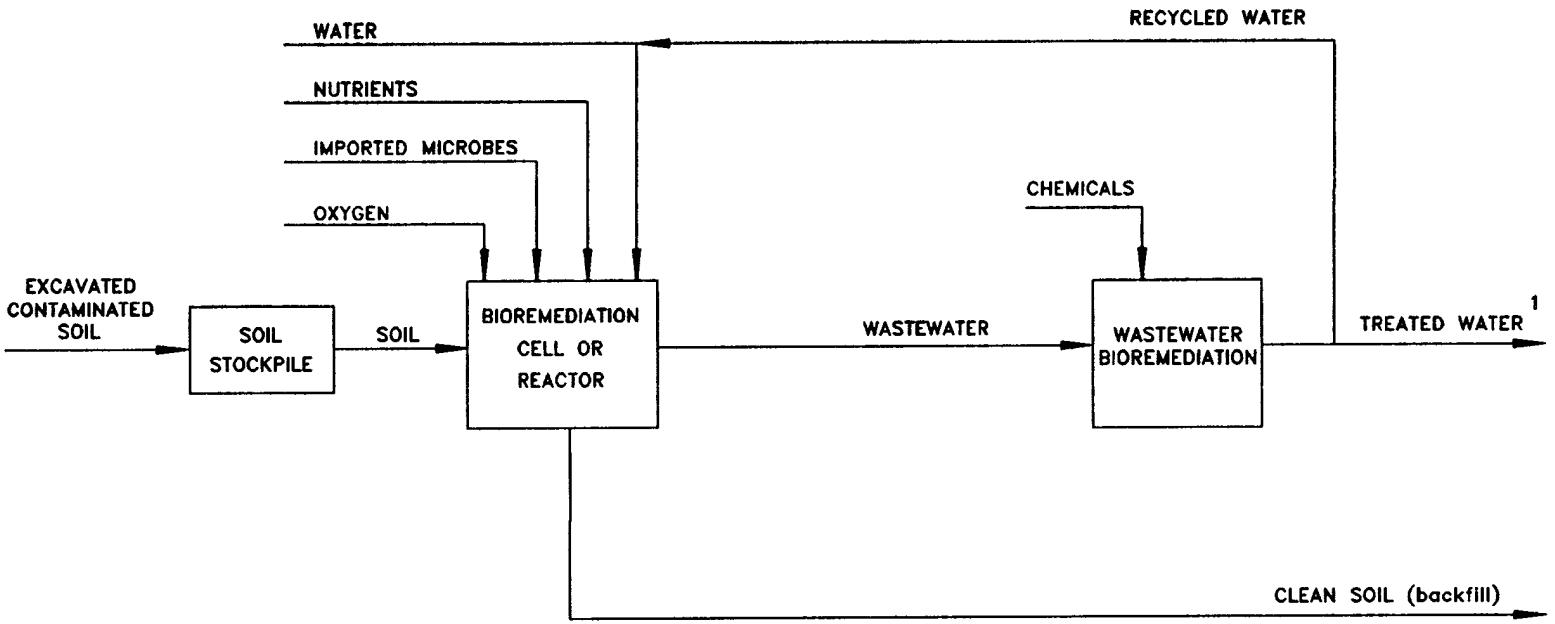
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FIGURE NO. 5-2

STEAM-ENHANCED SOIL WASHING PROCESS FLOW DIAGRAM

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DRAWING No. BULEXBIO



NOTES

1. Small volumes of water may be produced from waste water bioremediation. Bioremediation will reduce hydrocarbon levels such that ADEC could allow them to be poured on concrete to evaporate.

BULLEN POINT RADAR INSTALLATION

USAF 611th CES

FIGURE NO. 5-3

EX SITU BIOREMEDIATION PROCESS FLOW DIAGRAM

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Enhanced bioremediation is being evaluated for the gravel at Bullen Point. Nutrients and water may be added intermittently based on the results of a treatability study. Precautions will be taken to contain any runoff. It is not expected that contaminants would be mobilized by this process, but collected runoff would be analyzed to confirm this. Furthermore, collected runoff may be recycled by reintroducing it to the gravel. Figure 5-4 is a process flow diagram of enhanced bioremediation.

5.3 DEVELOPMENT OF REMEDIAL ALTERNATIVES

5.3.1 Approach to Developing Remedial Alternatives

The remedial technologies selected in Section 5.2.2 represent the GRAs retained in Section 5.2.1. In this section remedial technologies are developed into alternatives designed to address site-specific COCs. The alternatives are designed around the contaminated medium, gravel, rather than specific sites. Alternatives developed in this section are evaluated in the detailed evaluation of remedial alternatives in Section 5.4.

This section is organized by remedial alternative, and the rationale for development and a list of applicable sites and media are included. Remedial alternatives are summarized in Table 5-7 at the end of this section. The technologies are described in Section 5.2, and are not discussed further in this section.

The remedial alternatives retained for contaminated gravel at the POL Tanks (ST05) and Fuel Storage Area (ST09) are:

- No action;
- Institutional controls and monitoring;
- Steam-enhanced soil washing;
- Ex situ bioremediation; and
- Enhanced bioremediation.

5.3.1.1 No Action.

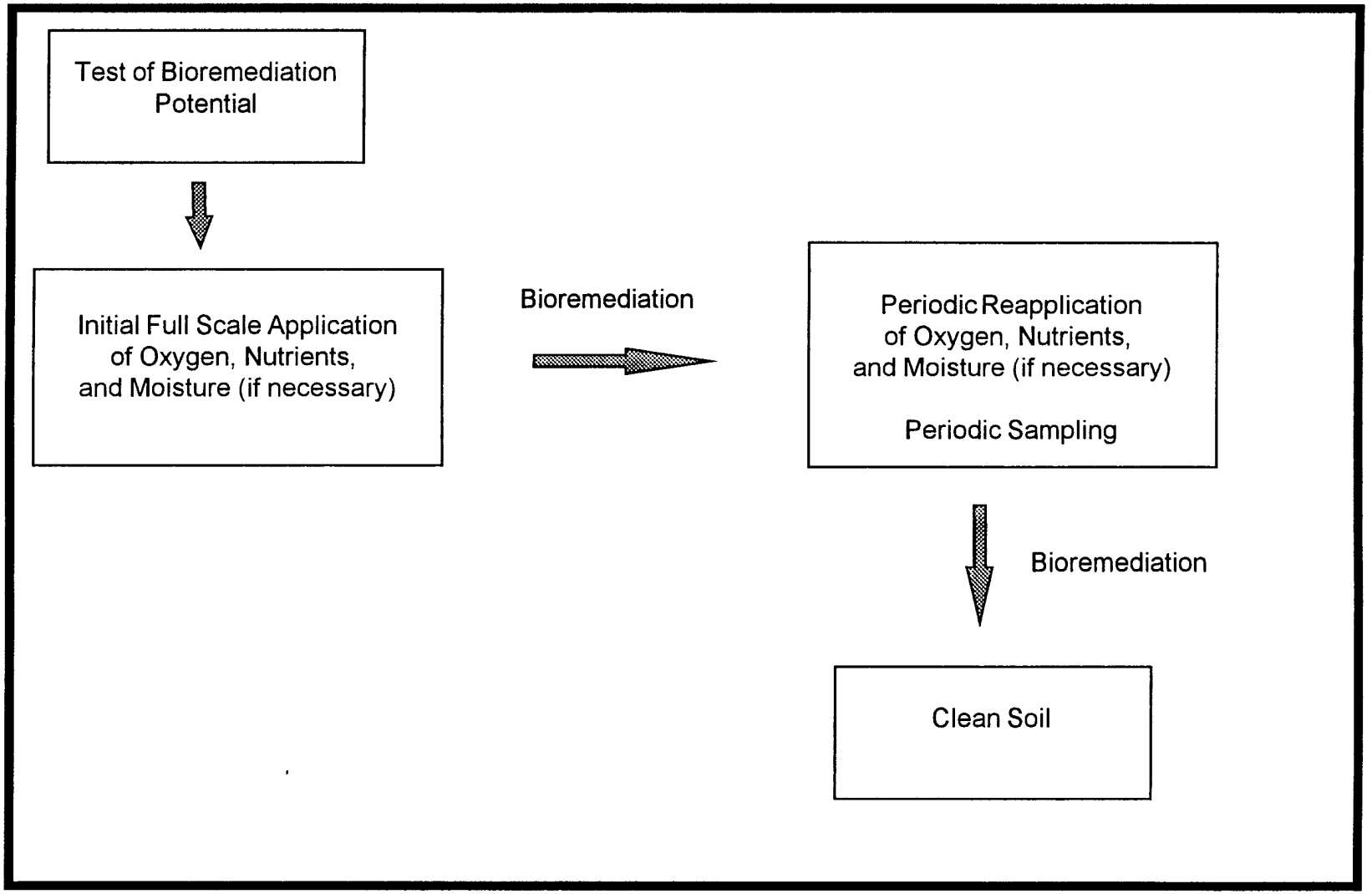
Rationale for Development. No action provides a baseline against which other alternatives are compared. It is a required alternative according to the NCP. Attenuation of petroleum hydrocarbons will occur over a long period of time through natural biodegradation if microbial populations and conditions (e.g., water, oxygen, temperature, and nutrients) are present that facilitate aerobic biodegradation.

Applicable Media and Sites.

- Gravel: POL Tanks (ST05) and Fuel Storage Area (ST09).

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Figure 5-4: Enhanced Bioremediation Process Flow Diagram



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5.3.1.2 Institutional Controls and Monitoring.

Rationale for Development. This alternative is feasible for gravel because the COCs do not pose a significant cancer risk or noncancer hazard. Attenuation of petroleum hydrocarbons may occur over a long period of time through natural biodegradation if microbial populations and conditions (e.g., water, oxygen, temperature, and nutrients) are present that facilitate aerobic biodegradation.

Institutional controls considered include public education and fencing off the affected area. Periodic monitoring will establish that contaminants are biodegrading and are not migrating offsite.

Applicable Media and Sites.

- Gravel: POL Tanks (ST05) and Fuel Storage Area (ST09).

5.3.1.3 Steam-Enhanced Soil Washing.

Rationale for Development. This method has been successfully used to remove petroleum hydrocarbons in the GRPH, DRPH, and RRPH ranges from sites with contaminated gravel in Alaska.

Applicable Medium and Sites.

- Gravel: POL Tanks (ST05) and Fuel Storage Area (ST09).

5.3.1.4 Ex Situ Bioremediation.

Rationale for Development. This method has been successfully used to bioremediate contaminated gravel at sites in Alaska. Enclosure of a biocell in a heated space will allow bioremediation to occur even during the cold winter months.

Applicable Medium and Sites.

- Gravel: POL Tanks (ST05) and Fuel Storage Area (ST09).

5.3.1.5 Enhanced Bioremediation.

Rationale for Development. This is an effective, low maintenance method for reducing petroleum concentrations in tundra and gravel. Enhanced bioremediation is accomplished by adding and maintaining nutrients, moisture, and oxygen to the contaminated medium in proportions established through treatability testing. This alternative is more aggressive than unassisted biodegradation and provides a feasible method of remediating gravel without excavation.

Monitoring will verify the progress of the bioremediation.

Applicable Media and Sites.

- Gravel: POL Tanks (ST05) and Fuel Storage Area (ST09).

5.4 DETAILED EVALUATION OF REMEDIAL ALTERNATIVES

5.4.1 Approach

The alternatives developed in Section 5.3 are evaluated in this section using the suggested criteria in the AFCEE Guidance for remedial alternative evaluation. These five criteria are defined in Sections 5.4.1.1 through 5.4.1.5. The detailed evaluation of alternatives is conducted in Section 5.4.2 and summarized in Section 5.4.3. The alternatives are evaluated with respect to the NCP's nine criteria in Section 5.4.4. Preferred alternatives are presented in Section 5.4.5.

5.4.1.1 Successful Application Of The Technology Under Site Conditions. This criterion requires the location and approximate date of a successful application of the technology, the managing name of the entity, and a presentation of a successful application of the given alternative under conditions similar to those found at the Bullen Point Installation. Case studies conducted on the Alaskan North Slope are used to the extent possible.

5.4.1.2 Total Project Cost. The total cost of performing the remedial alternative is estimated and divided into technology testing, capital, total labor, operating, environmental testing, and closure costs.

For the purpose of this evaluation, the itemized cost elements are defined as follows:

- Technology testing costs consist of pilot tests or treatability studies;
- Capital costs include equipment or materials purchased;
- Total labor costs include the labor required for operating and maintaining the remedial action system, oversight, project management, design and development of planning documents;
- Operating costs include costs other than labor associated with operating remedial systems (e.g., steam-enhanced soil washing system) and earth moving;
- Environmental testing costs are for sampling and analysis, including periodic monitoring, and monitoring associated with site closure; and
- Closure costs are related to reporting associated with site closure.

5.4.1.3 Contaminant Reduction. The reduction in concentration of each COC may be projected for each medium and site, based on case-study derived efficiencies. This reduction, referred to as post-remedial concentration, is listed with the initial concentration and target

cleanup level. Post-remedial concentration is a more useful measure of the effectiveness than risk reduction for the remedial alternatives at the Bullen Point installation, as none of the COCs present significant cancer risk or noncancer HQ. Risks or HQs, therefore, are not indicators of successful remediation. Post-remedial concentration is applicable to target cleanup concentrations set by regulations and/or cleanup guidance.

The concentrations presented in Section 5.4.3 are defined as follows:

Initial Concentration. This is the maximum concentration of the COC detected. The average concentration of sample results that exceed target cleanup levels is included in parentheses.

Target Cleanup Level. This is the cleanup level specified for the given COC (the basis for which is presented in Tables 5-1 to 5-3).

Post Remedial Concentration. This is the estimated final concentration of the COC based on remedial efficiencies from case studies. References to these case studies can be found in Subsection 5.4.2.1, Successful Applications of Alternatives. The efficiencies that relate to bioremediation are independent of time (over the short term, e.g., one year, biodegradation would be significantly less efficient than active remedial alternatives like steam-enhanced soil washing). The estimated remedial efficiencies used in the FS for DRPH and GRPH are as follows:

- Steam-enhanced soil washing - 98 percent;
- Ex situ bioremediation - 94 percent;
- Enhanced bioremediation - 94 percent; and
- Institutional controls and monitoring; and no action - 50 percent (Natural unassisted bioremediation).

The post-remedial concentration is estimated using the following formula (assuming no time constraints):

Post-remedial Concentration = Initial Concentration x (1 - Remedial Efficiency)

5.4.1.4 Project Duration. The estimated duration of each of the remedial alternatives and associated project schedules is an important consideration because of the seasonal limitations on outdoor work and the lack of personnel to perform operation and maintenance activities in this remote location. The North Slope of Alaska is frozen and covered with snow and ice for the majority of the year, leaving a period of only approximately 100 days in the summer when the weather is favorable for outdoor work, especially remedial alternatives involving excavation and flowing water. Outdoor phases of remedial actions significantly longer than 100 days must be suspended until the following summer, causing a marked increase in duration because of the extended winter down time. In order to maximize efficiency, remedial alternatives were designed either to complete outdoor phases of remediation within this narrow time frame, or extend over a longer term and require only minimal labor.

Project durations are based on case studies from Alaska. The rates of biological degradation for ex situ bioremediation, enhanced bioremediation, and natural, unassisted bioremediation associated with no action and institutional controls and monitoring are expressed as a first order decay function. The first-order decay function used to model this biological degradation is $C = C_o e^{-kt}$ (C is final concentration, C_o is the initial concentration, e is the natural logarithm, k is a constant based on case studies, and t is time).

The rate constant, k, is estimated based on related case studies. In general, the k-values presented reflect the lower end of the expected range of values. These values are then downwardly adjusted because of the arctic environment. The lowest rates are associated with no action and institutional controls and monitoring because there is no enhancement of conditions. Enhanced bioremediation ranks next because more factors are optimized. Ex situ bioremediation has the highest expected rate because the materials can be remediated under the most controlled conditions (e.g., inside, with moisture control, etc.). DRPH is used to estimate the constants for all of the petroleum hydrocarbons because it represents the higher concentration of COC in gravel at the POL Tanks (ST05) and Fuel Storage Area (ST09) sites. The concentration of DRPH, in other words, is assumed to be the controlling factor in determining the effectiveness of the remedial action. The following constants and criteria were used for estimation of remedial rates:

DRPH Reduction

No action and institutional controls and monitoring (Natural unassisted bioremediation) $k = 0.0025$/day

The k-value for no action and institutional controls and monitoring is based on rate data from a control cell in an experiment to measure the effectiveness of enhanced bioremediation (Liddell et al. 1991). The case study k-value was decreased in an attempt to offset the bias that aeration of the control cell introduces.

Enhanced bioremediation $k = 0.008$/day

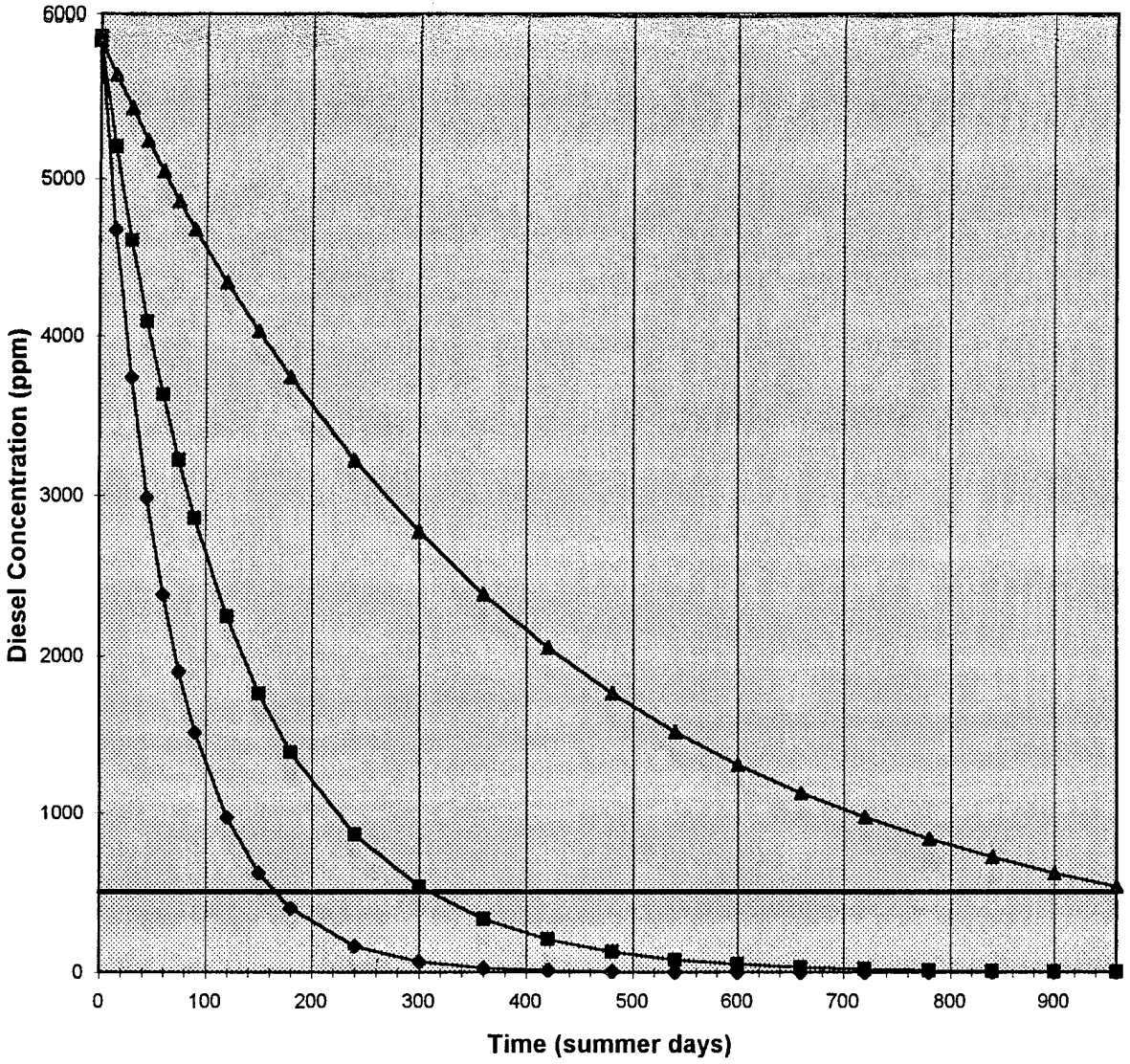
This rate is based on the rates found from observing a number of case studies. It represents the low end of the range of decay constants observed to account for the fact that many of the case studies took place under climatic conditions more favorable than those which exist at Bullen Point.

Ex situ bioremediation $k = 0.015$/day

This rate constant is based on the observed rate for a case study conducted in 1991 in Alaska.

A comparison of the predicted degradation of DRPH (and, by association, GRPH) using the three bioremedial technologies being evaluated is illustrated in Figure 5-5 (no action and institutional controls and monitoring are both represented by natural unassisted bioremediation).

Figure 5-5. Comparative Biodegradation of Diesel Fuel in Soils
(Basis: Maximum Diesel Concentration of 5,860 ppm in Gravel at Bullen Point)



Degradation is modelled by a decay function $C = C_o e^{(-kt)}$ with k in units of (1/day), and t in units of (day)

Ex Situ Bioremediation	k = 0.015
Enhanced Bioremediation	k = 0.008
Natural Unassisted Bioremediation	k = 0.0025

- Ex Situ Bioremediation
- Enhanced Bioremediation
- Natural Unassisted Bioremediation
- ADEC Non-UST Action Level (DRPH)

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The duration of onsite remedial activity and the total project duration are presented in Attachment B. These durations are defined as follows:

- Duration of onsite remedial activity includes all onsite activities related to conducting the remedial action: sampling, operating remedial equipment, mobilization, and demobilization (this is a quantification of the relative duration estimate); and

- Total project duration includes the duration of onsite remedial activity, as well as time required for preparing planning documents, conducting permitting activities, and closure.

5.4.1.5 Data Gaps. Data gaps include any environmental testing or treatability studies that must be done to determine the effectiveness of a given remedial alternative under site conditions.

Alternatives are analyzed comparatively in Sections 5.4.3 and 5.4.4 based on the AFCEE criteria above, and the nine criteria in the NCP, respectively. The preferred remedial alternatives are identified in Section 5.4.5.

5.4.2 Detailed Evaluation of Alternatives for Gravel

This section presents a detailed evaluation of remedial alternatives for contaminated gravel at the POL Tanks (ST05) and Fuel Storage Area (ST09) sites. Table 5-7 summarizes the remedial alternatives that are evaluated in Section 5.4.2. Alternatives considered for treatment of gravel at Bullen Point are:

- No action;
- Institutional controls and monitoring;
- Steam-enhanced soil washing;
- Ex situ bioremediation; and
- Enhanced bioremediation.

5.4.2.1 Successful Applications of Alternatives.

No Action. As part of a study of bioremediation of DRPH-contaminated gravel pads and soils near Prudhoe Bay, a control cell was left unassisted and untreated. This control cell represents, in essence, natural attenuation. Initial DRPH concentration was approximately 1,900 mg/kg. After nine weeks the DRPH concentration had decreased to 1,200 mg/kg. This indicates a reduction of 37 percent in DRPH concentration in 63 days. In addition, a slight increase in the microbial population was noted (Liddell et al. 1991). The difference between a control cell and undisturbed gravel is that the control cell was oxygenated as the material was placed in it. As a result, the rate and magnitude of reduction is probably greater than that for undisturbed compacted gravel. Therefore, the estimated efficiency of no action is 50 percent.

TABLE 5-7. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED FOR GRAVEL

SITES	REMEDIAL ALTERNATIVES
POL Tanks (ST05) Fuel Storage Area (ST09)	No action Institutional controls and monitoring Steam-enhanced soil washing Ex situ bioremediation Enhanced bioremediation

Institutional Controls and Monitoring. The bioremediation study noted under no action also applies to this remedial alternative, and estimated efficiency is 50 percent.

Steam-Enhanced Soil Washing. More than one vendor/firm offers this technology in Alaska. Case studies show that it has been applied successfully along the North Slope on soils and gravels contaminated with DRPH. One case study involved soils with DRPH-contamination averaging greater than 5,000 mg/kg and volumes greater than 3,000 cubic yards. DRPH-contamination was reduced to <200 mg/kg and the site was remediated in approximately three months (Worldwide Remediation, Inc. 1993).

Another case study involved DRPH-contaminated gravel remediated by steam-enhanced soil washing in Deadhorse, Alaska between September and November 1993. The amount of soil treated was 5,000 tons, with contamination ranging from 400 to 6,000 mg/kg DRPH. The DRPH concentrations in soils after treatment were between 100 and 250 mg/kg; a few samples did exceed ADEC's North Slope target concentration of 500 mg/kg. The soils with DRPH in excess of 500 mg/kg were successfully remediated after a second treatment through the system. Closure was secured from ADEC within one month of completing the remedial action (Worldwide Remediation, Inc. 1993).

The remedial action efficiency of steam-enhanced soil washing is expected to be 98 percent. This efficiency is based on case studies on diesel-contaminated gravels with initial concentrations and conditions similar to those at Bullen Point.

Ex Situ Bioremediation. Cell bioremediation and landfarming are well established methods for remediation of DRPH and GRPH-contaminated soils. An ADEC-supervised bench scale test was performed in Alaska on a silty sand and gravel medium contaminated with DRPH (March 1991). Five hundred cubic yards of soil were remediated in a cell 56 feet square. Initial concentrations of DRPH ranged from 500 to 1,000 ppm, with an average concentration of 530 ppm. The concentration decreased to <200 ppm within 50 days of beginning the test. The final concentration after testing was <100 ppm.

Another bench study conducted on the North Slope in 1990 involved tundra contaminated by crude oil. The initial concentration was 237,500 ppm TPH. The contaminant concentration was

reduced to 37,400 ppm in 12 weeks (an 84 percent reduction). This project was implemented under the management of Alaskan Biological Research, Inc.

The remedial action efficiency of ex situ bioremediation is expected to be 94 percent. This is based on the average initial contaminant concentration in Bullen Point gravel and assumes that the concentration can be reduced to levels similar to what was possible in case studies. An eventual theoretical efficiency approaching 100 percent is possible with ex situ bioremediation, but is unlikely because some heavier petroleum fractions will not break down easily.

Enhanced Bioremediation. Enhanced bioremediation has been successfully implemented in the arctic environment to treat petroleum hydrocarbon contamination on the North Slope. Studies at Point Thompson and Kuparuk oil fields in Alaska show that enhanced bioremediation is a successful and efficient method for reducing the concentration of petroleum hydrocarbons to a desired level within a relatively short time. The Point Thompson case study shows that 16,000 cubic yards of TPH-contaminated gravel with an initial concentration of 2,000 to 3,000 ppm was bioremediated to an average concentration of 285 ppm between July and September 1990 (Liddell et al. 1991).

The estimated remedial action efficiency of enhanced bioremediation is 94 percent based on case studies done is Alaska and estimates of biodegradation kinetics.

5.4.2.2 Project Costs. A summary of project costs for remediating contaminated gravel at Bullen Point is included in Table 5-8. Detailed cost estimates for each remedial alternative are located in Attachment A.

5.4.2.3 Contaminant Reduction. The degree to which COCs will meet target cleanup levels (proposed remediation goals) for each alternative is summarized in Table 5-9. This measure is presented as post-remedial concentration or the initial concentration multiplied by one minus the projected efficiency [initial concentration x (1 - projected efficiency)].

5.4.2.4 Project Duration. A breakdown of the project durations for the remedial alternatives being considered for gravel is shown in Table 5-10. Detailed project duration tables for each of the alternatives considered for remediating gravel are located in Attachment B.

No Action. Project duration for no action involves closure reporting only.

Institutional Controls and Monitoring. The duration of natural unassisted bioremediation for institutional controls and monitoring will be the same as that for no action, but there will be monitoring of this reduction. In this case, it is assumed that natural, unassisted biodegradation of COCs will show a clear trend towards the target cleanup level based on periodic sampling that will justify site closure within three years.

Steam-Enhanced Soil Washing. The estimated duration of steam-enhanced soil washing is based on existing case studies. Treatability testing, particularly for moisture content and percent fine grained materials will be necessary to determine more precisely the treatment rate. Excavation is another rate-limiting step to this alternative, and will vary according to the degree

TABLE 5-8. SUMMARY OF PROJECT COSTS FOR REMEDIAL ALTERNATIVES EVALUATED FOR GRAVEL

REMEDIAL ALTERNATIVE	TECHNOLOGY TESTING	CAPITAL COST	TOTAL LABOR	OPERATING COST	ENVIRONMENTAL TESTING	CLOSURE COST	ADMINISTRATIVE AND OTHER INDIRECT COSTS	PRESENT VALUE
No action	$0	$0	$0	$0	$0	$5,000	$750	$5,750
Institutional controls and monitoring	$0	$100	$29,320	$17,375	$1,550	$4,320	$14,640	$67,305
Steam-enhanced soil washing	$7,500	$54,645	$250,960	$1,414,385	$9,170	$5,000	$696,660	$2,438,320
Ex situ bioremediation	$7,500	$347,540	$168,530	$309,975	$9,115	$4,320	$382,990	$1,229,970
Enhanced bioremediation	$7,500	$10,430	$76,505	$43,325	$1,550	$4,320	$36,780	$180,405

TABLE 5-9. ESTIMATED POTENTIAL CONTAMINANT REDUCTION FOR GRAVEL

SITE	REMEDIAL ACTION	CONTAMINANTS	INITIAL CONCENTRATION maximum (average*) (mg/kg)	TARGET CLEANUP LEVELS[a] (mg/kg)	POST REMEDIAL CONCENTRATION maximum (average*) (mg/kg)
POL Tanks (ST05)	No action	DRPH	5,860 (2,400)	500	2,930 (1,200)
		GRPH	170 (140)	100	85 (70)
	Institutional controls and monitoring	DRPH	5,860 (2,400)	500	2,930 (1,200)
		GRPH	170 (140)	100	85 (70)
	Steam-enhanced soil wash	DRPH	5,860 (2,400)	500	117 (48)
		GRPH	170 (140)	100	3 (3)
	Ex situ bioremediation	DRPH	5,860 (2,400)	500	352 (144)
		GRPH	170 (140)	100	8 (8)
	Enhanced bioremediation	DRPH	5,860 (2,400)	500	352 (144)
		GRPH	170 (140)	100	8 (8)
Fuel Storage Area(ST09)	No action	DRPH	3,830 (2,400)	500	1,915 (1,200)
		GRPH	406 (300)	100	203 (150)
	Institutional controls and monitoring	DRPH	3,830 (2,400)	500	1,915 (1,200)
		GRPH	406 (300)	100	203 (150)
	Steam-enhanced soil wash	DRPH	3,830 (2,400)	500	77 (48)
		GRPH	406 (300)	100	8 (6)
	Ex situ bioremediation	DRPH	3,830 (2,400)	500	115 (144)
		GRPH	406 (300)	100	24 (18)
	Enhanced bioremediation	DRPH	3,830 (2,400)	500	230 (144)
		GRPH	406 (300)	100	24 (18)

* The average concentration is conservatively calculated by averaging sample results that exceed the target cleanup level (i.e., non-detects were not included).

[a] Target cleanup levels for DRPH and GRPH in soil are based on ADEC Non-UST guidance and do not necessarily correspond to final site-specific cleanup goals.

TABLE 5-10. ESTIMATED PROJECT DURATION FOR REMEDIAL ALTERNATIVES EVALUATED FOR GRAVEL

REMEDIAL ALTERNATIVE	DURATION OF ONSITE REMEDIAL ACTIVITY (Days)	TOTAL PROJECT DURATION (Days)
No action	0	30
Institutional controls and monitoring	13	881
Steam-enhanced soil washing	167	317
Ex situ bioremediation	79	678
Enhanced bioremediation	30	988

to which the ground is frozen at the installation as remediation commences. Since the estimate of onsite activity is greater than the assumed 100 days outdoor season, this alternative may have to be amended during remedial design to accelerate the process. Otherwise, the cost will increase markedly because of the need to demobilize and remobilize a year later to complete treatment of the entire estimated volume.

Ex Situ Bioremediation. Several assumptions are made concerning ex situ bioremediation based on case studies and best engineering judgement. Technology testing will be necessary for ex situ bioremediation and is expected to take about 60 days. This should not affect the start of the onsite remedial activities, provided that sufficient time is allowed before other onsite activities begin. The remedial duration of ex situ bioremediation is longer than that of soil washing, because the rate of biodegradation is slow compared to the soil washing process. These activities, however, will be conducted in a sheltered, heated environment and they will not be dependent on the season as outdoor activities would. Provided that heating is provided, bioremediation will continue through the coldest periods.

Enhanced Bioremediation. Project durations are based on the assumption that, in the case of enhanced bioremediation, reduction of maximum concentrations of COCs to target levels will occur within three years of the start of the project or show through periodic monitoring a clear trend in that direction. This clear trend will justify site closure even if the target cleanup level has not been met. Enhanced bioremediation will occur during summer months only because the gravel will be frozen the rest of the year. The target cleanup levels for DRPH and GRPH, again, are based on guidance and are negotiable with ADEC. Case studies cited support this approach and the average concentrations presented in Table 5-9 suggest that reduction could occur more quickly (see Figure 5-4).

5.4.2.5 Data Gaps.

No Action. The data gap is the lack of information on biodegradation potential.

Institutional Controls and Monitoring. The data gap is the lack of information on biodegradation potential.

Steam-Enhanced Soil Wash. The data gap is the treatment rate and efficiency. Moisture content and fine grained materials reduce treatment efficiency. A treatability study is necessary to determine site-specific treatment rate and efficiency.

Ex Situ Bioremediation. The data gap is the lack of information on biodegradation potential. A treatability study is necessary to determine the biodegradation potential in gravel under these conditions.

Enhanced Bioremediation. The data gap is the lack of information on biodegradation potential. A treatability study is necessary to determine the biodegradation potential in gravel under site conditions, and to determine the type and amounts of nutrient additions to enhance biodegradation.

5.4.3 Summary of Detailed Evaluation of Remedial Alternatives

Table 5-11 summarizes the remedial alternatives evaluated for gravel. Costs presented in this table are based on the detailed cost sheets in Appendix A.

5.4.4 Summary of the Nine Criteria

This section consists of an evaluation of the proposed alternatives according to the following nine criteria required in the NCP:

- Overall protection of human health and the environment;
- Compliance with ARARs;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume through treatment;
- Short-term effectiveness;
- Implementability;
- Cost;
- State acceptance; and
- Community acceptance.

State acceptance and community acceptance will be based on comments received on the RI/FS report and the proposed remedial alternative for each site.

The evaluation of the nine criteria is presented in Table 5-12 for gravel at the POL Tanks (ST05) and Fuel Storage Area (ST09). The following definitions of the nine criteria, taken from the EPA RI/FS Guidance Document and the NCP, are used:

TABLE 5-11. SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED FOR GRAVEL

SITE	REMEDIAL ACTION	CONTAMINANTS	REMEDIAL ACTION EFFICIENCY	INITIAL CONCENTRATION maximum (average) (mg/kg)	TARGET CLEANUP LEVEL[a] (mg/kg)	POST REMEDIAL CONCENTRATION maximum (average*) (mg/kg)	BENCH OR TREATABILITY STUDY REQUIRED	LEVEL OF WORKER PROTECTION	PROJECT COST	PROJECT DURATION (Months)
POL Tanks (ST05) and Fuel Storage Area (ST09)	No action	DRPH	50%	5,860 (2,400)	500	2,930 (1,200)	NO	D	$5,750	1
		GRPH	50%	406 (300)	100	203 (150)				
	Institutional controls and monitoring	DRPH	50%	5,860 (2,400)	500	2,930 (1,200)	NO	D	$67,305	30
		GRPH	50%	406 (300)	100	203 (150)				
	Steam-enhanced soil wash	DRPH	98%	5,860 (2,500)	500	117 (48)	YES	D	$2,438,320	11
		GRPH	98%	406 (300)	100	8 (6)				
	Ex situ bioremediation	DRPH	94%	5,860 (2,400)	500	352 (144)	YES	D	$1,229,970	23
		GRPH	94%	406 (300)	100	24 (18)				
	Enhanced bioremediation	DRPH	94%	5,860 (2,400)	500	352 (144)	YES	D	$180,405	33
		GRPH	94%	406 (300)	100	24 (18)				

* The average concentration is conservatively calculated by averaging sample results that exceed the target cleanup level (i.e., non-detects were not included).

a Target cleanup levels for DRPH and GRPH in soil are based on ADEC Non-UST guidance and do not necessarily correspond to final site-specific cleanup goals.

TABLE 5-12. EVALUATION OF NINE CRITERIA FOR GRAVEL

MEDIUM: Gravel	No Action	Institutional Control and Monitoring	Steam-Enhanced Soil Wash	Ex Situ Bioremediation	Enhanced Bioremediation
1. Overall Protection of Human Health and the Environment	This alternative may not be completely protective of human health and the environment because it may not comply with all chemical-specific ARARs. Therefore, it may not provide sufficient long-term effectiveness and permanence.	This alternative may not be completely protective of human health and the environment because it may not comply with all chemical-specific ARARs. Therefore, it may not provide sufficient long-term effectiveness and permanence.	This alternative is protective of human health and the environment because it complies with all ARARs, provides long-term effectiveness and permanence, and provides short-term effectiveness.	This alternative is protective of human health and the environment because it complies with all ARARs, provides long-term effectiveness and permanence, and provides short-term effectiveness.	This alternative is protective of human health and the environment because it complies with all ARARs, provides long-term effectiveness and permanence, and provides short-term effectiveness.
2. Compliance with ARARs	The use of this technology will comply with action-specific and location-specific ARARs, but may not provide enough reduction to comply with chemical-specific ARARs.	The use of this technology will comply with action-specific and location-specific ARARs, but may not provide enough reduction to comply with chemical-specific ARARs.	The use of this technology will comply with all chemical-specific, action-specific, and location-specific ARARs.	The use of this technology will comply with all chemical-specific, action-specific, and location-specific ARARs, especially if average concentrations are considered.	The use of this technology will comply with all chemical-specific, action-specific, and location-specific ARARs, especially if average concentrations are considered.
3. Long-term Effectiveness and Permanence	This alternative may not provide long-term effectiveness because gravel is sometimes nutrient poor and may not contain necessary microbes.	This alternative may not provide long-term effectiveness because gravel is sometimes nutrient poor and may not contain necessary microbes.	This alternative provides sufficient long-term effectiveness because the residual COC concentrations are below relevant risk and hazard levels, and are below relevant action levels. It provides permanence because COCs are removed from the contaminated medium.	This alternative provides sufficient long-term effectiveness because the estimated residual COC concentrations are below relevant risk and hazard levels and are below relevant action levels. It provides permanence because COCs are irreversibly transformed to non-hazardous by-products.	This alternative provides sufficient long-term effectiveness because the estimated residual COC concentrations are below relevant risk and hazard levels and below relevant action levels. It provides permanence because COCs are irreversibly transformed to non-hazardous by-products.
4. Reduction of Toxicity, Mobility, and Volume Through Treatment	Results in a reduction in toxicity through natural biodegradation.	Results in a reduction in toxicity through natural biodegradation.	Results in a reduction in volume and toxicity through treatment.	Results in a reduction in toxicity through treatment.	Results in a reduction in toxicity through treatment.
5. Short-Term Effectiveness	This alternative will not detrimentally affect the environment, the surrounding community, or workers.	This alternative will not detrimentally affect the environment, the surrounding community, or workers. Recommended worker protection is level D.	This alternative will not detrimentally affect the environment, the surrounding community, or workers. Recommended worker protection is level D.	This alternative will not detrimentally affect the environment, the surrounding community, or workers. Recommended worker protection is level D.	This alternative will not detrimentally affect the environment provided that runoff is minimized and contained. It will not present a detrimental effect on the surrounding community or workers. Recommended worker protection is level D.

TABLE 5-12. EVALUATION OF NINE CRITERIA FOR GRAVEL (CONTINUED)

MEDIUM: Gravel	No Action	Institutional Control and Monitoring	Steam-Enhanced Soil Wash	Ex Situ Bioremediation	Enhanced Bioremediation
6. Implementability	This alternative should be technically and administratively implementable, provided that a risk management decision is made that COC concentrations do not warrant remediation.	This alternative may not be technically implementable because of the biodegradation potential of gravel. It should be administratively implementable.	This technology is technically implementable. Administrative implementability issues include securing permits and siting of apparatus. Vendors are readily available.	Technical implementability will be determined by performing a treatability study. Administrative implementability issues includes securing permits and siting the biocell. Equipment and materials are readily available.	Technical implementability will be determined by performing a treatability study. Administrative implementability issues include securing permits. Equipment and materials are readily available.
7. Cost	$5,750	$67,305	$2,438,320	$1,229,970	$180,405
8. State/Support Agency	ADEC will be involved in review and selection of remedial alternatives.	ADEC will be involved in review and selection of remedial alternatives.	ADEC will be involved in review and selection of remedial alternatives.	ADEC will be involved in review and selection of remedial alternatives.	ADEC will be involved in review and selection of remedial alternatives.
9. Community Acceptance	Community Relations Plan is being implemented and community concerns will be addressed in responsiveness summary.	Community Relations Plan is being implemented and community concerns will be addressed in responsiveness summary.	Community Relations Plan is being implemented and community concerns will be addressed in responsiveness summary.	Community Relations Plan is being implemented and community concerns will be addressed in responsiveness summary.	Community Relations Plan is being implemented and community concerns will be addressed in responsiveness summary.

Overall Protection of Human Health and the Environment. This criterion addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Compliance with ARARs. This criterion addresses whether or not a remedy will meet all of the ARARs of federal and state environmental statutes and/or provide grounds for invoking a waiver.

Long-Term Effectiveness and Permanence. This criterion refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

Reduction of Toxicity, Mobility, or Volume Through Treatment. This criterion is the anticipated performance of the treatment technologies a remedy may employ (reflects the anticipated performance of treatment).

Short-Term Effectiveness. This criterion addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Implementability. This criterion is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Cost. Cost includes estimated capital and operation and maintenance costs, and net present worth costs.

State Acceptance. State acceptance addresses the technical or administrative issues and concerns the support agency may have regarding each alternative.

Community Acceptance. Community acceptance addresses the issues and concerns the public may have regarding each of the alternatives.

5.4.5 Preferred Alternatives

The preferred alternatives for the media at the three sites are presented in Table 5-13. The preferred alternative for gravel is enhanced bioremediation. The concentrations of COCs are too high to justify no action or institutional controls and monitoring. The use of alternatives employing excavation (i.e., steam-enhanced soil washing and ex situ bioremediation) may have implementability problems because the contaminated area includes areas where the active Short Range Radar system is constructed. Although enhanced bioremediation is likely to have a longer duration than more aggressive technologies, ultimately it is expected to decrease COC concentrations below target cleanup levels, and it costs an order of magnitude less than the other two options.

There are widespread areas around the POL Tanks (ST05) contaminated by levels of diesel at or below the target cleanup level. These areas are in tundra and gravel. Provision has been

TABLE 5-13. PREFERRED REMEDIAL ACTION ALTERNATIVES

SITE NAME	SITE ID NUMBER	MEDIUM	PREFERRED ALTERNATIVE
Inside Transformer	OT04	Floor Materials	Removal and offsite incineration
POL Tanks	ST05	Gravel/Tundra	Enhanced bioremediation
Fuel Storage Area	ST09	Gravel	Enhanced bioremediation

made in the cost estimate for enhanced bioremediation to extend the bioremediation area to include isolated areas of gravel and tundra with diesel concentrations higher than background at the discretion of the Air Force. These additional areas will be identified during the Remedial Design and Remedial Action phase.

Estimated costs of performing the preferred alternatives, including disposal of PCB-contaminated floor materials at the Inside Transformer (OT04), are as follows:

• Enhanced bioremediation (gravel)	$180,405
• Offsite incineration (PCB-contaminated material)	$ 47,365
TOTAL	$227,770

These alternatives are considered stand-alone projects, and costs are estimated as such. If the two projects were coordinated, cost savings may be realized in the preparation of planning documents, mobilization and demobilization, onsite labor, transportation of equipment, disposal of wastes, and shipment of samples.

5.5 SITING STUDY

Large remedial units will not be required to perform enhanced bioremediation and offsite incineration, so siting is not a concern.

The use of enhanced bioremediation on the gravel, by its nature, is a relatively non-intrusive action. The main concern in using this approach is ensuring that runoff is minimized and controlled. Booms or sandbags will be used where runoff from the gravel pad is likely to occur. The treatability study will be an assessment of the biodegradation potential of the gravel, the amounts of nutrients, moisture and oxygen needed to promote aerobic biodegradation, and an evaluation of the appropriate mechanism for delivering nutrients, moisture, and oxygen. If infiltration from the surface is feasible, an infiltration gallery may be employed. If not, air knives or another technique may be used to force delivery of nutrients, moisture, and oxygen throughout the contaminated gravel.

Removal and offsite incineration of the contaminated floor material at the Inside Transformer (OT04) will not require a significant staging area.

ATTACHMENT A
COST ESTIMATES

Floor Materials: Inside Transformer (OT04)

- Removal and Offsite Incineration 1

Gravel: POL Tanks (ST05) and Fuel Storage Area (ST09)

- No Action 2
- Institutional Controls and Monitoring 3
- Steam Enhanced Soil Wash 4
- Ex Situ Bioremediation 5
- Enhanced Bioremediation 6

Presumptive Remedy: Offsite Incineration

Estimated Costs

Site:
Inside Transformer (OT04)

Medium: Floor Materials
Total volume: 0.27 CY
Project duration: 4 Months (100 days)
Discount rate: 5% *

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Document (RD/RA) (Work plan, SAP, QAPjP, H&S)	1	Report	$5,000.00	$5,000	
Drum Cost	1	Drum	$42.50	$43	
Personal H & S Expendibles	14	Day	$10.00	$140	
Misc. Equipment and Supplies	1	Lump Sum	$100.00	$100	
Total Capital Cost over the 4 Month Project				$5,283	$0
OPERATING COSTS:					
Mobilize/Demobilize	1	Event	$3,000.00	$3,000	
Transport Equipment	1	Event	$2,000.00	$2,000	
Transportation and Incineration	1	Drum	$1,359.00	$1,359	
Waste Profiling	1	Event	$750.00	$750	
Documentation	1	Event	$200.00	$200	
Labor	160	Hr	$70.00	$11,200	
Per Diem	18	Day	$175.00	$3,150	
Sampling and Analysis	3	Sample	$70.00	$210	
Project Management	24	Hr	$70.00	$1,680	
Closure	1	Report	$5,000.00	$5,000	
Total Operating Cost over the 4 Month Project				$28,549	$0
Total Direct Cost over the 4 Month Project				$33,832	$0
Procurement costs (5%)				$1,692	$0
Overhead (10%)				$3,383	$0
Contingency (25%)				$8,458	$0
Total Administrative Cost over the 4 Month Project				$13,533	$0
NET PRESENT WORTH					**$47,364**

* Estimated discount rate for calculating present value of future costs

Alternative: No Action
Estimated Costs

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Medium: Gravel
Total volume: 9,980 CY
Project duration: 1 Month (30 days)
Discount rate: 5% *

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Total Capital Cost over the 1 Month Project				$0	$0
OPERATING COSTS:					
Closure	1	Event	$5,000.00	$5,000	
Total Operating Cost over the 1 Month Project				$5,000	$0
Total Direct Cost over the 1 Month Project				$5,000	$0
Procurement costs (0%)				$0	$0
Overhead (5%)				$250	$0
Contingency (10%)				$500	$0
Total Administrative Cost over the 1 Month Project				$750	$0
NET PRESENT WORTH					**$5,750**

* Estimated discount rate for calculating present value of future costs

Alternative: Institutional Controls and Monitoring
Estimated Costs

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Medium: Gravel
Total volume: 9,980 CY
Project duration: 30 Months (881 days)
Discount rate: 5% *

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Documents (Work plan, SAP, QAPjP, H&S)	2	Report	$5,000.00	$10,000	
Misc. Equipment and Supplies	1	Amount	$100.00	$100	
Total Capital Cost over the 30 Month Project				$10,100	$0
OPERATING COSTS:					
Implement Institutional Controls	1	Event	$10,000.00	$10,000	
Sampling (initial)	8	Sample	$70.00	$560	
Sampling (annual)	2	Event	$560.00		$1,120
Labor	240	Hr	$70.00	$16,800	
Per Diem	30	Days	$175.00	$5,250	
Project Management	36	Hr	$70.00	$2,520	
Travel for Sampling	6	Trips	$1,200.00		$7,200
Closure (Month 9980)	1	Report	$5,000.00		$5,000
Total Operating Cost over the 30 Month Project				$35,130	$13,320
Total Direct Cost over the 30 Month Project				$45,230	$13,320
Procurement costs (5%)				$2,262	$666
Overhead (10%)				$4,523	$1,332
Contingency (10%)				$4,523	$1,332
Total Administrative Cost over the 30 Month Project				$11,308	$3,330
NET PRESENT WORTH					**$67,303**

* Estimated discount rate for calculating present value of future costs

Alternative: Steam-Enhanced Soil Washing
Estimated Costs

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Medium: Gravel
Total volume: 9,980 CY
Project duration: 11 Months (317 days)
Discount rate: 5% *

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Documents (RD/RA) (Work plan, SAP, QAPjP, H&S)	3	Report	$5,000.00	$15,000	
Development of Specifications (30%, 95%, 100%)	3	Report	$5,000.00	$15,000	
Permitting	1	Event	$2,000.00	$2,000	
Treatability Study	1	Study	$7,500.00	$7,500	
Purchase Drums	17	Drums	$42.50	$723	
Backhoe Rental	5	Month	$5,000.00	$25,000	
Truck Rental	5	Month	$5,000.00	$25,000	
Personal H & S Expendibles	292	Day	$10.00	$2,920	
Misc. Equipment and Supplies	1	Amount	$1,000.00	$1,000	
Total Capital Cost over the 11 Month Project				$94,143	$0
OPERATING COSTS:					
Remediation of Soil	9,980	CY	$126.00	$1,257,480	
Trans. & Incineration of Sludge	17	Drum	$1,359.00	$23,103	
Transport Equipment	1	Event	$2,000.00	$2,000	
Labor	2,720	Hr	$70.00	$190,400	
Per diem	296	Day	$175.00	$51,800	
Confirmational Sampling	131	Sample	$70.00	$9,170	
Mobilization of Soil Wash Rig	1	Event	$30,000.00	$30,000	
Demobilization of Soil Wash Rig	1	Event	$30,000.00	$30,000	
Mob/Demob Backhoe & Truck	1	Event	$20,000.00	$20,000	
Project Management	408	Hr	$70.00	$28,560	
Closure	1	Report	$5,000.00	$5,000	
Total Operating Cost over the 11 Month Project				$1,647,513	$0
Total Direct Cost over the 11 Month Project				$1,741,656	$0
Procurement costs (5%)				$87,083	$0
Overhead (10%)				$174,166	$0
Contingency (25%)				$435,414	$0
Total Administrative Cost over the 11 Month Project				$696,662	$0
NET PRESENT WORTH					**$2,438,318**

* Estimated discount rate for calculating present value of future costs

Alternative: Ex situ Bioremediation
Estimated Costs

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Medium: Gravel
Total volume: 9,980 CY
Project duration: 23 Months (678 days)
Discount rate: 5% *

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Documents (RD/RA) (Work plan, SAP, QAPjP, H&S)	3	Report	$5,000.00	$15,000	
Engineering Design and Specs (30%, 95%, 100%)	3	Report	$10,000.00	$30,000	
Permitting	1	Event	$2,000.00	$2,000	
Treatability Study	1	Study	$7,500.00	$7,500	
Landfarm Construction	5	Unit	$65,000.00	$325,000	
Backhoe Rental	2	Month	$5,000.00	$10,000	
Truck Rental	2	Month	$5,000.00	$10,000	
Personal H & S Expendibles	154	Day	$10.00	$1,540	
Misc. Equipment and Supplies	1	Amount	$1,000.00	$1,000	
Total Capital Cost over the 23 Month Project				$402,040	$0
OPERATING COSTS:					
Mobilization/Demobilization Backhoe & Truck Transport Equipment	1	Event	$30,000.00	$30,000	
Remediation of Soil (incl. remediation supplies, heating)	9,980	CY	$25.00	$249,500	
Backhoe Operator	344	Hr	$50.00	$17,200	
Sampling & Analysis (initial)	47	Sample	$70.00	$3,290	
Sampling & Analysis (annual)	2	Event	$3,290.00		$6,580
Travel for Sampling	4	Trip	$1,200.00		$4,800
Labor	1,296	Hr	$70.00	$90,720	
Per diem	162	Day	$175.00	$28,350	
Project Management	194	Hr	$70.00	$13,608	
Closure (Month 23)	1	Report	$5,000.00		$5,000
Total Operating Cost over the 23 Month Project				$432,668	$16,380
Total Direct Cost over the 23 Month Project				$834,708	$16,380
Procurement costs (5%)				$41,735	$819
Overhead (10%)				$83,471	$1,638
Contingency (30%)				$250,412	$4,914
Total Administrative Cost over the 23 Month Project				$375,619	$7,371
NET PRESENT WORTH					**$1,229,968**

* Estimated discount rate for calculating present value of future costs

Alternative: Enhanced Bioremediation

Estimated Costs

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Medium: Gravel
Total volume: 9,980 CY
Project duration: 33 Months (988 days)
Discount rate: 5% *

Description	Quantity	Units	Unit Cost	Fixed Cost	Annual Cost
CAPITAL COSTS:					
Planning Documents (RD/RA) (Work plan, SAP, QAPjP, H&S)	3	Report	$5,000.00	$15,000	
Develop Specifications (30%, 95%, 100%)	3	Report	$5,000.00	$15,000	
Permitting (Air & Water)	2	Event	$2,000.00	$4,000	
Treatability study	1	Study	$7,500.00	$7,500	
Compressor	1	Month	$2,000.00	$2,000	
Nutrients	3,992	Lb	$1.00	$3,992	
Empty sand bags	130	Bag	$0.47	$61	
Hose	1	Hose	$50.00	$50	
Booms	94	Boom	$24.53	$2,306	
Trash pump	1	Month	$420.00	$420	
Personal H & S Expendibles	60	Day	$10.00	$600	
Misc. Equipment and Supplies	1	Amount	$1,000.00	$1,000	
Total Capital Cost over the 33 Month Project				$51,929	$0
OPERATING COSTS:					
Mobilize/Demobilize	1	Event	$30,000.00	$30,000	
Transport Nutrients					
Transport Equipment					
Labor	528	Hr	$70.00	$36,960	
Per diem	64	Day	$175.00	$11,200	
Sampling & Analysis (initial)	8	Sample	$70.00	$560	
Sampling & Analysis (annual)	2	Event	$560.00		$1,120
Travel for Sampling	4	Trips	$1,200.00		$4,800
Project Management	79	Hr	$70.00	$5,544	
Closure (Month 33)	1	Report	$5,000.00		$5,000
Total Operating Cost over the 33 Month Project				$84,264	$10,920
Total Direct Cost over the 33 Month Project				$136,193	$10,920
Procurement costs (5%)				$6,810	$546
Overhead (10%)				$13,619	$1,092
Contingency (10%)				$13,619	$1,092
Total Administrative Cost over the 33 Month Project				$34,048	$2,730
NET PRESENT WORTH					**$180,407**

* Estimated discount rate for calculating present value of future costs

ATTACHMENT B
ESTIMATED DURATION

Floor Materials: Inside Transformer (OT04)

- Removal and Offsite Incineration 1

Gravel: POL Tanks (ST05) and Fuel Storage Area (ST09)

- No Action 2
- Institutional Controls and Monitoring 3
- Steam Enhanced Soil Wash 4
- Ex Situ Bioremediation 5
- Enhanced Bioremediation 6

Presumptive Remedy: Offsite Incineration
Estimated Project Duration

Site:
Inside Transformer (OT04)

Start Date: Day 1
Medium: Floor Materials

Activity	Duration	Start Date	End Date
Development of Planning Documents	60 Days	Day 1	Day 60
Mobilization	3 Days	Day 61	Day 63
Preliminary Sampling	1 Days	Day 64	Day 64
Excavation and Removal	2 Days	Day 65	Day 66
Final Sampling	1 Days	Day 67	Day 67
Demobilization	3 Days	Day 68	Day 70
Development of Closure Report	30 Days	Day 71	Day 100
Secure Closure	0 Days	Day 100	Day 100
PROJECT DURATION	100 Days		

Alternative: No Action
Estimated Project Duration

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Start Date: Day 1
Medium: Gravel

Activity	Duration	Start Date	End Date
Develop Closure Report	30 Days	Day 1	Day 30
Secure Closure	0 Days	Day 30	Day 30
PROJECT DURATION	30 Days		

Alternative: Institutional Controls and Monitoring
Estimated Project Duration

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Start Date: Day 1
Medium: Gravel

Activity	Duration	Start Date	End Date
Development of Planning Documents	60 Days	Day 1	Day 60
Implementation of Institutional Controls	60 Days	Day 61	Day 120
Mobilization	2 Days	Day 121	Day 122
Preliminary Sampling	3 Days	Day 123	Day 125
Demobilization	2 Days	Day 126	Day 127
End of First Year Sampling	3 Days	Day 487	Day 489
End of Second Year Sampling	3 Days	Day 849	Day 851
Development of Closure Report	30 Days	Day 852	Day 881
Secure Closure	0 Days	Day 881	Day 881
PROJECT DURATION	881 Days		

Alternative: Steam-Enhanced Soil Washing
Estimated Project Duration

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Start Date: Day 1
Medium: Gravel

Activity	Duration	Start Date	End Date
Development of Planning Documents	90 Days	Day 1	Day 90
Development of Specifications	60 Days	Day 1	Day 60
Permits	60 Days	Day 61	Day 120
Mobilization	14 Days	Day 121	Day 134
Preliminary Sampling	3 Days	Day 135	Day 137
Remediation and Periodic Sampling	140 Days	Day 138	Day 277
Final Sampling	3 Days	Day 278	Day 280
Demobilization	7 Days	Day 281	Day 287
Development of Closure Report	30 Days	Day 288	Day 317
Closure	0 Days	Day 317	Day 317
PROJECT DURATION	317 Days		

Alternative: Ex situ Bioremediation
Estimated Project Duration

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Start Date: Day 1
Medium: Gravel

Activity	Duration	Start Date	End Date
Treatability Study	60 Days	Day 1	Day 60
Development of Planning Documents	90 Days	Day 61	Day 150
Engineering Design & Specifications	90 Days	Day 61	Day 150
Permits	60 Days	Day 151	Day 210
Mobilization	14 Days	Day 211	Day 224
Preliminary Sampling	3 Days	Day 225	Day 227
Set Up of Biocell and Excavation	21 Days	Day 228	Day 248
End of First Year Sampling	3 Days	Day 249	Day 251
End of Second Year Sampling	3 Days	Day 611	Day 613
Disassembly of Biocell and Backfill	21 Days	Day 614	Day 634
Demobilization	14 Days	Day 635	Day 648
Development of Closure Report	30 Days	Day 649	Day 678
Closure	0 Days	Day 678	Day 678
PROJECT DURATION	678 Days		

Alternative: Enhanced Bioremediation
Estimated Project Duration

Sites:
POL Tanks (ST05)
Fuel Storage Area (ST09)

Start Date: Day 1
Media: Gravel

Activity	Duration	Start Date	End Date
Perform Treatability Study	60 Days	Day 1	Day 60
Development of Planning Documents	90 Days	Day 61	Day 150
Development of Specifications	60 Days	Day 61	Day 120
Permits	60 Days	Day 151	Day 210
Mobilization	7 Days	Day 211	Day 217
Preliminary Sampling	3 Days	Day 218	Day 220
Application of Nutrients, and Water	7 Days	Day 221	Day 227
Demobilization	7 Days	Day 228	Day 234
End of First Year Sampling	3 Days	Day 594	Day 596
End of Second Year Sampling	3 Days	Day 956	Day 958
Development of Closure Report	30 Days	Day 959	Day 988
Closure	0 Days	Day 988	Day 988
PROJECT DURATION	988 Days		

APPENDIX A

REFERENCES AND LIST OF ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASUREMENT

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LIST OF ACRONYMS, ABBREVIATIONS, AND UNITS OF MEASUREMENT

ADEC	Alaska Department of Environmental Conservation
AFCEE	Air Force Center for Environmental Excellence
Air Force	United States Air Force
ARAR	Applicable or Relevant and Appropriate Requirement
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	Chemical of Concern
CT&E	Commercial Testing & Engineering Co.
DEQPPM	Defense Environmental Quality Program Policy Memorandum
DOD	Department of Defense
DRO	Diesel Range Organics
DRPH	Diesel Range Petroleum Hydrocarbons
EPA	U.S. Environmental Protection Agency
ERA	Ecological Risk Assessment
F&B	Friedman & Bruya, Inc.
FS	Feasibility Study
FWPCA	Federal Water Pollution Control Act
GC	Gas Chromatograph
GC/MS	Gas Chromatography/Mass Spectrometry
GRA	General Response Action
GRO	Gasoline Range Organics
GRPH	Gasoline Range Petroleum Hydrocarbons
HQ	Hazard Quotient
HVOC	Halogenated Volatile Organic Compound
ICP	Inductively Coupled Plasma
IDW	Investigation Derived Waste
IRP	Installation Restoration Program
MSL	Mean Sea Level
NCP	National Contingency Plan
NPL	National Priorities List
PCBs	Polychlorinated Biphenyls
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAPjP	Quality Assurance Project Plan
QC	Quality Control
RAGS	Risk Assessment Guidance for Superfund
RBSL	Risk-Based Screening Level

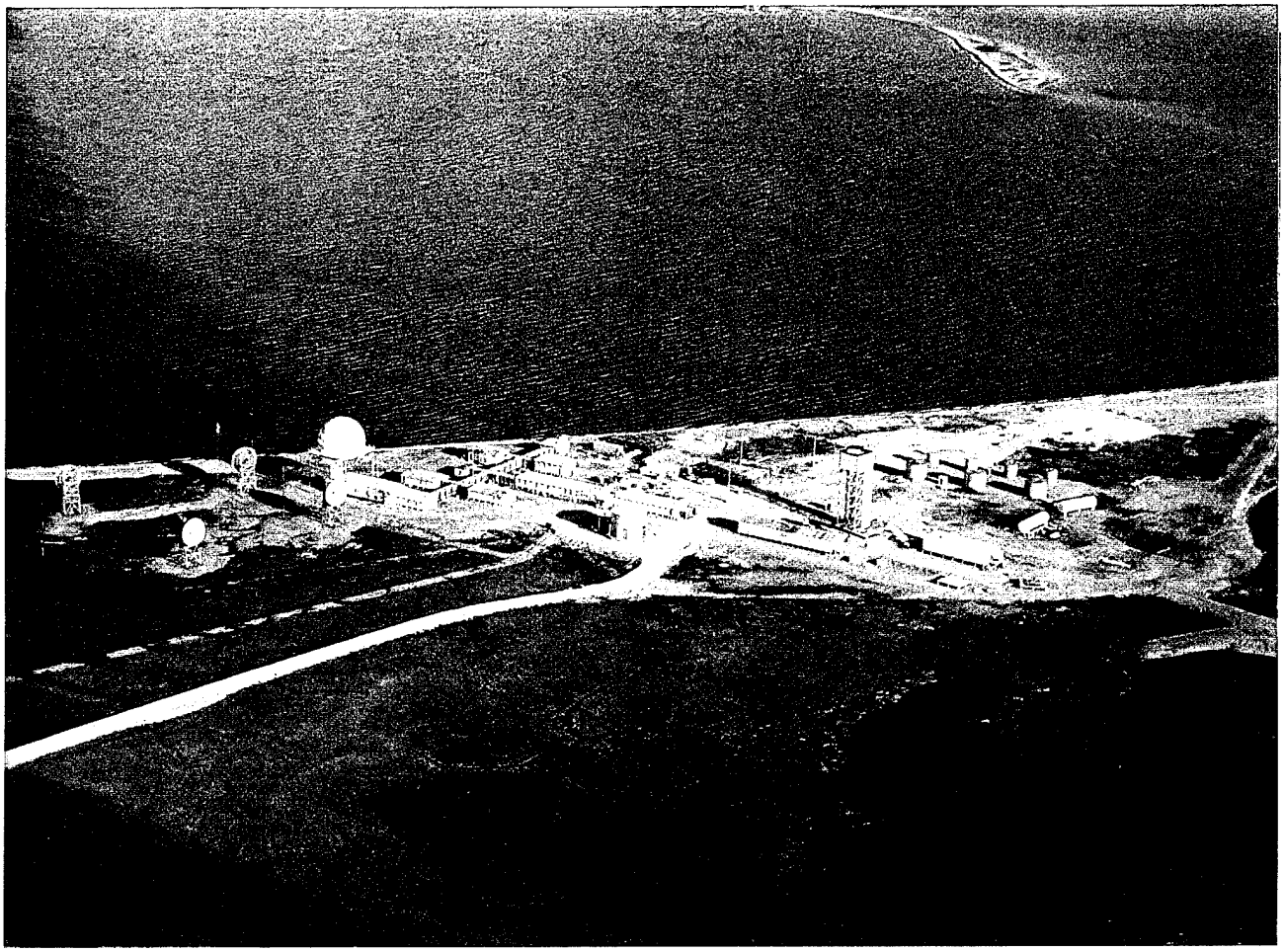
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act of 1986
SOP	Standard Operating Procedure
SRR	Short Range Radar
SVOC	Semi-Volatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
TOC	Total Organic Carbon
TRV	Toxicity Reference Value
TSS	Total Suspended Solids
UCL	Upper Confidence Limit
VOC	Volatile Organic Compound

MEASUREMENTS

µg/L	micrograms per liter
cy	cubic yards
gpm	gallons per minute
mg/kg	milligrams per kilogram
ppb	parts per billion
ppm	parts per million

APPENDIX B

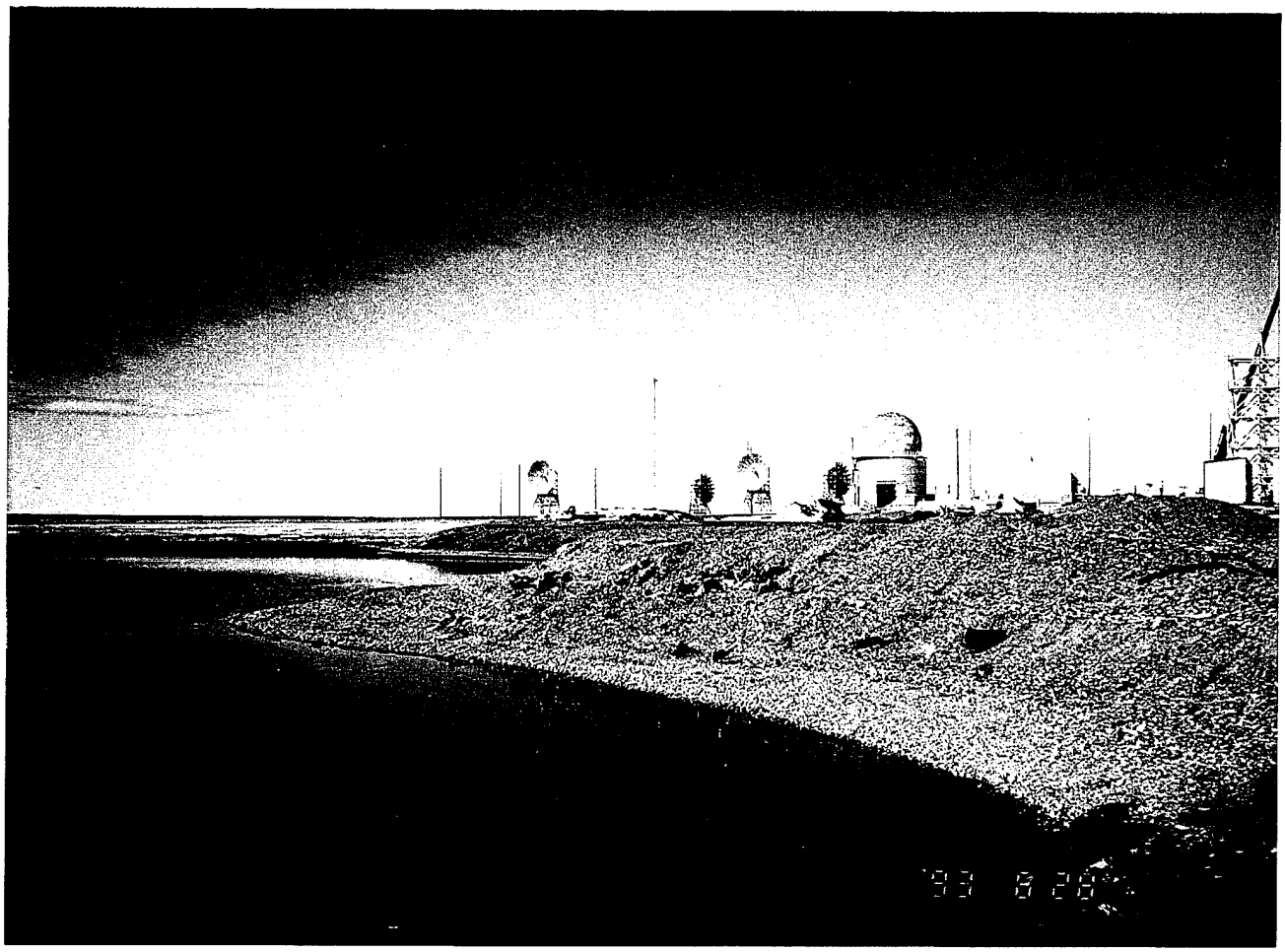
PHOTOGRAPHS OF BULLEN POINT RADAR INSTALLATION AND SITES



An aerial view to the northwest of the Bullen Point radar installation, Alaska.



The POL Tanks (ST05) site is located northwest of the module train. This is a view to the east of the seven inactive diesel tanks at the site.



The Old Landfill/Dump Site East (LF06) site is the location of the installation landfill that was active from 1956 to 1971. It is less than one acre in size. This is a view to the west.



The Fuel Storage Area **(ST09)** site is a deactivated gravel pad area that was used to store drums of fuel. This is a view to the southwest.



The deactivated Drum Storage Area (SS10) site was used to stockpile fluids such as solvents, antifreeze, and lube oil. This is a view to the southwest. The POL Tanks (ST05) site is located to the right in this photo.

APPENDIX C

COPY OF THE TASK DESCRIPTIONS AND STATEMENT OF WORK

RFP 88X

3 **ORDER FOR SUPPLIES OR SERVICES** 88X

PAGE 1 OF 3

2. PROC INSTRUMENT ID NUMBER (PIIN)	3. CALL/ORDER NUMBER	4. DATE OF ORDER*	5. REQUISITION/PURCHASE REQUEST PROJECT NUMBER	6. CERTIFIED FOR NATIONAL DEFENSE UNDER
F33615-90-D-4010 MARK ALL PACKAGES AND PAPERS WITH THIS NUMBER	0022	8 APR 1993	FY7624-93-08202	DO-C9 BOC RED STORE REQ RATING

7. ISSUED BY — CODE FQ2826

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER/PK
8005 9TH STREET
BROOKS AFB TX 78235-5353
BUYER: EDWIN CUSTODIO/HSC-PKVBA
PHONE: (210) 536-4493

8. ADMINISTERED BY — CODE S2101A

DCASMA BALTIMORE
200 TOWSONTOWN BLVD, WEST
TOWSON MD 21204-5299

11

9. CONTRACTOR NAME AND ADDRESS — CODE 69148 FACILITY CODE — IF "X" FOR MULTIPLE FACILITIES SEE SECT "G"

ICF TECHNOLOGY, INC
9300 LEE HIGHWAY
FAIRFAX VA 22031-1207

PHONE: (703) 934-3000
COUNTY: FAIRFAX

21

10. MAIL INVOICES TO: U

11. DISCOUNT FOR PROMPT PAYMENT

				NET DAYS
1ST	N %	DAYS	OTHER	IF "X" SEE SECT "G"
2ND	%	DAYS		
3RD	%	DAYS		

12A. PURCHASE OFFICE POINT OF CONTACT: MVH/M6V/MVY

13. PAYMENT WILL BE MADE BY — CODE S3910A IF "X" SEE SECT "G"

DCASR, PHILADELPHIA
P.O. BOX 7730
PHILADELPHIA, PA 19101-7478

31

12B. RESERVED FOR SERVICE/AGENCY USE

14. TYPE CONTRACTOR	15. SECURITY A. CLASSIFICATION	B. DATE OF DD 254
A	U	

16. CONTRACT ADMINISTRATION

A. FAST PAY	B. CONTRACT (1) KIND	(2) TYPE	C. ABSTRACT RECP ADP POINT	D. SPL CONT PROVISIONS	E. CONT ADMIN FUND LMT	17. (RESERVED)	18. DVC/AGENCY USE	19. SURV. CRIT	20. TOTAL AMOUNT
	I	Y						C	NOT-TO-EXCEED $299,855.00

21. APPROPRIATION AND ACCOUNTING DATA

A. ENTY CLAS	B. ACRN	C. APPROPRIATION	D. LIMIT SUBHEAD	E. SUPPLEMENTAL ACCOUNTING CLASSIFICATION
U	AA	5733400		303 7434 434419 00007 53440 78008F 674400

F. SPR RECIPIENT DODAAD: P74400 — G. OBLIGATION AMOUNT: $299,855.00 — H. NON-CUSTOMER PAYMENT INFO — I. ACC AGENCY USE

41

22A. TYPE OF ORDER: DELIVERY X / PURCHASE

B. NON-COD CONTRACT NUMBER: FY7624-93-08202

This delivery order is subject to instructions contained on this side of form only and is issued in accordance with and subject to terms and conditions of above numbered contract, or Non-COD Contract Number.

Reference your _____

Furnish the following on terms specified hereon.

If quantity accepted by the Government is same as quantity ordered, indicate by mark. If different, enter actual quantity accepted below quantity ordered and encircle.

23. UNITED STATES OF AMERICA — BY: NAME OF CONTRACTING/ORDERING OFFICER AND DATE: GARY J. MACDECY 93APR08

24. TOTAL

25. DIFFERENCES

51

25. QUANTITY ORDERED HAS BEEN
☐ INSPECTED ☐ RECEIVED ☐ ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS STATED

26. SHIP NUMBER — 27. D.O. VOUCHER NUMBER — 28. INITIALS

☐ PARTIAL ☐ FINAL — 31. PAID BY — 32. AMOUNT VERIFIED CORRECT FOR

DATE — SIGNATURE OF AUTHORIZED GOVERNMENT REPRESENTATIVE

36. I CERTIFY THIS AMOUNT IS CORRECT AND PROPER FOR PAYMENT

SIGNATURE AND TITLE OF CERTIFYING OFFICER

30. PAYMENT ☐ COMPLETE ☐ PARTIAL ☐ FINAL — 33. CHECK NUMBER — 34. BILL OF LADING NUMBER

35. RECEIVED AT — 37. RECEIVED BY — 38. DATE RECEIVED — 39. TOTAL CONTAINERS — 40. S/R ACCOUNT NUMBER — 41. S/R VOUCHER NUMBER

AFSC Form 700, DEC 88 PREVIOUS EDITION IS OBSOLETE

*When used as a formal contract this will be the effective date.

REFERENCE AF FORM 616 B93SR232 (Change #1), DATED: 23 MAR 93.

1. In accordance with the provisions of the Basic Contract F33615-90-D-4010 and this Delivery Order 0022, the contractor shall accomplish the effort described in the Statement of Work (SOW) dated 16 MAR 93 attached hereto at a total ceiling price of $299,855.00.

2. As a result of paragraph 1 above, the subject order is more specifically modified as set forth below:

SECTION B - THE SCHEDULE:

Item No	Supplies/Services	Quantity Purch Unit	Unit Price Total Item Amt
0001	CLIN sec class: U	1	N
		LO	N
	noun: SAMPLING, ANALYSIS AND DATA acrn: AA nsn: N site codes pqa: D acp: D fob: D pr/mipr data: FY7624-93-08202 type contract: Y		
	descriptive data: Conduct work in accordance with the Statement of Work (SOW) of this order, dated 16 MAR 93 and Section C, The Description/Specifications of the Basic contract. Submit data in accordance with Attachment #1, the Contract Data Requirements List (CDRL) of the basic contract as implemented by paragraph VI of this order's SOW dated 16 MAR 93.		
0002	CLIN sec class: U	1	N
		LO	N
	noun: SUPPORT acrn: AA nsn: N site codes pqa: D acp: D fob: D pr/mipr data: FY7624-93-08202 type contract: Y		
	descriptive data: Provide support in accordance with the Statement of Work (SOW) of this order, dated 16 MAR 93 and Section C, The Description/Specification of the basic contract.		

3. SECTION C - Description/Specification: - See attached Statement of Work entitled "Installation Restoration Program/Remedial Investigation/Feasibility Study for Distant Early Warning (DEW) line Sites, AK (Barter Island AFS (BAR-M), Bullen Point AFS (POW-3), Point Lonely AFS (POW-1), Point Barrow AFS (POW-M), Point Lay AFS (LIZ-2), Wainwright AFS (LIZ-3), and Oliktok Point AFS (POW-2)" dated 16 MAR 93.

4. SECTION F - Schedule Data:

Item No	Supplies Schedule Data	Delivery Quantity	Schedule Date
0001	CLIN Del Sch acrn: AA sec class: U ship to: U descriptive data: Technical effort shall be completed in accordance with the Statement of Work (SOW) dated 16 MAR 93. All data shall be delivered in accordance with Attachment #1 of the basic contract as implemented by paragraph VI of the Statement of Work dated 16 MAR 93. The data shall be accepted by the Government not later than 31 DEC 93.	1	93DEC31
0002	CLIN Del Sch acrn: AA sec class: U ship to: U descriptive data: Technical effort shall be completed in accordance with the Contract Data Requirements List (Attachment #1) of the basic contract as implemented by paragraph VI of the Statement of Work.	1	93DEC31

1993 March 16

STATEMENT OF WORK
INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

STAGE 1

DISTANT EARLY WARNING (DEW) LINE SITES and CAPE LISBURNE AFS, AK

I. DESCRIPTION OF WORK

1.1 Scope

1.1.1 **Background.** The objective of the Air Force Installation Restoration Program (IRP) is to assess past hazardous waste disposal and spill sites on Air Force installations and develop remedial actions consistent with the National Contingency Plan (NCP) for these sites which pose a threat to human health and welfare or the environment. This objective is achieved through a Remedial Investigation Feasibility Study (RI/FS) process in which conclusions and recommendations drawn from accurate and validated data are used to structure and guide subsequent activities.

The RI/FS process includes scoping to define data requirements and objectives, a remedial investigation to characterize sites for a baseline risk assessment, and a feasibility study to define and evaluate alternative remedial actions so that a recommended action may be selected. Each of these steps of the RI/FS process can be conducted in stages that focus on particular aspects of the process.

The contractor shall accomplish the actions described in this Statement of Work (SOW) to complete the RI/FS process at the following seven Dew Line Sites and Cape Lisburne:

Barter Island AFS (BAR-M); Bullen Point AFS (POW-3); Point Lonely AFS (POW-1); Point Barrow AFS (POW-M); Point Lay AFS (LIZ-2); Wainwright AFS (LIZ-3); and Oliktok Point AFS (POW-2).

1.1.2 **Requirements for Project Activities.** The Installation Restoration Program (IRP) Handbook referenced in this Statement of Work provides requirements for laboratory and field activities and applicable formats for project documents that shall be used by the contractor. Volume 1 of the Handbook dated May 1992 is provided under separate cover. This document is referenced in this Statement of Work as the Handbook. The contractor is responsible for the thorough knowledge and understanding of the previous findings and recommendations that affect this task prior to the start of field activities. The documents involved include but are not limited to the IRP Phase I Records Search, and the IRP Phase II plans and reports addressing the Dew Line Sites and Cape Lisburne.

1.1.3 **Meetings.** A maximum of two (2) contractor personnel, including the project leader, shall attend four (4) meetings at Elmendorf AFB, AK. Each meeting shall be two (2) 8-hour workdays in duration. All meetings shall be coordinated by the TPM.

1.1.4 **Special Notifications.** The contractor shall immediately report to the TPM, or designate, via telephone, any data or results generated during this investigation which may indicate an imminent health risk. Following this telephone notification, a written notice shall be prepared and

delivered within three (3) days. This notification shall include supporting documentation (sequence 16, para 6.1)

1.2 Project Scoping Documents

The purpose of the project scoping documents is to clearly and comprehensively define project activities prior to the initiation of field work. The contractor shall prepare and submit the following project scoping documents for this task prior to the initiation of any field activities or laboratory analyses.

1.2.1 **Engineering Network Analysis.** Provide within ten (10) days after the issuance of an order a computer generated network analysis which is a detailed task plan for the RI/FS work efforts. The network analysis (GANTT) chart shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period of the delivery order. The network analysis (GANTT) shall show both serial and parallel subtasks leading to a deliverable product or report, and shall show early and late start and completion dates with float. The network analysis (GANTT) shall be updated and submitted quarterly (sequence 3, para 6.1).

1.2.2 **Work Plan.** This section will discuss the overall approach, (including a brief summary of the Conceptual Site Model and Data Quality Objectives), major tasks, scope, timeline, and major decision points. Due to the extreme remoteness of the Dew Line Sites and Cape Lisburne, the contractor shall include a detailed plan for logistics and strategy to complete the RI/FS field activities. Follow the format specified in section 1 of the Handbook. In preparing the Work Plan, use previous reports and the information gathered during the literature search and presurvey along with experience at similar sites. Reevaluate the recommendations for Dew Line Sites and Cape Lisburne developed during previous IRP stages (sequence 4, para 6.1).

1.2.3 **Sampling and Analysis Plan (SAP).** The SAP consists of a quality assurance plan (QAPP) and a Field Sampling Plan (FSP). Prepare a SAP describing how project activities will be accomplished in the format specified in section 1 of the Handbook. Incorporate review comments and obtain TPM concurrence prior to the start of field activities (sequence 4, para 6.1).

1.2.4 **Health and Safety Plan (HSP).** Provide a written Health and Safety Plan within eight (8) weeks after the issuance of an order. The contractor shall comply with USAF, OSHA, EPA, state, and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of protection needed at the study sites. The Health and Safety Plan shall provide no less protection than the protection contained in the manual entitled "Health and Safety Requirements for Employees Engaged in Field Activities" dated 1981 and the "Occupational Safety and Health Manual for Hazardous Waste Sites Activities" dated 1985 and 29 CFR 1910. Coordinate the Health and Safety Plan directly with applicable regulatory agencies prior to submittal to AFCEE/ESR. The contractor shall certify to AFCEE/ESR that the contractor has reviewed the coordinated Health and Safety Plan with each employee and also subcontractor's employees prior to the time each employee engages in field activities (sequence 4, para 6.1).

1.2.5 **Community Relations Plan.** The contractor shall prepare a Community Relations Plan (CRP) for the DEW Line Sites and Cape Lisburne AFS outlining the specific public communications and involvement techniques to be used in coordination with remedial site activities (sequence 4, para 6.1). Follow the guidance contained in "Community Relations in Superfund, a Handbook", office of Solid Waste and Emergency Response (OSWER) Directive

9230.0-03C (EPA/540/R-92/009, January 1992. PB92-963341), and other applicable directives. Also, use as a guidance previously accomplished CRP from other installations in Alaska. Appropriately adapt such guidance to the local situation at the DEW Line Sites and Cape Lisburne. As described in OSWER Directive 9230.0-03C, the CRP shall include, but not be limited to, a description of the sites and the community, an overview of the community involvement to date, key community concerns regarding the site and AP site activities, and suggested community relations activities. A contact list of elected officials, agency representatives, and interested groups and individuals shall be included in appropriate copies of the plan. In addition, the plan will include suggested locations for meetings and information repositories. Contractor activities to develop the CRP shall include conducting a review of site information provided by the AF.

1.3 Project Activities

The contractor shall conduct the following tasks to achieve the purposes stated herein, in compliance with approved scoping documents, the Handbook, and all applicable regulations and requirements.

1.3.1 Community Relations. Provide support to the base public affairs office for the tasks described below pertaining to the RI/FS Community Relations Program.

1.3.1.1 Public meetings and workshops. The contractor shall be responsible for coordinating public meetings and workshops for all DEW Line Sites and Cape Lisburne AFS. This includes producing briefing scripts, slides and any associated products such as response cards and sign-in sheets. As requested by the base Community Relations office in coordination with the TPM, research and provide materials for public queries, news media queries, and news releases. Assume a maximum of one (1) workshop/meeting (Seq. nos. 3,9).

1.3.1.2 Public notices. As required by the base Community Relations office and the TPM, the contractor shall prepare and publish public notices for the Fairbanks and local newspapers. The purpose of these notices is to inform the public of a meeting, workshop, or comment period in which they have the opportunity to be involved in the IRP Program at DEW Line Sites and Cape Lisburne AFS. Also, these notices may be utilized to inform the public of other pertinent program information such as quarterly notices of documents placed in the information repositories. The format for the notices shall be coordinated with the Community Relations office and TPM, and then submitted to the TPM for review prior to delivery to the base. Assume a maximum of two (2) notices (Seq. no. 3).

1.3.1.3 Photo Notebook The contractor shall develop a photo notebook which focuses on the overall IRP program at DEW Line Sites and Cape Lisburne AFS. The layout of the notebook will be coordinated with the public affairs office and TPM. Assume a maximum of one (1) update (Seq. no. 9).

1.3.1.4 Mailing List. In coordination with the base Community Relations office and the TPM, prepare and update the mailing list on a quarterly basis. Assume a maximum of two (2) updates (Seq. no. 3).

1.3.1.5 Maps. Prepare presentation quality maps of the installations and their sites to use in newsletters and to distribute to the public.

1.3.2 Literature Search. Conduct a literature search and analyze aerial photos of the DEW Line Stes to supplement existing information that has been collected. The purpose of the literature search is to complete the

conceptual site model so that a numerical estimate of risk can be developed.

1.3.3 **Presurvey.** Within eight weeks of the issuance of an order, the contractor shall visit the Dew Line Sites and Cape Lisburne to ensure complete understanding of site conditions. Coordinate this visit with the TPM and the 11 CEOS project manager. The contractor shall look for evidence of contamination at each site visited (e.g., leaking drums, vegetative stress, leachate seeps). The contractor shall observe the physical settings of each site visited to formulate specific recommendations concerning boring placement, use of geophysical techniques, and other aspects of the proposed field investigation. The findings of the presurvey shall be used to prepare the Work Plan, SAP, and HSP for the RI and to prepare scoping documents for the treatability study(ies). Assume one presurvey and one reconnaisance trips.

1.3.4 **Quality Assurance/Quality Control (QA/QC).** A QA/QC program shall be conducted and documented for all work pursuant to this delivery order. Contractor and project-specific documents concerning QA/QC procedures and requirements shall be strictly followed. Data generated under the QA/QC program shall be used by the contractor for evaluating the analytical results and field records assembled for each site to identify accurate and validated data that may be used to assess risk, develop conceptual site models and evaluate alternatives.

1.3.5 **Conceptual Site Model.** Use all available RI/FS data supported by acceptable QA/QC results (as measured against QAPP requirements) and site characterization information to refine, based on newly collected data, the conceptual site model. The model shall define the nature and extent of contamination and the transport and fate of those contaminants. The minimum requirements of the model are given in section 2 of the Handbook. The complexity and detail of the site model shall be consistent with the nature of the site and site problems, and the amount of data available the conceptual site model shall be documented in the Work Plan.

1.3.6 **ARARs Evaluation.** The contractor shall identify all Applicable or Relevant and Appropriate Requirements (ARAR). These ARARs will be documented in the Work Plan.

1.4 **Project Deliverables**

Deliver the following documents in compliance with the requirements of item VI, the formats required in section 1 and 4 of the Handbook, and the specifications noted below. Draft reports are considered "drafts" only because they have not been reviewed and approved by the Air Force. In all other respects, "drafts" shall be complete, in the proper format, fully illustrated, and free of grammatical and typographical errors.

1.4.1 **Scoping Documents.**

a. Engineering Network Analysis (GANTT) (para 1.2.1). Provide within ten (10) days after the issuance of an order. Update and submit quarterly (sequence 3, para 6.1).

b. Work Plan (para 1.2.2). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

c. Sampling and Analysis Plan (1.2.3). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

d. Health and Safety Plan (para 1.2.6). Provide within six (6) weeks after the issuance of an order (sequence 4, para 6.1).

e. Community Relations Plan (para 1.2.5). Provide within eight (8) weeks after issuance of an order (sequence 4, para 6.1).

1.6.2 Special Notification. Provide written notification of imminent health hazards and supporting documentation within three (3) days of telephone notification (sequence 15, para 6.1).

1.6.3 Presentation Materials. The contractor shall prepare and present up to two (2) presentation packages at meetings coordinated by the Air Force (sequence 9, para 6.1). Attendance of these meetings is included in paragraph 1.1.3 of this SOW. As part of the presentation materials, the contractor shall provide paper copies of all slides and overheads.

1.6.4 Meeting Summaries (para 1.1.3). Provide no later than five (5) days after conclusion of each meeting (sequence 18, para 6.1).

1.6.5 Newsletter. Prepare and submit a quarterly newsletter which presents the status of the entire base IRP Program. This will include preparing an outline resulting from input by all contractors involved in the program. The outline must be approved by the base and TPM prior to submittal of the newsletter. The final product will be printed and distributed as agreed to by the TPM. Assume a maximum of two (2) newsletters (Sequence no. 3).

1.6.6 Fact Sheets. As required by the base IRP Program, prepare and submit fact sheets which facilitate the public's understanding of the IRP Program. These sheets should include key community concerns regarding sites as specified by the base. Use the format agreed to by the base and TPM. Print and distribute the fact sheets as agreed to by the TPM. Assume a maximum of two (2) fact sheets (Sequence no. 3).

1.6.7 Public Notices. In accordance with paragraph 1.3.6.2, prepare and submit public notices for the Fairbanks and local newspapers. Use the format agreed to by the base and TPM (Sequence no. 3).

1.6.8 Photo Notebook. In accordance with paragraph 1.3.6.3, develop a photo notebook which focuses on the overall base IRP Program. Prior to implementation, submit a conceptual layout of the notebook for review by the base and TPM (Sequence no. 9).

1.6.9 Mailing List. In accordance with the base Community Relations coordinator and paragraph 1.3.6.4, update the existing mailing list on a quarterly basis (Sequence no. 3).

1.6.10 Maps. In accordance with the base community Relations coordinator and paragraph 1.3.6.5, prepare presentation quality maps.

II. Site Locations and Dates

Dew Line Sites and Cape Lisburne, date to be established.

III. Base Support The base will:

3.1 Provide the contractor with existing engineering plans, drawings, diagrams, aerial photographs, digitized map files, etc., to facilitate evaluation of IRP sites under investigation.

3.2 Arrange for personnel identification badges, vehicles passes, and/or entry permits with the contention the contractor will provide necessary information to the base personnel no less than four weeks before needed.

3.3 Provide the contractor with all previously approved documents which provide information on all IRP efforts conducted at Dew Line Sites and Cape Lisburne and will aid in the determination of the amount of field work and analyses which need to be conducted.

IV. Government Furnished Property

See above in section III.

V. Government Points of Contact:

5.1 MAJCOM Coordinator

Major James R. Williams III
AFCEE/ESRU
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5243
DSN 240-5243
(210) 536-9026 FAX
DSN 240-9026

5.2 Restoration Team Chief

Mr. Marty M. Faile
AFCEE/ESRU
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5243
DSN 240-5243
(210) 536-9026 FAX
DSN 240-9026

5.3 Base Point of Contact (POC)

Mr. Jim Wolfe
11 CEOS/DEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

5.4 Public Affairs Coordinator

Ms. Wenda Wolf
11 CEOS/DEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

VI. Deliverables

6.1 Attachment 1 of the Basic Contract

Sequence numbers 1 and 5 listed in attachment 1 to the basic contract app. all orders. Guidance for preparing R&D Status Reports (sequence 1) is contained in the Handbook, section 4. In addition, the sequence numbers an dates listed below are applicable to this order:

Sequence No.	Item No.	Block 10 (Freq.)	Block 11 (as of date)	Block 12 (date of 1st. submit.)	Block 13 (date of final report)	Block (no. o copies
1 (NETWORK ANALYSIS)	I.1.4.1a	QTRLY	12APR93	30APR93	-	
4 (WORK PLAN)	I.1.4.1b	ONE/R	12APR93	30APR93	a	4
4 (SAP)	I.1.1.4a	ONE/R	12APR93	30MAY93	30NOV93	b
4 (HSP)	I.1.4.1d	ONE/R	12APR93	30MAY93	30JUL93	b
4 (COMM. REL. PLAN)	I.1.1.4c	ONE/R	12APR93	30MAY93	-	10
16 (SPECIAL NOTIF.)	I.1.4.2	OTHER	12APR93	30MAY93	31DEC93	b
9 (PERSONT. MATERIAL)	I.1.4.3	ASREQ	c	c	-	3
10 (MTG. RPTS)	I.1.4.4	ONE/R	d	d	-	10
3 (NEWSLETTER)	I.1.4.5	e	e	e	-	5
3 (FACT SHEETS)	I.1.4.6	QTRLY	12APR93	30NOV93	a	2
3 (PUBLIC NOTICES)	I.1.4.7	ASREQ	12APR93	15JUL93	g	-
9 (PHOTO NOTEBOOK)	I.1.4.8	ONE/R	12APR93	15JUL93	g	5
3 (MAILING LIST)	I.1.4.9	OTHER	12APR93	15JUL93	-	1
3 (MAPS)	I.1.4.10	QTRLY	12APR93	15JUL93	4	-
		OTHER	12APR93	15JUL93	-	2

6.2 Reserved.

6.3 Notes

a. Submit Quarterly Thereafter.

b. One (1) first draft plan (8 copies), one (1) second draft plan (8 copies), and one (1) final plan (10 copies) are required. Incorporate Air Force comments into the second draft and final plan as specified by the TPM. Supply AFCEE/ESR with an advance copy of the first draft, second draft, and final plan for acceptance prior to distribution. Distribute the remaining copies of each plan as specified by the TPM. The second and final reports shall be submitted within three (3) weeks of receipt of comments from the TPM.

c. Primary and Secondary Documents. One first draft report (25 copies), one second draft report (25 copies), and one final report (35 bound copies plus the original camera-ready copy and a 3.5 inch disk formatted in WordPerfect 5.1 containing the document file) are required. Incorporate Air Force comments into the second draft and final reports as specified by the TPM. Supply the TPM with an advance copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute the remaining copies as specified by the TPM .

d. Provide written notice with supporting documentation within three (3) days of telephone notification and at the direction of the TPM. Assume a maximum of 100 pages.

e. Provide within one (1) week of task/meeting completion.

f. Provide 500 copies of the Newsletters and distribute as agreed to by the TPM. This includes mailing the final product to on-base personnel and addresses on the existing mailing list.

g. Provide draft and final deliverables. Provide two advance copies to the AFCEE TPM and to the 11 CEOS Community Relations Coordinator for acceptance prior to preparation of the final deliverables.

h. Provide poster-size map.

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 3

2. DC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. BCC/DMS RATING
F33615-90-D-4010	002201		FY7624-93-08305	--

7. ISSUED BY CODE FQ2826

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER/PK
8005 9TH STREET
BROOKS AFB TX 78235-5353
Buyer: EDWIN CUSTODIO/HSC-PKVBA
Phone: (210) 536-4493

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A

DCMAO, BALTIMORE
200 TOWNSONTOWN BLVD., WEST
TOWNSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE

ICF TECHNOLOGY
9330 LEE HIGHWAY
FAIRFAX VA 22031-1207
COUNTY; FAIRFAX
PHONE: (703) 934-3000

MAIL DATE
JUN 1? 1993

IF "9" FOR MULTIPLE FACILITIES SEE SECT "K"

MAILING ADDRESS;
ICF TECHNOLOGY, INC
ATTN: CYNTHIA L. FALCE
FOUR GATEWAY CENTER 12TH FLOOR
PITTSBURGH PA 15222

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT

1ST	%	DAYS	NET DAYS
2ND	%	DAYS	OTHER IF "9"
3RD	%	DAYS	SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT
MVH/M6V/MVY

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLITCITATIONS

☐ The above numbered solicitation is amended as set forth in block 14. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offeror must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO _____
THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF _____
IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR 52.243-3, Changes - Time and Materials or Labor Hours (Aug 1987)

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS *(Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)* SUBJ: INCREASE IN CEILING AMOUNT
PROJECT OFFICER: MICHAEL F. MCGHEE, AFCEE/ESR, 8001 INNER CIRCLE, SUITE 2, BROOKS AFB, TX 78235-5328
FINANCE OFFICE:(SC1010) DFAS-COLUMBUS CENTER
ATTN: INDEPENDANCE
P.O. BOX 182362, COLUMBUS OHIO 43218-2362

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*
BY

20. NAME AND TITLE OF SIGNER *(Type or print)*

21. DATE SIGNED

22. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*
BY Gary J. Macdecy

23. NAME OF CONTRACTING OFFICER *(Type or print)*
GARY J. MACDECY

24. DATE SIGNED
93 Jun 16

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

1. Pursuant to the "Changes" Clause of Section I of the basic contract. The ceiling amount for the order is increased by $99,986. from $299, 855. to $399,841. The performance period remains the same, 31 DEC 93,as a result of this change.

2. As a result of paragraph 1 above, said order is more specifically modified as follows:

a. SECTION A - Cover page - The NTE amount in Block 20 (Cover Page) is increased by $99,986. from $299,855. to $399,841.

b. SECTION B - Supplies and Services - Establish Special ACRN XA.

Item No	Supplies/Services	Quantity Purch Unit	Unit Price Total Item Amt	
0001	CLIN Change sec class: U			N N
	noun: SAMPLING, ANALYSIS, AND DATA acrn: XA nsn: N site codes pqa: D acp: D fob: D type contract: Y			
0002	CLIN Change sec class: U			N N
	noun: SUPPORT acrn: XA nsn: N site codes pqa: D acp: D fob: D type contract: Y			

c. SECTION C - Description/Specs/Work Statement - The SOW for this order remains the same as the Basic order entitled, "Installation Restoration Program/Remedial Investigation/Feasibility Study for Distant Early Warning (DEW) Line Sites and Cape Lisburne AFS, AK" dated 16 MAR 93.

d. SECTION F - Supplies Schedule Data - is modified to include ACRN AB and Special ACRN XA.

Item No	Supplies Schedule Data	Delivery Quantity	Schedule Date
0001	CLIN Del Sch Change sec class: U acrn: XA ship to: U	1	93DEC31

0002 CLIN Del Sch Change sec class: U
acrn: XA
ship to: U 1 93DEC31

e. SECTION G. - Accounting Classification Data - is amended as set forth below:

ACRN	Acct Class Data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification	Obligation Amount
AB	ACCOUNT ESTABLISH UNCLASSIFIED	5733400 F74400 303 7434 434419 000007 53440 000000 674400 pr/mipr data: FY7624-93-08305	$99,986.00
XA	SPECIAL ACRN ESTABLISH UNCLASSIFIED		

descriptive data:
Special ACRN XA funds CLINs 0001 and 0002 and includes the following:

ACRN AA: $299,855.
AB: $ 99,986.
TOTAL $399,841.

Finance Officer: Pay Funds in Alphabetical Order.

3. This supplemental agreement constitutes full settlement of any claims of the contractor under the contract, including the clause entitled, "Changes", arising out of or in connection with the changes effected hereby.

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 3

2. PROC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. BCC/DMS RATING
F33615-90-D-4010	002202	93JUL23	FY7624-93-08353	--

7. ISSUED BY CODE FQ2826

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER/PK
8005 9TH STREET
BROOKS AFB TX 78235-5353
Buyer: REBECCA ROUNSAVILL/PKVBA
Phone: (210) 536-4502

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A

DCMAO, BALTIMORE
ATTN: CHESAPEAKE
200 TOWNSONTOWN BLVD, WEST
TOWNSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE

ICF TECHNOLOGY
9330 LEE HIGHWAY
FAIRFAX VA 22031-1207
COUNTY: FAIRFAX
PHONE: (703) 934-3000

MAIL DATE

JUL 26 1993

IF "0" FOR MULTIPLE FACILITIES SEE SECT "K"

MAILING ADDRESS:
ICF TECHNOLOGY, INC
ATTN: CYNTHIA L. FALCE
FOUR GATEWAY CENTER 12TH FLOOR
PITTSBURGH PA 15222

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT

1ST % DAYS NET DAYS
2ND % DAYS OTHER IF "0" SEE SECT "E"
3RD % DAYS

12. PURCHASE OFFICE POINT OF CONTACT

MVX/M6V/MVY

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLITCITATIONS

☐ The above numbered solicitation is amended as set forth in block 14.

The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO _____
THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF _____
IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR 52.253-3, Changes - Time and Materials or Labor Hours. (AUG 1987)

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS (Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.) SUBJ: INCREASE IN CEILING AMOUNT
PROJECT OFFICER: MICHAEL F. MCGHEE, AFCEE/ESR, 8001 INNER CIRCLE, SUITE 2, BROOKS AFB, TX 78235-5328
FINANCE OFFICE: (SC1030) DFAS-COLUMBUS CENTER
ATTN: DFAS-CO/CHESAPEAKE DIVISION
P.O. BOX 182264, COLUMBUS OHIO 43218-2264

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR (Signature of person authorized to sign)
BY

20. NAME AND TITLE OF SIGNER (Type or print)

21. DATE SIGNED

22. UNITED STATES OF AMERICA (Signature of Contracting Officer)
BY Gary J. Macdecy

23. NAME OF CONTRACTING OFFICER (Type or print)
GARY J. MACDECY

24. DATE SIGNED
93 Jul 23

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE
REFERENCE: AF Form 616 H93-SR329, DATED: 9 JUL 93; EXPIRES: 15SEP 93; $2.9M

1. Pursuant to the "Changes" Clause of Section I of the basic contract. The ceiling amount for the order is increased by $2,899,511.00 from $399,841.00 to $3,299,352.00. The performance period is changed to 94 Feb 15, as a result of this change.

2. As a result of paragraph 1 above, said order is more specifically modified as follows:

a. SECTION A Cover page - The NTE amount in Block 20 (Cover Page) is increased by $2,899,511.00 from $399,841.00 to $3,299,352.00.

b. SECTION B - Supplies and Services - Establish Special ACRN XA.

Item No	Supplies/Services	Quantity Purch Unit	Unit Price	Total Item Amount
0001	CLIN Change sec class: U			N N
	noun: SAMPLING, ANALYSIS AND DATA acrn: XA nsn: N site codes pqa: D acp: D fob: D type contract: Y			
0002	CLIN Change sec class: U			N N
	noun: SUPPORT acrn: XA nsn: N site codes pqa: D acp: D fob: D type contract: Y			
0004	CLIN Establish sec class: U		1 LO	N N
	noun: CHEMICAL ANALYSES acrn: XA nsn: N site codes pqa: D acp: D fob: D pr/mirp Data: FY7624-93-08353 type contract: Y			

c. SECTION C - Description/Specs/Work Statement - The SOW for this order entitled, "Installation Restoration Program Remedial Investigation/Feasibility Study, Stage 1, Distant Early Warning (DEW) Line Sites and Cape Lisburne AFS, AK", dated 6 JUL 93 is attached hereto as Attachment #1 to this modification.

d. SECTION F - Supplies Schedule Data is modified to include ACRN AB and Special ACRN XA.

Item No	Supplies Schedule Data	Delivery Quantity	Schedule Date
0001	CLIN Del Sch Change sec class: U acrn: XA ship to: U	1	95JANØ1
0002	CLIN Del Sch Change sec class: U acrn: XA ship to: U	1	95JANØ1
0004	CLIN Del Sch Establish sec class: U acrn: XA ship to: U	1	95JANØ1

e. SECTION G - Accounting Classification Data - is amended as set forth below:

ACRN	Acct Class data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification	Obligation Amount
AB	ACCOUNT CHANGE UNCLASSIFIED	5733400 F74400 303 7434 434419 000007 53440 000000 674400	$2,899,511.00+
	pr/mipr data:		
XA	SPECIAL ACRN CHANGE UNCLASSIFIED		

descriptive data:
Special ACRN XA funds CLINs 0001, 0002 and 0004 and includes the following:

ACRN AA:	$ 299,855.00	
AB:	$ 99,986.00	(MOD 0022-01)
	$2,899,511.00	(MOD 0022-02)
TOTAL	$3,299,352.00	

FINANCE OFFICER: Pay funds in alphabetical order.

3. This supplemental agreement constitutes full settlement of any claims of the contractor under the contract, including the clause entitled, "Changes", arising out of or in connecting with the changes effected hereto.

1993 JUL 6

STATEMENT OF WORK
INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

STAGE 1

DISTANT EARLY WARNING (DEW) LINE SITES and CAPE LISBURNE AFS, AK

I. DESCRIPTION OF WORK

1.1 Scope

1.1.1 **Background.** The objective of the Air Force Installation Restoration Program (IRP) is to assess past hazardous waste disposal and spill sites on Air Force installations and develop remedial actions consistent with the National Contingency Plan (NCP) for those sites which pose a threat to human health and welfare or the environment. This objective is achieved through a Remedial Investigation Feasibility Study (RI/FS) process in which conclusions and recommendations drawn from accurate and validated data are used to structure and guide subsequent activities.

The RI/FS process includes scoping to define data requirements and objectives, a remedial investigation to characterize sites for a baseline risk assessment, and a feasibility study to define and evaluate alternative remedial actions so that a recommended action may be selected. Each of these steps of the RI/FS process can be conducted in stages that focus on particular aspects of the process.

The contractor shall accomplish the actions described in this Statement of Work (SOW) to complete the RI/FS process at the following seven Dew Line Sites and Cape Lisburne:

Barter Island AFS (BAR-M); Bullen Point AFS (POW-3); Point Lonely AFS (POW-1); Point Barrow AFS (POW-M); Point Lay AFS (LIZ-2); Wainwright AFS (LIZ-3); and Oliktok Point AFS (POW-2).

1.1.2 **Requirements for Project Activities.** The Installation Restoration Program (IRP) Handbook referenced in this Statement of Work provides requirements for laboratory and field activities and applicable formats for project documents that shall be used by the contractor. Volume 1 of the Handbook dated May 1992 is provided under separate cover. This document is referenced in this Statement of Work as the Handbook. The contractor is responsible for the thorough knowledge and understanding of the previous findings and recommendations that affect this task prior to the start of field activities. The documents involved include but are not limited to the IRP Phase I Records Search, and the IRP Phase II plans and reports addressing the Dew Line Sites and Cape Lisburne.

1.1.3 **Meetings.** A maximum of two (2) contractor personnel, including the project leader, shall attend ~~four (4)~~ eight (8) meetings at Elmendorf AFB, AK. Each meeting shall be two (2) 8-hour workdays in duration. All meetings shall be coordinated by the Restoration Team Chief (RTC).

1.1.4 **Special Notifications.** The contractor shall immediately report to the RTC, or designate, via telephone, any data or results generated during this investigation which may indicate an imminent health risk. Following this telephone notification, a written notice shall be prepared and

delivered within three (3) days. This notification shall include supporting documentation (sequence 16, para 6.1)

1.2 Project Scoping Documents

The purpose of the project scoping documents is to clearly and comprehensively define project activities prior to the initiation of field work. The contractor shall prepare and submit the following project scoping documents for this task prior to the initiation of any field activities or laboratory analyses.

1.2.1 **Engineering Network Analysis.** Provide within ten (10) days after the issuance of an order a computer generated network analysis which is a detailed task plan for the RI/FS work efforts. The network analysis (GANTT) chart shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period of the delivery order. The network analysis (GANTT) shall show both serial and parallel subtasks leading to a deliverable product or report, and shall show early and late start and completion dates with float. The network analysis (GANTT) shall be updated and submitted quarterly (sequence 3, para 6.1).

1.2.2 **Work Plan.** This section will discuss the overall approach, (including a brief summary of the Conceptual Site Model and Data Quality Objectives), major tasks, scope, timeline, and major decision points. Due to the extreme remoteness of the Dew Line Sites and Cape Lisburne, the contractor shall include a detailed plan for logistics and strategy to complete the RI/FS field activities. Follow the format specified in section 1 of the Handbook. In preparing the Work Plan, use previous reports and the information gathered during the literature search and presurvey along with experience at similar sites. Reevaluate the recommendations for Dew Line Sites and Cape Lisburne developed during previous IRP stages (sequence 4, para 6.1).

1.2.3 **Sampling and Analysis Plan (SAP).** The SAP consists of a quality assurance plan (QAPP) and a Field Sampling Plan (FSP). Prepare a SAP describing how project activities will be accomplished in the format specified in section 1 of the Handbook. Incorporate review comments and obtain RTC concurrence prior to the start of field activities (sequence 4, para 6.1).

1.2.4 **Health and Safety Plan (HSP).** Provide a written Health and Safety Plan within eight (8) weeks after the issuance of an order. The contractor shall comply with USAF, OSHA, EPA, state, and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of protection needed at the study sites. The Health and Safety Plan shall provide no less protection than the protection contained in the manual entitled "Health and Safety Requirements for Employees Engaged in Field Activities" dated 1981 and the "Occupational Safety and Health Manual for Hazardous Waste Sites Activities" dated 1985 and 29 CFR 1910. Coordinate the Health and Safety Plan directly with applicable regulatory agencies prior to submittal to AFCEE/ESR. The contractor shall certify to AFCEE/ESR that the contractor has reviewed the coordinated Health and Safety Plan with each employee and also subcontractor's employees prior to the time each employee engages in field activities (sequence 4, para 6.1).

1.2.5 **Community Relations Plan.** The contractor shall prepare a Community Relations Plan (CRP) for the DEW Line Sites and Cape Lisburne AFS outlining the specific public communications and involvement techniques to be used in coordination with remedial site activities (sequence 4, para 6.1). Follow the guidance contained in "Community Relations in Superfund, a Handbook", office of Solid Waste and Emergency Response (OSWER) Directive

9230.0-03C (EPA/540/R-92/009, January 1992, PB92-963341), and other applicable directives. Also, use as a guidance previously accomplished CRP from other installations in Alaska. Appropriately adapt such guidance to the local situation at the DEW Line Sites and Cape Lisburne. As described in OSWER Directive 9230.0-03C, the CRP shall include, but not be limited to, a description of the sites and the community, an overview of the community involvement to date, key community concerns regarding the site and AF site activities, and suggested community relations activities. A contact list of elected officials, agency representatives, and interested groups and individuals shall be included in appropriate copies of the plan. In addition, the plan will include suggested locations for meetings and information repositories. Contractor activities to develop the CRP shall include conducting a review of site information provided by the AF.

1.3 Project Activities

The contractor shall conduct the following tasks to achieve the purposes stated herein, in compliance with approved scoping documents, the Handbook, and all applicable regulations and requirements.

1.3.1 **Community Relations.** Provide support to the base public affairs office for the tasks described below pertaining to the RI/FS Community Relations Program.

1.3.1.1 Public meetings and workshops. The contractor shall be responsible for coordinating public meetings and workshops for all DEW Line Sites and Cape Lisburne AFS. This includes producing briefing scripts, slides and any associated products such as response cards and sign-in sheets. As requested by the base Community Relations office in coordination with the RTC, research and provide materials for public queries, news media queries, and news releases. Assume a maximum of one (1) workshop/meeting (Seq. nos. 3,9).

1.3.1.2 Public notices. As required by the base Community Relations office and the RTC, the contractor shall prepare and publish public notices for the Fairbanks and local newspapers. The purpose of these notices is to inform the public of a meeting, workshop, or comment period in which they have the opportunity to be involved in the IRP Program at DEW Line Sites and Cape Lisburne AFS. Also, these notices may be utilized to inform the public of other pertinent program information such as quarterly notices of documents placed in the information repositories. The format for the notices shall be coordinated with the Community Relations office and RTC, and then submitted to the RTC for review prior to delivery to the base. Assume a maximum of two (2) notices (Seq. no. 3).

1.3.1.3 Photo Notebook. The contractor shall develop a photo notebook which focuses on the overall IRP program at DEW Line Sites and Cape Lisburne AFS. The layout of the notebook will be coordinated with the public affairs office and RTC. Assume a maximum of one (1) update (Seq. no. 9).

1.3.1.4 Mailing List. In coordination with the base Community Relations office and the RTC, prepare and update the mailing list on a quarterly basis. Assume a maximum of two (2) updates (Seq. no. 3).

1.3.1.5 Maps. Prepare presentation quality maps of the installations and their sites to use in newsletters and to distribute to the public.

1.3.1.6 Information Repository/Administrative Record. Prepare a listing of all documents required for the Information Repository and Administrative Record. Create an Informatin Repository and Administrative Record. The Reporsitory and Record will be maintained by the 11 CEOS/CEVR Community Relations Coordinator. Assume two locations for the Repository and Record, one in Anchorage and another in Elmendorf AFB, AK. Actual locations will be determined by the 11 CEOS/CEVR Community Relations Coordinator.

1.3.2 **Literature Search.** Conduct a literature search and analyze aerial photos of the DEW Line Sties to supplement existing information that has been collected. The purpose of the literature search is to complete the conceptual site model so that a numerical estimate of risk can be developed.

1.3.3 **Presurvey.** Within eight weeks of the issuance of an order, the contractor shall visit the Dew Line Sites and Cape Lisburne to ensure complete understanding of site conditions. Coordinate this visit with the RTC and the 11 CEOS project manager. The contractor shall look for evidence of contamination at each site visited (e.g., leaking drums, vegetative stress, leachate seeps). The contractor shall observe the physical settings of each site visited to formulate specific recommendations concerning boring placement, use of geophysical techniques, and other aspects of the proposed field investigation. The findings of the presurvey shall be used to prepare the Work Plan, SAP, and HSP for the RI and to prepare scoping documents for the treatability study(ies). Assume one presurvey and one reconnaisance trips.

1.3.4 **Quality Assurance/Quality Control (QA/QC).** A QA/QC program shall be conducted and documented for all work pursuant to this delivery order. Contractor and project-specific documents concerning QA/QC procedures and requirements shall be strictly followed. Data generated under the QA/QC program shall be used by the contractor for evaluating the analytical results and field records assembled for each site to identify accurate and validated data that may be used to assess risk, develop conceptual site models and evaluate alternatives.

1.3.5 **Conceptual Site Model.** Use all available RI/FS data supported by acceptable QA/QC results (as measured against QAPP requirements) and site characterization information to refine, based on newly collected data, the conceptual site model. The model shall define the nature and extent of contamination and the transport and fate of those contaminants. The minimum requirements of the model are given in section 2 of the Handbook. The complexity and detail of the site model shall be consistent with the nature of the site and site problems, and the amount of data available the conceptual site model shall be documented in the Work Plan.

1.3.6 **ARARs Evaluation.** The contractor shall identify all Applicable or Relevant and Appropriate Requirements (ARAR). These ARARs will be documented in the Work Plan.

1.3.7 **Data Collection, Sampling, and Analysis Procedures.** The contractor shall conduct field activities, sampling, laboratory analysis, and data quality assessment. Section 2 of the Handbook is recommended for the contractor to follow. The contractor shall conduct all activities in accordance with the WP and the SAP approved by the COR. The COR shall be notified in writing of any planned deviation from the activities specified in these documents. COR approval of deviations is required prior to performance.

The field investigation (including all drilling and sampling operations) shall be supervised by a registered geologist, hydrogeologist, or professional engineer. If required by the state, the on-site field supervisor shall be

certified by the state to install test wells. A detailed log of field conditions, materials penetrated during drilling, well completion, and sampling conditions, as described in Section 2 of the Handbook, shall be maintained and made available for Government inspection upon request. Decisions on well and boring locations, well depths, screened intervals, and all details of the field investigation shall be made by the COR, and the contractor's field or project supervisor.

1.3.8 **Regulatory Requirements and Permits.** All well drilling, development , sampling, laboratory analysis, and other activities pursuant to this effort shall be conducted in strict accordance with all applicable federal and state laws, ordinances, rules and regulations, and all authorities with jurisdiction over such activities. The contractor shall complete permits, applications, other documents, and proficiency tests required by the regulatory agencies. The contractor shall file documents with appropriate agencies and pay all applicable permit and filing fees. The contractor shall identify locations requiring permits to Radar Station Manager. The contractor shall include all correspondence in appendices to the technical reports in accordance with Section 4 of the Handbook.

All laboratory analyses shall conform to all applicable federal, state, and local regulatory agency requirements. If the requirements specify that certification is necessary to conduct one or more specific analyses, the contractor shall furnish documentation showing laboratory certification with the first set of analytical data supplied to AFCEE/ESR and the COR.

The contractor shall containerize and sample materials suspected to be hazardous in accordance with applicable requirements, Guidance from the Handbook, and the approved Plans. The contractor shall transport these containerized materials to a location within the installation boundary designated by the Radar Station Manager at a frequency specified by the Station Manager. The contractor shall handle, store, and/or dispose of potentially hazardous materials. The contractor shall transport and empty containerized materials determined not to be hazardous to locations within the installation boundary identified by the Station Manager.

1.3.9 **Remedial Investigation (RI).** The contractor shall conduct a RI to characterize environmental conditions; define the concentration, nature, and extent of contamination; and quantitatively estimate the risk to human health and the environment and study the area through the collection of geologic and hydrologic data, environmental samples, the laboratory analyses of those samples for potential contaminants, the evaluation of the analytical results and field measurements with respect to quality control data, and the interpretation and analysis of accurate and precise data. The purpose of data collection, sample collection, and laboratory analysis is to determine whether any contaminants generated from installation activities have entered the environment. The field investigation is used to determine the source of any identified contaminants, the magnitude of contamination relative to Applicable or Relevant and Appropriate Requirements (ARARs), and any naturally occurring or background concentrations for specific compounds. The RI shall comply with the specifications, procedures, and methodologies presented in the project-specific SAP. The COR must be notified in writing prior to any modification of or deviation from any activity described in these documents.

1.3.9.1 **Soil Borehole Drilling and Sampling and Well Installation and Sampling.** The contractor shall drill and collect samples from boreholes as specified in the SAP. The contractor shall evaluate the need to install, sample, and develop monitoring or extraction wells.

1.3.9.1.1 **Lithologic Samples.** The contractor shall describe core samples at least every five (5) feet of drilling or at each change in lithology, whichever is less, to indicate significant changes in lithology of characteristic properties that relate to the strata penetrated. Any deviations shall be coordinated with the COR. Guidance for standard identification practices are found in the Handbook. The contractor shall include in the field logbook observations made by the driller and rig geologist during drilling such as depth to water, penetration rate, drill rig behavior, and other observations that might be indicative of changes in formation characteristics. The contractor shall record depth to permafrost in all the soil borings and shall not proceed beyond five (5) feet into the permafrost layer.

1.3.9.1.2 **Drill Cuttings and Drilling Fluids.** The contractor shall containerize all drill cuttings and drilling fluids. All drill cuttings and drilling fluids shall be managed and disposed of in accordance with the project SAP. (Note: The contractor shall be responsible for providing all necessary containers.) The contractor shall be responsible for the logistics of the ultimate disposal of all drill fluids or drill cuttings deemed hazardous in accordance with current EPA off-site disposal policy and state and/or local hazardous waste disposal laws. The contrator shall coordinate with the Station Manager for on-site placement and disposal of all drill cuttings, fluids, purge fluid, and excavated material. If on-site disposal is excluded, all hazardous waste shall be transported by a permitted hazardous waste transporter to a licensed Resource Conservation and Recovery Act (RCRA) approved facility and be accompanied by a Uniform Hazardous Waste Manifest. The contractor shall provide a final, completed copy of the hazardous waste manifest to the 11 CEOS/CEVR. The Radar Stations' hazardous waste managers will sign all hazardous waste manifest documents.

1.3.9.1.3 **Well/Boring Precautions.** The contractor shall mark the field locations of all borings during the planning/mobilization phase of the field investigation. The contractor shall consult with base personnel to minimize the disruption of base activities, to properly position wells with respect to site locations, and to avoid penetrating underground utilities. The contractor shall obtain all permits prior to commencement of digging and drilling operations. The contractor shall utilize a registered land surveyor in determining the elevations and locations of all off-base background study borings. All borings and wells from which samples are taken shall be surveyed by the contractor for vertical and horizontal control. The contractor shall record the positions on project and site specific maps. Bench marks used must have been previously established from and be traceable to a U. S. Coast and Geodetic Survey (USCGS) or U. S. Geological Survey (USGS) survey marker. Clearly identify all bench mark locations on the base map.

1.3.9.1.4 **Water-Level Measurements in Boreholes.** The contractor shall measure water levels in all boreholes after the water level has stabilized. Include this information and the date of measurement in the boring logs. Also, record soil moisture conditions (moist, wet, saturated, etc.) in the boring log.

1.3.9.1.5 **Air Monitoring During Drilling.** The contractor shall monitor the ambient air in the breathing zone above the borehole during all drilling with an appropriate organic vapor analyzer to identify potentially hazardous and/or toxic vapors. Include air monitoring results in borehole logs.

1.3.9.1.6 **Subsurface Soil Sampling.** The contractor shall collect soil samples from borings as specified in the SAP. The SAP specifies the analytical methods, the parameters for analysis, and the estimated number of analyses for soil samples.

1.3.9.1.7 **Well Construction Requirements.** The contractor shall coordinate with the COR to determine well completion requirements (flush or projected above ground surface). All wells shall be secured as soon as possible after drilling. The contractor shall provide corrosion resistant locks for both flush and above-ground well assemblies. The locks shall be compatible with existing wells. The contractor shall turn the lock keys over to 11 CEOS/CEVR POC following completion of the field effort. The contractor shall coordinate with the 11 CEOS/CEVR POC, the RTC, and the COR the selection of exact well and screen placement, gravel pack design, and screen slot size.

1.3.9.1.8 **Well Logs.** For each well, the contractor shall prepare a well completion log and schematic diagram showing well construction details. Lithologic descriptions, well elevation survey data, and other information included in the well logs shall conform to the specifications of the SAP.

1.3.9.1.9 **Well Development.** The contrator shall develop each well as soon as possible. Guidance for well development procedures are found in the the Handbook. The contractor shall measure the rate of water production, pH, specific conductance, and water temperature during well development.

1.3.9.1.10 **Well Placement.** The contractor shall avoid installing wells in depressions or areas subject to frequent flooding and/or standing water. If wells must be installed in such areas, the contractor shall design the wells so standing water does not leak into the top of the casing or cascade down the annular space.

1.3.9.1.11 **Well and Borehole Clean-up.** The contractor shall clean the area following the completion of each well and borehole. The contractor shall return all sites to the original condition of the site.

1.3.9.1.12 **Groundwater and Surface Water Sampling.** The contractor shall collect groundwater and Surface Water samples from newly developed well and existing wells and from surface water bodies. The SAP shall specify the analytical methods, the parameters for analysis, and the estimated number of analyses for groundwater and surface water samples.

1.3.9.1.13 **Composite Sampling.** The contractor shall collect and analyze drill cuttings, fluids, purge fluids, and excavated material. The SAP shall specify the analytical methods, the parameters for analysis, and the estimated number of analyses for composite samples.

1.3.9.2 **Geophysical Surveys.** The contractor shall evaluate whether geophysical surveys are needed (e.g., to determine boundaries of landfills, to locate underground debris, utilities and storage tanks). Where geophysical surveys are appropriate, the contractor shall select a geophysical survey technique or techniques [such as ground penetrating radar (GPR), magnetometer or electromagnetic surveys (EM)] that will best meet the desired application. The technique(s) used shall be approved by the RTC prior to use. Approximate number of surveying days is included in Annex A which is to be used for costing purposes only. Appropriate grid systems shall be established and the contractor shall use the results of this survey to prepare a contour map of the results. Provide this map as an attachment to the first R&D Status Report

submitted after the completion of the geophysical surveys. The contractor shall perform the geophysical surveys before drilling and use the results in selecting the location of soil borings, wells, test pits, if necessary.

1.3.9.3 **Permeability Testing.** The contractor shall determine the need for a permeability test at Cape Lisburne AFS, to provide additional data on the hydrogeologic characteristics of the water table aquifer. The SAP shall specify the method to be used for the permeability test.

1.3.9.4 **Water Level Measurement.** The contractor shall evaluate the need for conducting a complete round of water level measurements in all existing and new wells at Cape Lisburne AFS at the beginning of field work and during the field sampling effort. Data gathered shall be used for interpreting groundwater flow directions and groundwater gradient.

1.3.9.5 **Soil Gas Surveys.** The contractor shall evaluate the need for soil gas surveys and Hydropunch (e.g., to select soil boring locations). If soil gas surveys and hydropunch are included as part of the approved Work Plan and FSP, the contractor shall establish appropriate grid systems. The contractor shall prepare a posting map of soil gas values relative to their location on the grid used. Provide this map as an attachment to the first R&D Status Report submitted after completion of the soil gas survey (sequence 3, para 6.1). Approximate number of surveying days are included in Annex A which is to be used for costing purposes only.

1.3.9.6 **Groundwater Field Screening.** The contractor shall perform groundwater field screening. The SAP shall specify the method, location, and type of groundwater field screening.

1.3.9.7 **Baseline Risk Assessment.** The contractor shall use data supported by acceptable QA/QC results (as measured against QAPP requirements) and the conceptual site model to numerically estimate the risk posed by site contaminants to human health and the environment. The contractor shall identify and list all ARARs for those contaminants detected in environmental samples at the site. The contractor shall provide all ARARs evaluations as an attachment to the Technical Report. Provide the results of the baseline risk assessment in the Technical Report using the formats in Section 4 of the Handbook as a guidance.

The contractor shall identify those sites posing minimal or no threat to human health, welfare, or the environment and for which no further action is appropriate.

The contractor shall use the results of the risk assessment in establishing remedial action objectives and developing remedial alternatives in the Feasibility Study.

1.3.9.8 **Defense Priority Model Scores.** The contractor shall use the Defense Priority Model to score the sites. The score shall be included as an appendix to the RI/FS Technical Report.

1.3.9.9 **Fate and Transport.** The contractor shall perform fate and transport modeling for contaminants of interest to include the projection of future contaminant concentrations within the boundaries of the site. This will be done in conjunction with the RI/FS report.

1.3.13 **Weekly Field Activity Report**

The contractor shall transmit a Weekly field activity report. The AFCEE RTC shall develop the format for the report.

1.4 Project Deliverables

Deliver the following documents in compliance with the requirements of item VI, the formats required in section 1 and 4 of the Handbook, and the specifications noted below. Draft reports are considered "drafts" only because they have not been reviewed and approved by the Air Force. In all other respects, "drafts" shall be complete, in the proper format, fully illustrated, and free of grammatical and typographical errors.

1.4.1 **Scoping Documents.**

a. Engineering Network Analysis (GANTT) (para 1.2.1). Provide within ten (10) days after the issuance of an order. Update and submit quarterly (sequence 3, para 6.1).

b. Work Plan (para 1.2.2). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

c. Sampling and Analysis Plan (1.2.3). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

d. Health and Safety Plan (para 1.2.4). Provide within six (6) weeks after the issuance of an order (sequence 4, para 6.1).

e. Community Relations Plan (para 1.2.5). Provide within eight (8) weeks after issuance of an order (sequence 4, para 6.1).

1.4.2 **Special Notification.** Provide written notification of imminent health hazards and supporting documentation within three (3) days of telephone notification (sequence 16, para 6.1).

1.4.3 **Presentation Materials.** The contractor shall prepare and present up to two (2) presentation packages at meetings coordinated by the Air Force (sequence 9, para 6.1). Attendance of these meetings is included in paragraph 1.1.3 of this SOW. As part of the presentation materials, the contractor shall provide paper copies of all slides and overheads.

1.4.4 **Meeting Summaries** (para 1.1.3). Provide no later than five (5) days after conclusion of each meeting (sequence 18, para 6.1).

1.4.5 **Newsletter.** Prepare and submit a quarterly newsletter which presents the status of the entire base IRP Program. This will include preparing an outline resulting from input by all contractors involved in the program. The outline must be approved by the base and RTC prior to submittal of the newsletter. The final product will be printed and distributed as agreed to by the RTC. Assume a maximum of two (2) newsletters (Sequence no. 3).

1.3.10 **Feasibility Study (FS).** The contractor shall perform a FS concurrently with the RI. As much of the FS as possible shall be performed early in the RI/FS process and refined as additional RI data are obtained. The contractor shall use the information from the RI and the baseline risk assessment to develop and evaluate remedial action alternatives for each site where a threat to human health or the environment exists. The contractor shall follow the procedures specified in USEPA OSWER Directive 9355.3-01, "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA." The contractor shall employ streamlining methods wherever possible and develop and evaluate the minimum number of alternatives needed to provide a range of promising treatment and containment actions. The contractor shall eliminate impracticable alternatives from further consideration early in the FS process. The scope and level of detail shall be consistent with the nature and complexity of site problems.

1.3.10.1 **Develop and Screen Alternatives.** The contractor shall establish remedial action objectives and remediation goals for protecting human health and the environment. These objectives and goals shall be determined based on identified ARARs and acceptable exposure levels as defined in the baseline risk assessment and refined throughout the RI/FS process. Identify general response actions and applicable technologies based on site and contaminant conditions, and combine technologies to formulate distinct alternatives. The contractor shall develop alternatives which eliminate, control, and /or reduce risk to human health or the environment to acceptable levels for each pathway. Where a wide variety of promising alternatives exists, the contractor shall screen the alternatives based on effectiveness, implementability, and cost. The contractor shall detail the development and screening of the alternatives process and identify the alternatives selected for detailed analysis in the Informal Technical Information Report (ITIR).

1.3.10.2 **Detailed Screening of Alternatives.** The contractor shall conduct a detailed analysis on each alternative selected and identified in the above step and approved by the COR. Using the methodology in OSWER Directive 9355.3-01, the contractor shall evaluate each alternative against the nine criteria. In addition to the individual assessment, the contractor shall perform a comparative analysis to determine the relative performance of alternatives. The contractor shall focus the analysis on sub-factors and criteria most pertinent to each site and the scope and complexity of the proposed action. Provide a summary of the Detailed Analysis of Alternatives in the R&D report submitted following task completion. Include summary tables of the individual and comparative analyses that will be used in the Technical Report.

1.3.11 **Decision Documents.** The contractor shall prepare and submit Decision Documents (DD) following the Handbook Section 4.4 as guidance. The purpose of the DD is to support a remedial action alternative or a no further action alternative.

1.3.12 **Site Specific Requirements.** The contractor shall perform the requirements listed in this SOW in conformance with the guidance of the Handbook, requirements of the approved WP, and the SAP. Annex A specifies the proposed values for field and laboratory activities to be conducted, specifications for field activities, information for sediment and soil samples, analytical methods, parameters for analysis, estimated number of analyses for water/sediment/soil samples, required analytical methods, estimated number of analyses for all core samples, estimated number soil gas analyses for each parameter, and field QC sample requirements for soil and water samples for costing purposes only.

1.4.6 **Fact Sheets.** As required by the base IRP Program, prepare and submit fact sheets which facilitate the public's understanding of the IRP Program. These sheets should include key community concerns regarding sites as specified by the base. Use the format agreed to by the base and RTC. Print and distribute the fact sheets as agreed to by the RTC. Assume a maximum of two (2) fact sheets (Sequence no. 3).

1.4.7 **Public Notices.** In accordance with paragraph 1.3.6.2, prepare and submit public notices for the Fairbanks and local newspapers. Use the format agreed to by the base and RTC (Sequence no. 3).

1.4.8 **Photo Notebook.** In accordance with paragraph 1.3.6.3, develop a photo notebbok which focuses on the overall base IRP Program. Prior to implementation, submit a conceptual layout of the notebook for review by the base and RTC (Sequence no. 9).

1.4.9 **Mailing List.** In accordance with the base Community Relations coordinator and paragraph 1.3.6.4, update the existing mailing list on a quarterly basis (Sequence no. 3).

1.4.10 **Maps.** In accordance with the base community Relations coordinator and paragraph 1.3.6.5, prepare presentation quality maps.

1.4.11 **Information Repository/Administrative Records.** Submit the Information Repository and Administrative Records in accordance with Air Force Guidance and in concurrance with the COR and the base Community Relations Coordinator. (sequence no. 4, para 6.1)

1.4.12 **Data Management.** The contractor shall meet the data deliverable requirements of the Installation Restoration Program Information Management System (IRPIMS). The contractor shall be responsible for recording field and laboratory data into a computerized format as required by the most current version of the IRPIMS Data Loading Handbook (mailed under separate cover). In order to perform this task, the contractor shall use the IRPIMS Quality Control Tool (QC Tool) and PC software utility (mailed under separate cover with software manual) to quality check ASCII data files and to check all data files for compliance with requirements in the IRPIMS Data Loading Handbook. Upon request, the IRPIMS Contractor Data Loading Tool (CDLT) is available. This PC software is designed to assist the contractor in preparing the various ASCII data files.

Individual IRPIMS data files (e.g., analytical results, groundwater level data, etc.), including resubmissions, shall be delivered with a transmittal letter by the contractor to the Air Force Center for Environmental Excellence (AFCEE) in sequence according to a controlled time schedule as identified in the current version of the IRPIMS Data Loading Handbook. The contractor shall include a copy of the Quality Control Tool error report, i.e., output from the QC tool, for each IRPIMS file submission. The error report shall be submitted both in hard copy and as an electronic file on the submission disks with the filename of the error report identified in the transmittal letter (SEQUENCE No. 3).

All contractor data deliverables shall be sent to:

AFCEE/ESD BLDG 624W
ENVIRONMENTAL RESTORATION DIVISION
ATTN: IRPIMS Data Management
Brooks AFB, TX 78235-5000

In addition, the contractor shall provide a copy of the transmittal letter to the Air Force contracting office responsible for the contract, HSC/PKV (Brooks AFB, TX, 78235-5000) for AFCEE contracts. This letter shall identify the files included or otherwise omitted (with an appropriate explanation), the Government contract and delivery order number, and the Air Force POC that is responsible for monitoring the Government contract.

The contractor shall be responsible for the accuracy and completeness of all data submitted. All data entered into the IRPIMS data files and submitted by the contractor shall correspond exactly with the data contained in the original laboratory reports and other documents associated with sampling and laboratory contractual tasks.

Each file delivered by the contractor will be electronically evaluated by AFCEE/ESD for format compliance and data integrity in order to verify acceptance. All files delivered by the contractor are required to be error-free and in compliance with the IRPIMS Data Loading Handbook. Any errors identified by AFCEE/ESD in the submission shall be corrected by the contractor.

1.4.13 **Decision Document.** The contractor shall prepare and submit DD as described in Section 1.3.11 (SEQUENCE No. 4, para 6.1).

1.4.14 **Technical Reports.** Summarize the findings of the tasks pursuant to the SOW, integrate them with the results of all pertinent previous studies, and formulate conclusions and recommendations for future efforts in Technical Reports.

1.4.14.1. **Remedial Investigation (RI) Report** (para 1.3.3). Provide a RI Report following the format in section 4 of the Handbook (sequence 4, para 6.1).

1.4.14.2. **Risk Assessment (RA) Report** (para 1.3.3.7). Provide a RA Report following the format in section 4 of the Handbook (sequence 4, para 6.1).

1.4.14.3 **Feasibility Study Report** (para 1.3.4). Provide a Feadsibility Study Report foillowing the format in section 4.0 of the Handbook. (sequence 4, para 6.1).

1.4.14.4 **RI/FS Technical Report** (para 1.3.3). Provide a RI/FS Technical Report following the format in section 4.0 of the Handbook. The RI/FS Technical Report shall integrate the RI, RA, and FS reports. Provide two microfiche copies with the final RI/FS Technical Report (sequence 4, para 6.1).

1.4.15 **Basewide Comprehensive IRP Document.** The contractor shall develop a comprehensive document that summarizes both the historic and projected IRP activities. This document shall be used as managment tool to efficiently guide future IRP activities at the DEW Line Sites and Cape Lisburne AFS. The contractor shall follow the outline developed by the AFCEE RTC. Assume two (2) updates (sequence no. 4)

1.4.16 **Analytical Data ITIR.** Prepare and submit the following ITIR's:

a. Development & Screening of Alternatives (para. 1.3.10.1). Submit the results of the development and screening of alternatives in an ITIR prepared in compliance with section 3 of the Handbook (sequence 3, para 6.1)

b. Detailed Screening of Alternatives (para 1.3.10.2).

c. DPM Scoring (para 1.3.9.8). Provide scores, a summary of procedures and assumptions, and Automated DPM output tables for all sites scored with DPM (sequence 3, para 6.1).

d. Mylar® Map. Construct Radar Stations' maps of Mylar using guidelines in section 3 of the Handbook. The Maps shall contain all sites and related water and sediment sampling locations (sequence no.3, para. 6.1). The contractor shall create and update digitized map files. Use the digitized data file to produce the Mylar map. The contractor shall print the revision date on the Mylar maps and the date shall be encoded in the digitized data file. Provide a copy of the revised digitized data file to AFCEE-ESO/ER (sequence 1, para. 6.2).

e. Geophysical Survey Contour Map (para 1.3.9.2). Provide a contour map showing geophysical survey results. Interpret the significance of the data in the R&D Status Report (sequence 3, para 6.1).

f. Soil Gas Map (para 1.3.9.5). Provide site maps showing soil gas data superimposed on the sampling locations and incorporate soil gas data generated by the 11 CEOS/CEOR. Interpret the significance of the data in the R&D Status Report (sequence 3, para 6.1).

g. Site Characterization Summary Informal Technical Information Report (SCS ITIR). The contractor shall prepare the report to include the following components:

1. Source identification and contaminant delineation.

2. Identification and ranking of appropriate treatability studies for the listed sites.

3. Data and interpretations integrating the findings of the current study and all previous RI efforts at the sites.

4. Current isoconcentration plots of contaminants detected at each site, lithologic logs of each boring showing contaminants detected and relationship to other borings in the site, and cross-sections of the site showing contaminant distribution.

5. The contents and objectives of a Site Characterization Summary Informal Technical Information Report (ITIR) are specified in the Handbook. The Site Characterization Summary ITIR shall serve as a core document for the RI report. The contractor shall submit an annotated outline of each section of the ITIR for approval by the TPM prior to preparation of the report itself. The contractor shall prepare the report as specified in the accepted annotated outline. The contractor shall submit newly revised portions of the working draft ITIR in order to make available current site characterization data. A prime objective shall be to minimize the volume of comments on the working draft and final submittals by incorporating comments into the report in an on-going manner. The final summary shall contain all sites included in this effort (Sequence No. 4).

h. Weekly Field Activities Report (para 1.3.13). Transmit a Weekly field activities report during field activities pursuant to a format developed by the AFCEE RTC. (Seqence 4, para 6.1)

II. Site Location and Dates

Dew Line Sites and Cape Lisburne, date to be established.

III. Base Support The base will:

3.1 Provide the contractor with existing engineering plans, drawings, diagrams, aerial photographs, digitized map files, etc., to facilitate evaluation of IRP sites under investigation.

3.2 Arrange for personnel identification badges, vehicles passes, and/or entry permits with the contention the contractor will provide necessary information to the base personnel no less than four weeks before needed.

3.3 Provide the contractor with all previously approved documents which provide information on all IRP efforts conducted at Dew Line Sites and Cape Lisburne and will aid in the determination of the amount of field work and analyses which need to be conducted.

IV. Government Furnished Property

See above in section III.

V. Government Points of Contact:

5.1 MAJCOM Coordinator

Major James R. Williams III
AFCEE/ESRU
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5243
DSN 240-5243
(210) 536-9026 FAX
DSN 240-9026

5.2 Restoration Team Chief

Mr. Michael F. McGhee
AFCEE/ESRU
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5293
DSN 240-5293
(210) 536-9026 FAX
DSN 240-9026

5.3 Base Point of Contact (POC)

Mr. Jim Wolfe
11 CEOS/CEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

5.4 Public Affairs Coordinator

Ms. Wende Wolf
11 CEOS/DEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

VI. Deliverables

6.1 Attachment 1 of the Basic Contract

Sequence numbers 1 and 5 listed in attachment 1 to the basic contract apply to all orders. Guidance for preparing R&D Status Reports (sequence 1) is contained in the Handbook, section 4. In addition, the sequence numbers and dates listed below are applicable to this order:

Sequence No.	Para No.	Block 10 (freq.)	Block 11 (as of date)	Block 12 (date of 1st. submit.)	Block 13 (date of final report)	Block 14 (no. of copies)
3 (NETWORK ANALYSIS)	I.1.4.1a	QTRLY	12APR93	30APR93	a	4
4 (WORK PLAN)	I.1.4.1b	ONE/R	12APR93	30MAY93	30JULY93	b
4 (SAP)	I.1.1.4c	ONE/R	12APR93	30MAY93	30JULY93	b
4 (HSP)	I.1.4.1d	OTIME	12APR93	30MAY93	-	10
4 (COMM. REL. PLAN)	I.1.1.4e	ONE/R	12APR93	30MAY93	31DEC93	b
16 (SPECIAL NOTIF.)	I.1.4.2	OTIME	c	c	-	3
9 (PRESNT. MATERIAL)	I.1.4.3	ASREQ	d	d	-	10
18 (MTG. RPTS)	I.1.4.4	ONE/R	e	e	-	5
3 (NEWSLETTER)	I.1.4.5	QTRLY	12APR93	30NOV93	a	f
3 (FACT SHEETS)	I.1.4.6	ASREQ	12APR93	15JUL93	g	-
3 (PUBLIC NOTICES)	I.1.4.7	ASREQ	12APR93	15JUL93	g	h
9 (PHOTO NOTEBOOK)	I.1.4.8	OTIME	12APR93	15JUL93	-	1
3 (MAILING LIST)	I.1.4.9	QTRLY	12APR93	15JUL93	a	-
3 (MAPS)	I.1.4.10	OTIME	12APR93	15JUL93	-	2
4 INFO REPOS	I.1.4.11	OTIME	31JUL93	-	31JAN94	2
3 (IRPMS Data ITIR) (Data Management) BCHCON BCHLDI BCHSLI BCHWCI BCHSAMP BCHCALC BCHLTD BCHTEST BCHRES BCHGWD	I.1.4.12	OTIME	31JUL93	31JAN94	31MAR94	2
4 DECISION DOC	I.1.4.13	ONE/R	i	i	31OCT94	b
4 RI REPORT	I.1.4.14.1	ONE/R	15SEP93	15FEB94	30APR94	b
4 RISK ASSESSMENT	I.1.4.14.2	ONE/R	1OCT93	16MAY94	15JUL94	b
4 FEASIB. STUDY	I.1.4.14.3	ONE/R	30SEPT93	30AUG94	-	b
4 RI/FS Report	I.1.4.14.4	ONE/R	30SEP93	30SEP94	1JAN95	b
4 IRP DOCUMENT	I.14.15	ONE/R	31JUL93	31OCT93	10DEC93	b
3 SCREENING ALTER ITIR	I.1.4.16a	OTIME	30SEP93	30DEC93	-	10
3 DETAL ANALYSIS ALTER ITIR	I..1.4.16.b	OTIME	28 FEB94	30MAR94	-	10
1 DPM SCORING	I.1.4.16c	OTIME	30SEP93	j	j	3
3 MYLAR MAP	I.1.4.16d	OTIME	k	k	-	5
3 GEOPHYS CONT	I.1.4.16.e	OTIME	l	l	-	10
3 SOIL GAS MAP	I.1.4.16f	OTIME	l	l	-	10
4 SCS ITIR	I.1.4.16g	ONE/R	15SEP93	30NOV93	15FEB94	5
4 WEEKLY ACT REP	I.1.4.16h	WEEKLY	13AUG93	13AUG93	-	1

6.2 Reserved.

6.3 Notes

a. Submit Quarterly Thereafter.

b. One (1) first draft plan (8 copies), one (1) second draft plan (8 copies), and one (1) final plan (10 copies) are required. Incorporate Air Force comments into the second draft and final plan as specified by the RTC. Supply AFCEE/ESR with an advance copy of the first draft, second draft, and

final plan for acceptance prior to distribution. Distribute the remaining copies of each plan as specified by the RTC. The second and final reports shall be submitted within three (3) weeks of receipt of comments from the RTC.

c. Primary and Secondary Documents. One first draft report (25 copies), one second draft report (25 copies), and one final report (35 bound copies plus the original camera-ready copy and a 3.5 inch disk formatted in WordPerfect 5.1 containing the document file) are required. Incorporate Air Force comments into the second draft and final reports as specified by the RTC. Supply the RTC with an advance copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute the remaining copies as specified by the RTC .

d. Provide written notice with supporting documentation within three (3) days of telephone notification and at the direction of the RTC. Assume a maximum of 100 pages.

e. Provide within one (1) week of task/meeting completion.

f. Provide 500 copies of the Newsletters and distribute as agreed to by the RTC. This includes mailing the final product to on-base personnel and addresses on the existing mailing list.

g. Provide draft and final deliverables. Provide two advance copies to the AFCEE RTC and to the 11 CEOS Community Relations Coordinator for acceptance prior to preparation of the final deliverables.

h. Provide poster-size map.

i. Submit with the second draft Technical Report

j. Submit with the Technical Report

k. Provide with the Technical Report

l. Provide within four (4) weeks of task completion

ANNEX-A, TABLE A-1
SUMMARY OF ESTIMATED FIELD WORK
FOR COST-ESTIMATING PURPOSES ONLY

Estimated Number of Monitor Wells to be Constructed	5
Estimated Footage of Monitor Wells	100
Estimated Number of Water Samples for Lab Analysis	339
Estimated Number of Surface and Subsurface Soil Sampling	1350
Estimated Number of Soil Samples from Augerings	1350
Estimated Number of Containerized Waste Samples	40
Estimated Number of Disposal Water Samples	5
Estimated Number of Sludge Samples	5
Estimated Number of Wipe Samples	3
Estimated Number of Geophysical Surveys	3
Estimated Total Number of Survey Days	20
Estimated Number of Soil Gas Survey Days	20

Annex-A, Table A-2
Analytical METHODS AND ESTIMATED TOTAL NUMBER OF SOIL ANALYSES
(for Cost Estimating Purposes Only)

	analytical method (a)	Reporting Units	Number of Analyses	Trip Blanks	Amb. Cond Blanks	Equipment Blanks	Dup/Rep	Second Column(b)	Total Analyses
Petroleum Hydrocarbon (Gasoline Range Organics)	SW3050/SW8015 (mod)	mg/Kg	400	20	20	20	40	-	500
Petroleum Hydrocarbon (Diesel Range Organics)	SW3050/SW8015 (mod)	mg/Kg	400			20	40	-	460
ICP Screen (23 Metals, exclude Boron and Silica)	SW3050/SW6010	mg/Kg	100	-		6	10	-	116
Arsenic	SW3050/SW7060	mg/Kg	-			-	-	-	0
Lead	SW3050/SW7421	mg/Kg	-	-		-	-	-	0
Mercury	SW7471	mg/Kg	-	-		-	-	-	0
Selenium	SW3050/SW7740	mg/Kg	-	-		-	-	-	0
Organochlorine Pesticides and PCBs	SW3540/SW8080	mg/Kg	500	-		20	50	250	820
Volatile Organic Compounds	SW8240	mg/Kg	72	8	8	4	7	36	135
Semivolatile Organic Compounds	SW3540/SW8270	mg/Kg	100	-		10	10	-	120
Polynuclear Aromatic Hydrocarbons	SW3540/SW8310	mg/Kg	-	-		-	-	-	0
Volatile Organic Compounds	SW5030/SW8010	mg/kg	-	-		-	-	-	0
Volatile Organic Compounds	SW5030/SW8020	mg/kg	-	-		-	-	-	0
Volatile Organic Compounds	SW5030/SW8260	mg/kg	-	-		-	-	-	0
Total Organic Compounds	SW5030/SW9060	mg/kg	88	-		-	4	8	100
Cyanide, Total	SW9010	mg/Kg	-	-		-	-	-	0
Toxic Characteristic Leaching Procedures (TCLP)	SW1311	mg/L	40	-	-	-	-	-	40
Soil Moisture Content	ASTM D2216	Percent (%)	650	-		-	-	-	650
Soil PH	SW9045		650	-		-	-	-	650
Sulfer Cleanup/Florisil Cleanup	SW3660/SW3620		-	-	-	-	-	-	0
Gel-Permeation Cleanup	SW3640		-	-	-	-	-	-	0
Total Analyses			**3000**	**28**	**28**	**80**	**161**	**294**	**3591**

Annex A, TABLE A-3
Analytical Methods and Estimated Total Number of Water Analyses
(For Cost Estimating Purposes Only)

	analytical method (a)	Reporting Units	Number of Analyses	Trip Blanks	Amb Cond Blanks	Equipment Blanks	Dup/Rep	Second Column(b)	Total Analyses
Alkalinity-Carbonate, Bicarbonate, & Hydroxide (field test)	A401	mg/L	10			-	1	-	11
Specific Conductance (field test)	E120.1	mg/L	10			-	1	-	11
pH (field test)	E150.1	µmhos/cm	15			-	2	-	17
Residue, Filterable (Total Dissoloved Solids)	E160.1	mg/L	80		-	3	8	-	91
Non-Filterable Residue (Total Suspended Solids)	E160.2	mg/L	80			-	8		88
Temperature (field test)	E170.1	deg C	200			-	-	-	200
Common Anions (Chloride, Fluoride, Sulfate)	E325.1	mg/L	-		-	-	-	-	0
Nitrogen, Nitrate+nitrite	E353.2	mg/L	-		-	-	-	-	0
ICP Screen (23 metals, exclude Boron and Silica)	SW3005/SW6010	mg/L	100		-	7	25	-	132
Arsenic	SW7060	mg/L	-		-	-	-	-	0
Lead	SW3005/SW7421	mg/L	100		-	2	10	-	112
Mercury	SW7470	mg/L	-		-	-	-	-	0
Selenium	SW7740	mg/L	-		-	-	-	-	0
Petroleum Hydrocarbons (Gasoline Range Organics)	SW5030/SW8015 (mod.)	mg/L	150	10	10	5	35	-	210
Petroleum Hydrocarbons (Diesel Range Organics)	SW5030/SW8015 (mod.)	mg/L	150		-	5	35	-	190
Purgeable Halocarbons	SW5030/SW8010	µg/L	150	8	8	4	25	75	270
Nonhalogenated Volatile Organics	SW5030/SW8015	µg/L	150	8	8	4	25	125	320
Purgeable Aromatics	SW5030/SW8020	µg/L	150	8	8	4	25	125	320
Organochlorine Pesticides and PCBs	SW3510/SW8080	µg/L	166	-	-	3	17	83	269
Semivolatile Organic Compounds	SW3510/SW8270	µg/L	150		-	4	15	-	169
Polynuclear Aromatic Hydrocarbons	SW3510/SW8310	µg/L	150		-	4	15	-	169
Volatile Organic Compounds	SW3510/SW8260	µg/L	-		-	-	-	-	0
Volatile Organic Compounds	SW3510/SW8240	µg/L	150	8	8	4	25	125	320
Total Organic Compounds	SW9060	µg/L	80			4	10		94
Total Petroleum Hydrocarbon (WTPH-HCID)	E418.1	mg/L	-	-	-	-	-	-	0
Sulfur Cleanup/Florisil Column Cleanup	SW3660/SW3620	-	-	-		-	-	-	0
Gel-Permeation Cleanup	SW3640	-	-	-		-	-	-	0
COLUMN TOTALS			2041	42	42	53	282	533	2993

Notes:

a Unless an abbreviated list of analytes is specified under "Parameter" above, the analytical protocol shall include all analytes listed in the referenced analytical method. The methods cited are from the following sources:

"A" Methods	Standard Methods for the Examination of Water and Wastewater, 16th Edition (1985)
"E" Methods	Methods for Chemical Analysis of Water and Wastes, EPA Manual, 600/4-79-020 (USEPA, 1983--with additions)
"SW" Methods	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (USEPA, 1986)
"ASTM" Methods	American Society for Testing and Materials, 1919 Race treet, Philadelphia, PA 19103

b The maximum number of second-column confirmation analyses shall not exceed fifty (50) percent of the actual number of field samples (to include duplicates, replicates, ambient, condition blanks, trip blanks, and equipment blanks). If the number of samples requiring second-column confirmation exceeds this allowance, contact the HSD Technical Project Manager. The total number of samples listed in Tables A-4 and A-5 includes the allowance applicable to each GC method. IF GC/MS, or a combination of second-column GC and GC/MS, is used, the total cost of all such analyses for a particular parameter shall not exceed the funding allowed for positive confirmation using only second-column GC.

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 2

2. PROC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. SCC/DMS RATING
F33615-90-D-4010	002203	94 FEB 15	FY7624-94-08235	

7. ISSUED BY CODE FA8900

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIAL COMMAND
HUMAN SYSTEMS CENTER/PK
8005 9TH STREET
BROOKS AFB, TX 78235-5353
Buyer: EDWIN CUSTODIO/PKVBA
Phone: (210)536-4493

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A

DCMAO, BALTIMORE
ATTN: CHESAPEAKE
200 TOWNSONTOWN BLVD, WEST
TOWNSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE

ICF TECHNOLOGY
9330 LEE HIGHWAY
FAIRFAX VA 22031-1207
COUNTY: FAIRFAX
PHONE: (703) 934-3000

IF "B" FOR MULTIPLE FACILITIES SEE SECT "K"

MAILING ADDRESS:
ICF TECHNOLOGY, INC
ATTN: CYNTHIA L. FALCE
FOUR GATEWAY CENTER 12TH FL.
PITTSBURGH PA 15222

ADVANCE COPY

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT

1 ST	%	DAYS	NET DAYS
2 ND	%	DAYS	OTHER IF "B"
3 RD	%	DAYS	SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT

MVH/M6V/MVH

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLITCITATIONS

☐ The above numbered solicitation is amended as set forth in Block 14.

The hour and date specified for receipt of Offer ☐ is extended ☐ is not extended

Offeror must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO _____ THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF _____ IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR52.253-3, CHANGES-TIME&MATLS OR LABOR HRS (AUG87)

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS *(Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)* SUBJECT: TIME EXTENSION AT NO INCREASE IN CEILING AMOUNT
PROJECT OFFICER: MICHAEL F. MCGHEE, AFCEE/ESR, BROOKS AFB, TX 78235-5328
FINANCE OFFICE: (SC1030) DFAS-COLUMBUS CENTER
ATTN:DFAS-CO/CHESAPEAKE DIV.
P.O.BOX 182264, COLUMBUS OHIO 43218-2264

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*
BY

20. NAME AND TITLE OF SIGNER *(Type or print)*

21. DATE SIGNED

22. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*
BY Gary J. MacDecy

23. NAME OF CONTRACTING OFFICER *(Type or print)*
GARY J. MACDECY

24. DATE SIGNED
94 FEB 17

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

1. Pursuant to the "Changes" Clause of Section I of the basic contract. The performance period and the final delivery schedule are changed from 15 Feb 94 (performance period) and 1 Jan 95 (final delivery schedule date) to 31 Dec 94. The ceiling amount of this delivery order will not be affected by this modification. This modification was generated by request of the contractor with no increase to the ceiling amount. contractor's letter dated 10 Feb 94 is incorporated to this document by reference.

ADVANCE COPY

REF 68X

CONTRACTOR COPY

68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 4

2. PROC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. BCC/DMS RATING
F33615-90-D-4010	002204	IL DATE	FY7624-94-08663	

7. ISSUED BY CODE FA8900

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER/PKVBC
8005 9TH STREET
BROOKS AFB TX 78235-5318
Buyer: BRENDA DILLARD, HSC/PKVBB
Phone: (210) 536-4503

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A

DCMAO BALTIMORE
ATTN: CHESAPEAKE
200 TOWSONTOWN BLVD, WEST
TOWSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE IF "0" FOR MULTIPLE FACILITIES SEE SECT "K"

ICF TECHNOLOGY
9330 LEE HIGHWAY
FAIRFAX VA 22031-1207

COUNTY: FAIRFAX
PHONE: (703) 934-3000

MAIL DATE
AUG 15 1994

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT
NONE

1 ST	%	DAYS	NET DAYS
2 ND	%	DAYS	OTHER IF "0"
3 RD	%	DAYS	SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT
MEC/M5E/MVT

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLITCITATIONS

☐ The above numbered solicitation is amended as set forth in block 17.

The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offeror must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO _____
THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF _____
IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR 52.243-3, CHANGES - TIME AND MATERIALS OR LABOR HOU

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS *(Except as provided herein, all items and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)* SUBJECT: REVISION TO STATEMENT OF WORK
PROJ MNGR: SAMER N. KARMI, AFCEE/ERDW, 8001 INNER CIRCLE, BROOKS AFB, TX
FINANCE OFFICE: (SC1030)DFAS COLUMBUS CENTER, ATTN: DFAS-CO/CHESAPEAKE DIV
PO BOX 182264, COLUMBUS OH 43218-2264

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*
BY

20. NAME AND TITLE OF SIGNER *(Type or print)*

21. DATE SIGNED

22. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*
BY William M Watts

23. NAME OF CONTRACTING OFFICER *(Type or print)*
WILLIAM M. WATTS

24. DATE SIGNED
15 AUG 94

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

1. Pursuant to the "Changes" Clause in Section I of the basic contract, the Statement of Work for Delivery Order 0022, dated 06 Jul 93 is superseded by the revised Statement of Work, dated 17 Jul 94. The subject delivery order ceiling amount is increased by $229,526.00.

2. As a result of paragraph 1 above, the said order is more specifically modified as set forth below:

a. SECTION A - Cover Page - The Not-to-Exceed amount in block 20 (cover page) is increased BY $229,526.00 from $3,299,352.00 to $3,528,878.00."

b. SECTION B - THE SCHEDULE

Item No	Supplies/Services	Quantity Purch Unit	Unit Price Total Item Amount
0001	CLIN Change sec class: U	1	N
		LO	N

noun: SAMPLING, ANALYSIS AND DATA
acrn: XA nsn: N
site codes: pqa: D acp: D fob: D
pr/mipr data: FY7624-94-08202, FY7624-93-08305, FY7624-94-08353, FY7624-94-08235, and FY7624-94-08663
type contract: Y

descriptive data:
Conduct work in accordance with the Statement of Work (SOW) of this order, dated 17 JUL 94 and Section C, The Description/Specifications of the Basic contract. Submit data in accordance with Attachment #1, the Contract Data Requirements List (CDRL) of the basic contract as implemented by paragraph VI of this order's SOW. This modification adds $83,590.00 to the price for CLIN 0001.

0002	CLIN Change sec class: U	1	N
		LO	N

noun: SAMPLING, ANALYSIS AND DATA
acrn: XA nsn: N
site codes: pqa: D acp: D fob: D
pr/mipr data: FY7624-94-08202, FY7624-93-08305, FY7624-94-08353, FY7624-94-08235, and FY7624-94-08663
type contract: Y

descriptive data:
Provide support in accordance with the Statement Work (SOW) of this order, dated 17 JUL 94 and Section C, The Description/Specification of the basic contract. This modification adds $128,148.00 to the price for CLIN 0002.

SECTION B - THE SCHEDULE (Cont'd)

Item No	Supplies/Services	Quantity Purch Unit	Unit Price Total Item Amount
0004	CLIN Change sec class: U	1 LO	N N

noun: CHEMICAL ANALYSES
acrn: XA nsn: N
site codes: pqa: D acp: D fob: D
pr/mipr data: FY7624-94-08353, FY7624-94-08235, and FY7624-94-08663
type contract: Y

descriptive data:
This modification adds $17,788.00 to the price for CLIN 0004.

c. SECTION C - Description/Specs - The SOW for this order entitled "Installation Restoration Program Remedial Investigation/Feasibility Study, Distant Early Warning (DEW) Line Sites and Cape Lisburne AFS, AK", dated 17 Jul 94 is attached hereto as Attachment #1 to this modification.

d. SECTION F - Supplies Schedule Data - The delivery schedule is modified as set forth below:

Item No	Supplies Schedule Data	Delivery Schedule Quantity	Date
0001	CLIN Del Sch Change sec class: U acrn: XA ship to: U	1	95APR01
0002	CLIN Del Sch Change sec class: U acrn: XA ship to: U	1	95APR01
0004	CLIN Del Sch Establish sec class: U acrn: XA ship to: U	1	95APR01

e. SECTION G - Accounting Classification Data:

ACRN	Acct Class data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification	Obligation Amount
AC	ACCOUNT ESTABLISH UNCLASSIFIED	5743400 F74400 304 7431 434419 040000 53440 000000 674400	$229,526.00+
	pr/mipr data: FY7624-94-08663		
XA	SPECIAL ACRN CHANGE UNCLASSIFIED		

descriptive data:
Special ACRN XA funds CLINs 0001, 0002, and 0004 and includes the following:

AA:$ 299,855.00
AB:$ 99,986.00 (mod 0022,01)
:$2,899,511.00 (mod 0022,02)
AC:$ 229,526.00 (mod 0022-04)
TOTAL $3,528,878.00

FINANCE OFFICER: Pay funds in alphabetical order.

3. All other terms and conditions remain unchanged.

1994 JUL 17 ~~1993 JUL 6~~

STATEMENT OF WORK
INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

~~STAGE 1~~

DISTANT EARLY WARNING (DEW) LINE SITES and CAPE LISBURNE AFS, AK

I. DESCRIPTION OF WORK

1.1 Scope

1.1.1 **Background.** The objective of the Air Force Installation Restoration Program (IRP) is to assess past hazardous waste disposal and spill sites on Air Force installations and develop remedial actions consistent with the National Contingency Plan (NCP) for those sites which pose a threat to human health and welfare or the environment. This objective is achieved through a Remedial Investigation Feasibility Study (RI/FS) process in which conclusions and recommendations drawn from accurate and validated data are used to structure and guide subsequent activities.

The RI/FS process includes scoping to define data requirements and objectives, a remedial investigation to characterize sites for a baseline risk assessment, and a feasibility study to define and evaluate alternative remedial actions so that a recommended action may be selected. Each of these steps of the RI/FS process can be conducted in stages that focus on particular aspects of the process.

The Contractor shall accomplish the actions described in this Statement of Work (SOW) to complete the RI/FS process at the following seven Dew Line Sites and Cape Lisburne:

Barter Island AFS (BAR-M); Bullen Point AFS (POW-3); Point Lonely AFS (POW-1); Point Barrow AFS (POW-M); Point Lay AFS (LIZ-2); Wainwright AFS (LIZ-3); and Oliktok Point AFS (POW-2).

1.1.2 **Requirements for Project Activities.** ~~The Installation Restoration Program (IRP) Handbook referenced in this Statement of Work provides requirements for laboratory and field activities and applicable formats for project documents that shall be used by the Contractor. Volume 1 of the Handbook dated May 1992 is provided under separate cover. This document is referenced in this Statement of Work as the Handbook.~~ The Handbook to Support the Installation Restoration Program (IRP) Statements of Work, dated September 1993, referred to in this SOW as "The Handbook," is provided under separate cover as general guidance only. Any reference within the Handbook language regarding compliance and/or formats for reports as a requirement of this Delivery Order shall be considered deleted. If a conflict is identified between this general guidance and any OSWER, U.S. Environmental Protection Agency (EPA), or other regulatory guidance or requirements, the Handbook shall be disregarded. Also, references to requirements for approval for deviations throughout the Handbook shall be considered invalid. Finally, the Method Detection Limits (MDLs) identified in the Handbook are a consolidation of numerous CFR documents which incorporate current EPA requirements. However, the Contractor shall be responsible for any updates in the CFR. The Contractor is responsible for the thorough knowledge and understanding of the previous findings and recommendations that affect this

task prior to the start of field activities. The documents involved include but are not limited to the IRP Phase I Records Search, and the IRP Phase II plans and reports addressing the Dew Line Sites and Cape Lisburne.

1.1.3 **Meetings.** ~~A maximum of two (2) Contractor personnel, including the project leader, shall attend eight (8) meetings at Elmendorf AFB, AK. Each meeting shall be two (2) 8-hour workdays in duration.~~ All meetings shall be coordinated by the Restoration Team Chief (RTC).

1.1.4 **Special Notifications.** The Contractor shall immediately report to the RTC via telephone, any data or results generated during this investigation which may indicate an imminent health risk. Following this telephone notification, a written notice shall be prepared and delivered within three (3) days. This notification shall include supporting documentation (sequence 16, para 6.1)

1.2 Project Scoping Documents

The purpose of the project scoping documents is to clearly and comprehensively define project activities prior to the initiation of field work. The Contractor shall prepare and submit the following project scoping documents for this task prior to the initiation of any field activities, removal actions, or laboratory analyses.

1.2.1 **Engineering Network Analysis.** Provide within ten (10) days after the issuance of an order a computer generated network analysis which is a detailed task plan for the RI/FS work efforts. The network analysis (GANTT) chart shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period of the delivery order. The network analysis (GANTT) shall show both serial and parallel subtasks leading to a deliverable product or report, and shall show early and late start and completion dates with float. The network analysis (GANTT) shall be updated and submitted quarterly (sequence 3, para 6.1).

1.2.2 **Work Plan.** This section will discuss the overall approach, (including a brief summary of the Conceptual Site Model and Data Quality Objectives), major tasks, scope, timeline, and major decision points. Due to the extreme remoteness of the Dew Line Sites and Cape Lisburne, the Contractor shall include a detailed plan for logistics and strategy to complete the RI/FS field activities. Follow the format specified in section 1 of the Handbook. In preparing the Work Plan, use previous reports and the information gathered during the literature search and presurvey along with experience at similar sites. Reevaluate the recommendations for Dew Line Sites and Cape Lisburne developed during previous IRP stages. The Contractor shall also prepare a draft and final addendum to the existing DEW Lines RI/FS work plan. The addendum shall detail the removal activities occurring at Cape Lisburne LRRS pursuant to paragraph I.1.3.14 of this SOW. (sequence 4, para 6.1).

1.2.3 **Sampling and Analysis Plan (SAP).** The SAP consists of a quality assurance plan (QAPP) and a Field Sampling Plan (FSP). Prepare a SAP describing how project activities will be accomplished in the format specified in section 1 of the Handbook. The Contractor shall also prepare a short addendum to this basic SAP which focuses on those sampling and analysis activities undertaken as part of the removal action specified in paragraph I.1.3.14 of this SOW. Incorporate review comments and obtain RTC concurrence prior to the start of field activities (sequence 4, para 6.1).

1.2.4 **Health and Safety Plan (HSP).** Provide a written Health and Safety Plan within eight (8) weeks after the issuance of an order. The Contractor shall also prepare an addendum to the existing DEW Lines RI/FS HSP, concerning removal activities conducted pursuant to paragraph 1.1.3.14 of this SOW. The Contractor shall comply with USAF, OSHA, EPA, state, and local health and safety regulations regarding the proposed work effort. Use EPA guidelines for designating the appropriate levels of protection needed at the study sites. The Health and Safety Plan shall provide no less protection than the protection contained in the manual entitled "Health and Safety Requirements for Employees Engaged in Field Activities" dated 1981 and the "Occupational Safety and Health Manual for Hazardous Waste Sites Activities" dated 1985 and 29 CFR 1910. Coordinate the Health and Safety Plan directly with applicable regulatory agencies prior to submittal to AFCEE/ESR. The Contractor shall certify to AFCEE/ESR that the Contractor has reviewed the coordinated Health and Safety Plan with each employee and also subcontractor's employees prior to the time each employee engages in field activities (sequence 4, para 6.1).

1.2.5 **Community Relations Plan.** The Contractor shall prepare a Community Relations Plan (CRP) for the DEW Line Sites and Cape Lisburne AFS outlining the specific public communications and involvement techniques to be used in coordination with remedial site activities (sequence 4, para 6.1). Follow the guidance contained in "Community Relations in Superfund, a Handbook", office of Solid Waste and Emergency Response (OSWER) Directive 9230.0-03C (EPA/540/R-92/009, January 1992, PB92-963341), and other applicable directives. Also, use as a guidance previously accomplished CRP from other installations in Alaska. Appropriately adapt such guidance to the local situation at the DEW Line Sites and Cape Lisburne. As described in OSWER Directive 9230.0-03C, the CRP shall include, but not be limited to, a description of the sites and the community, an overview of the community involvement to date, key community concerns regarding the site and AF site activities, and suggested community relations activities. A contact list of elected officials, agency representatives, and interested groups and individuals shall be included in appropriate copies of the plan. In addition, the plan will include suggested locations for meetings and information repositories. Contractor activities to develop the CRP shall include conducting a review of site information provided by the AF.

1.3 **Project Activities**

The Contractor shall conduct the following tasks to achieve the purposes stated herein, in compliance with approved scoping documents, the Handbook, and all applicable regulations and requirements.

1.3.1 **Community Relations.** Provide support to the base public affairs office for the tasks described below pertaining to the RI/FS Community Relations Program.

1.3.1.1 Public meetings and workshops. The Contractor shall be responsible for coordinating public meetings and workshops for all DEW Line Sites and Cape Lisburne AFS. This includes producing briefing scripts, slides and any associated products such as response cards and sign-in sheets. As requested by the base Community Relations office in coordination with the RTC, research and provide materials for public queries, news media queries, and news releases. Assume a maximum of one (1) workshop/meeting (Seq. nos. 3,9).

1.3.1.2 Public notices. As required by the base Community Relations office and the RTC, the Contractor shall prepare and publish public notices for the Fairbanks and local newspapers. The purpose of these notices is to inform the public of a meeting, workshop, or comment period in which they have the opportunity to be involved in the IRP Program at DEW Line Sites and Cape Lisburne AFS. Also, these notices may be utilized to inform the public of other pertinent program information such as quarterly notices of documents placed in the information repositories. The format for the notices shall be coordinated with the Community Relations office and RTC, and then submitted to the RTC for review prior to delivery to the base. Assume a maximum of two (2) notices (Seq. no. 3).

1.3.1.3 Photo Notebook. The Contractor shall develop a photo notebook which focuses on the overall IRP program at DEW Line Sites and Cape Lisburne AFS. The layout of the notebook will be coordinated with the public affairs office and RTC. Assume a maximum of one (1) update (Seq. no. 9).

1.3.1.4 Mailing List. In coordination with the base Community Relations office and the RTC, prepare and update the mailing list on a quarterly basis. Assume a maximum of two (2) updates (Seq. no. 3).

1.3.1.5 Maps. Prepare presentation quality maps of the installations and their sites to use in newsletters and to distribute to the public.

1.3.1.6 Information Repository/Administrative Record. Prepare a listing of all documents required for the Information Repository and Administrative Record. Create an Information Repository and Administrative Record. The Repository and Record will be maintained by the 11 CEOS/CEVR Community Relations Coordinator. Assume two locations for the Repository and Record, one in Anchorage and another in Elmendorf AFB, AK. Actual locations will be determined by the 11 CEOS/CEVR Community Relations Coordinator.

1.3.2 **Literature Search.** Conduct a literature search and analyze aerial photos of the DEW Line Sties to supplement existing information that has been collected. The purpose of the literature search is to complete the conceptual site model so that a numerical estimate of risk can be developed.

1.3.3 **Presurvey.** Within eight weeks of the issuance of an order, the Contractor shall visit the Dew Line Sites and Cape Lisburne to ensure complete understanding of site conditions. Coordinate this visit with the RTC and the 11 CEOS project manager. The Contractor shall look for evidence of contamination at each site visited (e.g., leaking drums, vegetative stress, leachate seeps). The Contractor shall observe the physical settings of each site visited to formulate specific recommendations concerning boring placement, use of geophysical techniques, and other aspects of the proposed field investigation. The findings of the presurvey shall be used to prepare the Work Plan, SAP, and HSP for the RI and to prepare scoping documents for the treatability study(ies). Assume one presurvey and one reconnaissance trip.

1.3.4 **Quality Assurance/Quality Control (QA/QC).** A QA/QC program shall be conducted and documented for all work pursuant to this delivery order. Contractor and project-specific documents concerning QA/QC procedures and requirements shall be strictly followed. Data generated under the QA/QC program shall be used by the Contractor for evaluating the analytical results and field records assembled for each site to identify accurate and validated data that may be used to assess risk, develop conceptual site models and evaluate alternatives.

1.3.5 **Conceptual Site Model.** Use all available RI/FS data supported by acceptable QA/QC results (as measured against QAPP requirements) and site characterization information to refine, based on newly collected data, the conceptual site model. The model shall define the nature and extent of contamination and the transport and fate of those contaminants. The minimum requirements of the model are given in section 2 of the Handbook. The complexity and detail of the site model shall be consistent with the nature of the site and site problems, and the amount of data available the conceptual site model shall be documented in the Work Plan.

1.3.6 **ARARs Evaluation.** The Contractor shall identify all Applicable or Relevant and Appropriate Requirements (ARAR). These ARARs will be documented in the Work Plan.

1.3.7 **Data Collection, Sampling, and Analysis Procedures.** The Contractor shall conduct field activities, sampling, laboratory analysis, and data quality assessment. Section 2 of the Handbook is recommended for the Contractor to follow. The Contractor shall conduct all activities in accordance with the WP and the SAP approved by the COR. The COR shall be notified in writing of any planned deviation from the activities specified in these documents. COR approval of deviations is required prior to performance. The Contractor shall ensure that all analyses and analytical methods' QA/QC requirements are being met at all times before and during the analysis of samples.

The field investigation (including all drilling and sampling operations) shall be supervised by a registered geologist, hydrogeologist, or professional engineer. If required by the state, the on-site field supervisor shall be certified by the state to install test wells. A detailed log of field conditions, materials penetrated during drilling, well completion, and sampling conditions, as described in Section 2 of the Handbook, shall be maintained and made available for Government inspection upon request. Decisions on well and boring locations, well depths, screened intervals, and all details of the field investigation shall be made by the COR, and the Contractor's field or project supervisor.

1.3.8 **Regulatory Requirements and Permits.** All well drilling, development , sampling, laboratory analysis, and other activities pursuant to this effort shall be conducted in strict accordance with all applicable federal and state laws, ordinances, rules and regulations, and all authorities with jurisdiction over such activities. The Contractor shall complete permits, applications, other documents, and proficiency tests required by the regulatory agencies. The Contractor shall file documents with appropriate agencies and pay all applicable permit and filing fees. The Contractor shall identify locations requiring permits to Radar Station Manager. The Contractor shall include all correspondence in appendices to the technical reports in accordance with Section 4 of the Handbook.

All laboratory analyses shall conform to all applicable federal, state, and local regulatory agency requirements. If the requirements specify that certification is necessary to conduct one or more specific analyses, the Contractor shall furnish documentation showing laboratory certification with the first set of analytical data supplied to AFCEE/ESR and the COR.

The Contractor shall containerize and sample materials suspected to be hazardous in accordance with applicable requirements, Guidance from the Handbook, and the approved Plans. The Contractor shall transport these containerized materials to a location within the installation boundary designated by the Radar Station Manager at a frequency specified by the

Station Manager. The Contractor shall handle, store, and/or dispose of potentially hazardous materials. The Contractor shall transport and empty containerized materials determined not to be hazardous to locations within the installation boundary identified by the Station Manager.

1.3.9 **Remedial Investigation (RI).** The Contractor shall conduct a RI to characterize environmental conditions; define the concentration, nature, and extent of contamination; and quantitatively estimate the risk to human health and the environment and study the area through the collection of geologic and hydrologic data, environmental samples, the laboratory analyses of those samples for potential contaminants, the evaluation of the analytical results and field measurements with respect to quality control data, and the interpretation and analysis of accurate and precise data. The purpose of data collection, sample collection, and laboratory analysis is to determine whether any contaminants generated from installation activities have entered the environment. The field investigation is used to determine the source of any identified contaminants, the magnitude of contamination relative to Applicable or Relevant and Appropriate Requirements (ARARs), and any naturally occurring or background concentrations for specific compounds. The RI shall comply with the specifications, procedures, and methodologies presented in the project-specific SAP. The COR must be notified in writing prior to any modification of or deviation from any activity described in these documents.

1.3.9.1 **Soil Borehole Drilling and Sampling and Well Installation and Sampling.** The Contractor shall drill and collect samples from boreholes as specified in the SAP. The Contractor shall evaluate the need to install, sample, and develop monitoring or extraction wells.

1.3.9.1.1 **Lithologic Samples.** The Contractor shall describe core samples at least every five (5) feet of drilling or at each change in lithology, whichever is less, to indicate significant changes in lithology of characteristic properties that relate to the strata penetrated. Any deviations shall be coordinated with the COR. Guidance for standard identification practices are found in the Handbook. The Contractor shall include in the field logbook observations made by the driller and rig geologist during drilling such as depth to water, penetration rate, drill rig behavior, and other observations that might be indicative of changes in formation characteristics. The Contractor shall record depth to permafrost in all the soil borings and shall not proceed beyond five (5) feet into the permafrost layer.

1.3.9.1.2 **Drill Cuttings and Drilling Fluids.** The Contractor shall containerize all drill cuttings and drilling fluids. All drill cuttings and drilling fluids shall be managed and disposed of in accordance with the project SAP. (Note: The Contractor shall be responsible for providing all necessary containers.) The Contractor shall be responsible for the logistics of the ultimate disposal of all drill fluids or drill cuttings deemed hazardous in accordance with current EPA off-site disposal policy and state and/or local hazardous waste disposal laws. The contractor shall coordinate with the Station Manager for on-site placement and disposal of all drill cuttings, fluids, purge fluid, and excavated material. If on-site disposal is excluded, all hazardous waste shall be transported by a permitted hazardous waste transporter to a licensed Resource Conservation and Recovery Act (RCRA) approved facility and be accompanied by a Uniform Hazardous Waste Manifest. The Contractor shall provide a final, completed copy of the hazardous waste manifest to the 11 CEOS/CEVR. The Radar Stations' hazardous waste managers will sign all hazardous waste manifest documents.

1.3.9.1.3 **Well/Boring Precautions.** The Contractor shall mark the field locations of all borings during the planning/mobilization phase of the field investigation. The Contractor shall consult with base personnel to minimize the disruption of base activities, to properly position wells with respect to site locations, and to avoid penetrating underground utilities. The Contractor shall obtain all permits prior to commencement of digging and drilling operations. The Contractor shall utilize a registered land surveyor in determining the elevations and locations of all off-base background study borings. All borings and wells from which samples are taken shall be surveyed by the Contractor for vertical and horizontal control. The Contractor shall record the positions on project and site specific maps. Bench marks used must have been previously established from and be traceable to a U. S. Coast and Geodetic Survey (USCGS) or U. S. Geological Survey (USGS) survey marker. Clearly identify all bench mark locations on the base map.

1.3.9.1.4 **Water-Level Measurements in Boreholes.** The Contractor shall measure water levels in all boreholes after the water level has stabilized. Include this information and the date of measurement in the boring logs. Also, record soil moisture conditions (moist, wet, saturated, etc.) in the boring log.

1.3.9.1.5 **Air Monitoring During Drilling.** The Contractor shall monitor the ambient air in the breathing zone above the borehole during all drilling with an appropriate organic vapor analyzer to identify potentially hazardous and/or toxic vapors. Include air monitoring results in borehole logs.

1.3.9.1.6 **Subsurface Soil Sampling.** The Contractor shall collect soil samples from borings as specified in the SAP. The SAP specifies the analytical methods, the parameters for analysis, and the estimated number of analyses for soil samples.

1.3.9.1.7 **Well Construction Requirements.** The Contractor shall coordinate with the COR to determine well completion requirements (flush or projected above ground surface). All wells shall be secured as soon as possible after drilling. The Contractor shall provide corrosion resistant locks for both flush and above-ground well assemblies. The locks shall be compatible with existing wells. The Contractor shall turn the lock keys over to 11 CEOS/CEVR POC following completion of the field effort. The Contractor shall coordinate with the 11 CEOS/CEVR POC, the RTC, and the COR the selection of exact well and screen placement, gravel pack design, and screen slot size.

1.3.9.1.8 **Well Logs.** For each well, the Contractor shall prepare a well completion log and schematic diagram showing well construction details. Lithologic descriptions, well elevation survey data, and other information included in the well logs shall conform to the specifications of the SAP.

1.3.9.1.9 **Well Development.** The contractor shall develop each well as soon as possible. Guidance for well development procedures are found in the Handbook. The Contractor shall measure the rate of water production, pH, specific conductance, and water temperature during well development.

1.3.9.1.10 **Well Placement.** The Contractor shall avoid installing wells in depressions or areas subject to frequent flooding and/or standing water. If wells must be installed in such areas, the Contractor shall design the wells so standing water does not leak into the top of the casing or cascade down the annular space.

1.3.9.1.11 **Well and Borehole Clean-up.** The Contractor shall clean the area following the completion of each well and borehole. The Contractor shall return all sites to the original condition of the site.

1.3.9.1.12 **Groundwater and Surface Water Sampling.** The Contractor shall collect groundwater and Surface Water samples from newly developed well and existing wells and from surface water bodies. The SAP shall specify the analytical methods, the parameters for analysis, and the estimated number of analyses for groundwater and surface water samples.

1.3.9.1.13 **Composite Sampling.** The Contractor shall collect and analyze drill cuttings, fluids, purge fluids, and excavated material. The SAP shall specify the analytical methods, the parameters for analysis, and the estimated number of analyses for composite samples.

1.3.9.2 **Geophysical Surveys.** The Contractor shall evaluate whether geophysical surveys are needed (e.g., to determine boundaries of landfills, to locate underground debris, utilities and storage tanks). Where geophysical surveys are appropriate, the Contractor shall select a geophysical survey technique or techniques [such as ground penetrating radar (GPR), magnetometer or electromagnetic surveys (EM)] that will best meet the desired application. The technique(s) used shall be approved by the RTC prior to use. Approximate number of surveying days is included in Annex A which is to be used for costing purposes only. Appropriate grid systems shall be established and the Contractor shall use the results of this survey to prepare a contour map of the results. Provide this map as an attachment to the first R&D Status Report submitted after the completion of the geophysical surveys. The Contractor shall perform the geophysical surveys before drilling and use the results in selecting the location of soil borings, wells, test pits, if necessary.

1.3.9.3 **Permeability Testing.** The Contractor shall determine the need for a permeability test at Cape Lisburne AFS, to provide additional data on the hydrogeologic characteristics of the water table aquifer. The SAP shall specify the method to be used for the permeability test.

1.3.9.4 **Water Level Measurement.** The Contractor shall evaluate the need for conducting a complete round of water level measurements in all existing and new wells at Cape Lisburne AFS at the beginning of field work and during the field sampling effort. Data gathered shall be used for interpreting groundwater flow directions and groundwater gradient.

1.3.9.5 **Soil Gas Surveys.** The Contractor shall evaluate the need for soil gas surveys and Hydropunch (e.g., to select soil boring locations). If soil gas surveys and hydropunch are included as part of the approved Work Plan and FSP, the Contractor shall establish appropriate grid systems. The Contractor shall prepare a posting map of soil gas values relative to their location on the grid used. Provide this map as an attachment to the first R&D Status Report submitted after completion of the soil gas survey (sequence 3, para 6.1). Approximate number of surveying days are included in Annex A which is to be used for costing purposes only.

1.3.9.6 **Groundwater Field Screening.** The Contractor shall perform groundwater field screening. The SAP shall specify the method, location, and type of groundwater field screening.

1.3.9.7 **Baseline Risk Assessment.** The Contractor shall use data supported by acceptable QA/QC results (as measured against QAPP requirements) and the conceptual site model to numerically estimate the risk posed by site contaminants to human health and the environment. The Contractor shall identify and list all ARARs for those contaminants detected in environmental

samples at the site. The Contractor shall provide all ARARs evaluations as an attachment to the Technical Report. Provide the results of the baseline risk assessment in the Technical Report using the formats in Section 4 of the Handbook as a guidance.

The Contractor shall identify those sites posing minimal or no threat to human health, welfare, or the environment and for which no further action is appropriate.

The Contractor shall use the results of the risk assessment in establishing remedial action objectives and developing remedial alternatives in the Feasibility Study.

1.3.9.8 **Defense Priority Model Scores.** The Contractor shall use the Defense Priority Model to score the sites. The score shall be included as an appendix to the RI/FS Technical Report.

1.3.9.9 **Fate and Transport.** The Contractor shall perform fate and transport modeling for contaminants of interest to include the projection of future contaminant concentrations within the boundaries of the site. This will be done in conjunction with the RI/FS report.

1.3.10 **Feasibility Study (FS).** The Contractor shall perform a FS concurrently with the RI. As much of the FS as possible shall be performed early in the RI/FS process and refined as additional RI data are obtained. The Contractor shall use the information from the RI and the baseline risk assessment to develop and evaluate remedial action alternatives for each site where a threat to human health or the environment exists. The Contractor shall follow the procedures specified in USEPA OSWER Directive 9355.3-01, "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA." The Contractor shall employ streamlining methods wherever possible and develop and evaluate the minimum number of alternatives needed to provide a range of promising treatment and containment actions. The Contractor shall eliminate impracticable alternatives from further consideration early in the FS process. The scope and level of detail shall be consistent with the nature and complexity of site problems.

1.3.10.1 **Develop and Screen Alternatives.** The Contractor shall establish remedial action objectives and remediation goals for protecting human health and the environment. These objectives and goals shall be determined based on identified ARARs and acceptable exposure levels as defined in the baseline risk assessment and refined throughout the RI/FS process. Identify general response actions and applicable technologies based on site and contaminant conditions, and combine technologies to formulate distinct alternatives. The Contractor shall develop alternatives which eliminate, control, and /or reduce risk to human health or the environment to acceptable levels for each pathway. Where a wide variety of promising alternatives exists, the Contractor shall screen the alternatives based on effectiveness, implementability, and cost. The Contractor shall detail the development and screening of the alternatives process and identify the alternatives selected for detailed analysis in the Informal Technical Information Report (ITIR).

1.3.10.2 **Detailed Screening of Alternatives.** The Contractor shall conduct a detailed analysis on each alternative selected and identified in the above step and approved by the COR. Using the methodology in OSWER Directive 9355.3-01, the Contractor shall evaluate each alternative against the nine criteria. In addition to the individual assessment, the Contractor shall perform a comparative analysis to determine the relative performance of alternatives. The Contractor shall focus the analysis on sub-factors and criteria most pertinent to each site and the scope and complexity of the

proposed action. Provide a summary of the Detailed Analysis of Alternatives in the R&D report submitted following task completion. Include summary tables of the individual and comparative analyses that will be used in the Technical Report.

1.3.11 **Decision Documents.** The Contractor shall prepare and submit Decision Documents (DD) following the Handbook Section 4.4 as guidance. The purpose of the DD is to support a remedial action alternative or a no further action alternative. The Contractor shall submit an Interim Decision Document detailing the removal action process, results and conclusions.

1.3.12 **Site Specific Requirements.** The Contractor shall perform the requirements listed in this SOW in conformance with the guidance of the Handbook, requirements of the approved WP, and the SAP. Annex A specifies the proposed values for field and laboratory activities to be conducted, specifications for field activities, information for sediment and soil samples, analytical methods, parameters for analysis, estimated number of analyses for water/sediment/soil samples, required analytical methods, estimated number of analyses for all core samples, estimated number soil gas analyses for each parameter, and field QC sample requirements for soil and water samples for costing purposes only.

1.3.13 **Weekly Field Activity Report**

The contractor shall transmit a Weekly field activity report. The reports shall include, but not be limited to, all field work detailed in this SOW, a listing of any problems encountered (e.g., equipment problems, equipment downtime), and actions taken to resolve those problems. ~~The AFCEE RTC shall develop the format for the report.~~

1.3.14 **Removal Actions**

The Contractor shall complete the following tasks to remove or otherwise control source contamination and further characterize site conditions at Cape Lisburne LRRS. The Contractor shall include any data generated during these activities in the pertinent reports.

1.3.14.1 **Task 1** involves placement of an interceptor trench (French drain) below Petroleum, Oil, and Lubricant (POL) Tanks 1 and 2 to capture spilled or leaked petroleum products which are currently migrating through the subsurface toward a nearby surface water body. Collected material shall drain to a sump for separation into its water and petroleum components. Accumulated water shall be treated using granulated activated carbon or appropriate vapor control technology, chemically analyzed for the presence of remaining contaminants, and subsequently, in coordination with Alaska Department of Environmental Conservation (ADEC), disposed of according to all applicable water regulations. Recovered petroleum product will be incinerated on-site, after coordination ADEC. Soils excavated to accommodate the trench may be returned to the surrounding land, provided that they are not considered hazardous under the RCRA "contained-in" policy. Soils which are deemed hazardous may be drummed and sent for off-site disposal according to applicable hazardous waste regulations, or may be stored on-site pending subsequent remedial activities.

1.3.14.2 **Task 2** requires the removal and off-site disposal of a sludge pile located at Landfill and Waste Accumulation Area Number 1. Using a backhoe provided by the base, the sludge pile shall be excavated,

containerized in 55-gallon drums, and transported to a disposal facility in the continental U.S. A temporary drum staging area shall be established nearby to store the drums until they are transported. Current plans may involve shipment of waste on the barge's return trip to Cape Lisburne. Prior to field operations on this task, a representative sample of the sludge must be collected and analyzed using TCLP and other characteristic methods to determine if the material is a hazardous waste. The sludge must be managed and disposed of according to the results of such analyses. After removal of the sludge, the excavated area must also be sampled and analyzed to detect any constituents remaining at the site.

1.3.14.3 **Task** 3 involves limited PCB sampling and analysis. The purpose of this task is twofold: to further characterize contamination in ocean sediments adjacent to Landfill and Waste Accumulation Area Number 1, and to locate a reported "hot spot" undiscovered during the 1993 RI/FS sampling program.

1.4 Project Deliverables

Deliver the following documents in compliance with the requirements of item VI, the formats required in section 1 and 4 of the Handbook, and the specifications noted below. Draft reports are considered "drafts" only because they have not been reviewed and approved by the Air Force. In all other respects, "drafts" shall be complete, in the proper format, fully illustrated, and free of grammatical and typographical errors.

1.4.1 Scoping Documents.

a. Engineering Network Analysis (GANTT) (para 1.2.1). Provide within ten (10) days after the issuance of an order. Update and submit quarterly (sequence 3, para 6.1).

b. Work Plan (para 1.2.2). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

c. Sampling and Analysis Plan (1.2.3). Use the format in section 1 of the Handbook (sequence 4, para 6.1).

d. Health and Safety Plan (para 1.2.4). Provide within six (6) weeks after the issuance of an order (sequence 4, para 6.1).

e. Community Relations Plan (para 1.2.5). Provide within eight (8) weeks after issuance of an order (sequence 4, para 6.1).

1.4.2 **Special Notification.** Provide written notification of imminent health hazards and supporting documentation within three (3) days of telephone notification (sequence 16, para 6.1).

1.4.3 **Presentation Materials.** The Contractor shall prepare and present up to two (2) presentation packages at meetings coordinated by the Air Force (sequence 9, para 6.1). Attendance of these meetings is included in paragraph 1.1.3 of this SOW. As part of the presentation materials, the Contractor shall provide paper copies of all slides and overheads.

1.4.4 **Meeting Summaries** (para 1.1.3). Provide no later than five (5) days after conclusion of each meeting (sequence 18, para 6.1).

1.4.5 **Newsletter.** Prepare and submit a quarterly newsletter which presents the status of the entire base IRP Program. This will include preparing an outline resulting from input by all Contractors involved in the program. The outline must be approved by the base and RTC prior to submittal of the newsletter. The final product will be printed and distributed as agreed to by the RTC. Assume a maximum of two (2) newsletters (Sequence no. 3).

1.4.6 **Fact Sheets.** As required by the base IRP Program, prepare and submit fact sheets which facilitate the public's understanding of the IRP Program. These sheets should include key community concerns regarding sites as specified by the base. Use the format agreed to by the base and RTC. Print and distribute the fact sheets as agreed to by the RTC. Assume a maximum of two (2) fact sheets (Sequence no. 3).

1.4.7 **Public Notices.** In accordance with paragraph 1.3.6.2, prepare and submit public notices for the Fairbanks and local newspapers. Use the format agreed to by the base and RTC (Sequence no. 3).

1.4.8 **Photo Notebook.** In accordance with paragraph 1.3.6.3, develop a photo notebook which focuses on the overall base IRP Program. The Contractor shall include photos of sites under investigation, field and removal activities, and sample locations. Photos shall reflect proper sampling techniques, QA/QC procedures, and Health and Safety reports during field activities. Prior to implementation, submit a conceptual layout of the notebook for review by the base and RTC (Sequence no. 9).

1.4.9 **Mailing List.** In accordance with the base Community Relations coordinator and paragraph 1.3.6.4, update the existing mailing list on a quarterly basis (Sequence no. 3).

1.4.10 **Maps.** In accordance with the base community Relations coordinator and paragraph 1.3.6.5, prepare presentation quality maps.

1.4.11 **Information Repository/Administrative Records.** Submit the Information Repository and Administrative Records in accordance with Air Force Guidance and in concurrence with the COR and the base Community Relations Coordinator. (sequence no. 4, para 6.1)

1.4.12 **Data Management.** The Contractor shall meet the data deliverable requirements of the Installation Restoration Program Information Management System (IRPIMS). The Contractor shall be responsible for recording field and laboratory data into a computerized format as required by the most current version of the IRPIMS Data Loading Handbook (mailed under separate cover). In order to perform this task, the Contractor shall use the IRPIMS Quality Control Tool (QC Tool) and PC software utility (mailed under separate cover with software manual) to quality check ASCII data files and to check all data files for compliance with requirements in the IRPIMS Data Loading Handbook. Upon request, the IRPIMS Contractor Data Loading Tool (CDLT) is available. This PC software is designed to assist the Contractor in preparing the various ASCII data files.

Individual IRPIMS data files (e.g., analytical results, groundwater level data, etc.), including resubmissions, shall be delivered with a transmittal letter by the Contractor to the Air Force Center for Environmental Excellence (AFCEE) in sequence according to a controlled time schedule as identified in the current version of the IRPIMS Data Loading Handbook. The Contractor shall include a copy of the Quality Control Tool error report, i.e., output from the QC tool, for each IRPIMS file submission. The error report shall be

submitted both in hard copy and as an electronic file on the submission disks with the filename of the error report identified in the transmittal letter (SEQUENCE No. 3).

All Contractor data deliverables shall be sent to:

AFCEE/ESD BLDG 624W
ENVIRONMENTAL RESTORATION DIVISION
ATTN: IRPIMS Data Management
Brooks AFB, TX 78235-5000

In addition, the Contractor shall provide a copy of the transmittal letter to the Air Force contracting office responsible for the contract, HSC/PKV (Brooks AFB, TX, 78235-5000) for AFCEE contracts. This letter shall identify the files included or otherwise omitted (with an appropriate explanation), the Government contract and delivery order number, and the Air Force POC that is responsible for monitoring the Government contract.

The Contractor shall be responsible for the accuracy and completeness of all data submitted. All data entered into the IRPIMS data files and submitted by the Contractor shall correspond exactly with the data contained in the original laboratory reports and other documents associated with sampling and laboratory contractual tasks.

Each file delivered by the Contractor will be electronically evaluated by AFCEE/ESD for format compliance and data integrity in order to verify acceptance. All files delivered by the Contractor are required to be error-free and in compliance with the IRPIMS Data Loading Handbook. Any errors identified by AFCEE/ESD in the submission shall be corrected by the Contractor.

1.4.13 **Decision Document.** The Contractor shall prepare and submit DD as described in Section 1.3.11 (SEQUENCE No. 4, para 6.1).

1.4.14 **Technical Reports.** Summarize the findings of the tasks pursuant to the SOW, integrate them with the results of all pertinent previous studies, and formulate conclusions and recommendations for future efforts in Technical Reports.

1.4.14.1. **Remedial Investigation (RI) Report** (para 1.3.3). Provide a RI Report following the format in section 4 of the Handbook (sequence 4, para 6.1).

1.4.14.2. **Risk Assessment (RA) Report** (para 1.3.3.7). Provide a RA Report following the format in section 4 of the Handbook (sequence 4, para 6.1).

1.4.14.3 **Feasibility Study Report** (para 1.3.4). Provide a Feasibility Study Report following the format in section 4.0 of the Handbook. (sequence 4, para 6.1).

1.4.14.4 **RI/FS Technical Report** (para 1.3.3). Provide a RI/FS Technical Report following the format in section 4.0 of the Handbook. The RI/FS Technical Report shall integrate the RI, RA, and FS reports. Provide two microfiche copies with the final RI/FS Technical Report (sequence 4, para 6.1).

1.4.15 **Basewide Comprehensive IRP Document.** The Contractor shall develop a comprehensive document that summarizes both the historic and projected IRP activities. This document shall be used as management tool to efficiently guide future IRP activities at the DEW Line Sites and Cape Lisburne AFS. The Contractor shall follow the outline developed by the AFCEE RTC. Assume two (2) updates (sequence no. 4)

1.4.16 **Analytical Data ITIR.** Prepare and submit the following ITIRs, as well as the Analytical Data ITIR itself:

a. Development & Screening of Alternatives (para. 1.3.10.1). Submit the results of the development and screening of alternatives in an ITIR prepared in compliance with section 3 of the Handbook (sequence 3, para 6.1)

b. Detailed Screening of Alternatives (para 1.3.10.2).

c. DPM Scoring (para 1.3.9.8). Provide scores, a summary of procedures and assumptions, and Automated DPM output tables for all sites scored with DPM (sequence 3, para 6.1).

d. Mylar® Map. Construct Radar Stations' maps of Mylar using guidelines in section 3 of the Handbook. The Maps shall contain all sites and related water and sediment sampling locations (sequence no. 3, para. 6.1). The Contractor shall create and update digitized map files. Use the digitized data file to produce the Mylar map. The Contractor shall print the revision date on the Mylar maps and the date shall be encoded in the digitized data file. Provide a copy of the revised digitized data file to AFCEE-ESO/ER (sequence 1, para. 6.2).

e. Geophysical Survey Contour Map (para 1.3.9.2). Provide a contour map showing geophysical survey results. Interpret the significance of the data in the R&D Status Report (sequence 3, para 6.1).

f. Soil Gas Map (para 1.3.9.5). Provide site maps showing soil gas data superimposed on the sampling locations and incorporate soil gas data generated by the 11 CEOS/CEOR. Interpret the significance of the data in the R&D Status Report (sequence 3, para 6.1).

g. Site Characterization Summary Informal Technical Information Report (SCS ITIR). The Contractor shall prepare the report to include the following components:

1. Source identification and contaminant delineation.

2. Identification and ranking of appropriate treatability studies for the listed sites.

3. Data and interpretations integrating the findings of the current study and all previous RI efforts at the sites.

4. Current isoconcentration plots of contaminants detected at each site, lithologic logs of each boring showing contaminants detected and relationship to other borings in the site, and cross-sections of the site showing contaminant distribution.

5. The contents and objectives of a Site Characterization Summary Informal Technical Information Report (ITIR) are specified in the Handbook. The Site Characterization Summary ITIR shall serve as a core document for the RI report. The Contractor shall submit an annotated outline of each section of the

ITIR for approval by the TPM prior to preparation of the report itself. The Contractor shall prepare the report as specified in the accepted annotated outline. The Contractor shall submit newly revised portions of the working draft ITIR in order to make available current site characterization data. A prime objective shall be to minimize the volume of comments on the working draft and final submittals by incorporating comments into the report in an on-going manner. The final summary shall contain all sites included in this effort (Sequence No. 4).

h. Weekly Field Activities Report (para 1.3.13). Transmit a Weekly field activities report during field activities pursuant to a format developed by the AFCEE RTC. (Sequence no. 4, para 6.1)

II. Site Location and Dates

Dew Line Sites and Cape Lisburne, date to be established.

III. Base Support The base will:

3.1 Provide the Contractor with existing engineering plans, drawings, diagrams, aerial photographs, digitized map files, etc., to facilitate evaluation of IRP sites under investigation.

3.2 Arrange for personnel identification badges, vehicles passes, and/or entry permits with the contention the Contractor will provide necessary information to the base personnel no less than four weeks before needed.

3.3 Provide the Contractor with all previously approved documents which provide information on all IRP efforts conducted at Dew Line Sites and Cape Lisburne and will aid in the determination of the amount of field work and analyses which need to be conducted.

IV. Government Furnished Property
Not Applicable

V. Government Points of Contact:

5.1 MAJCOM Coordinator

Major James R. Williams III
AFCEE/ERD
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5243
DSN 240-5243
(210) 536-9026 FAX
DSN 240-9026

5.2 Restoration Team Chief

Mr. Michael F. McGhee
AFCEE/ERD
8001 Inner Circle DR STE 2
Brooks AFB TX 78235-5328
(210) 536-5293
DSN 240-5293
(210) 536-9026 FAX
DSN 240-9026

5.3 Base Point of Contact (POC)

Mr. Jim Wolfe
11 CEOS/CEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

5.4 Public Affairs Coordinator

Ms. Wende Wolf
11 CEOS/DEVR
21885 Second Street
Elmendorf AFB AK 99506-4420
(907) 552-4532
DSN 317-552-4532
(907) 552-1533 FAX
DSN 317-552-1533

VI. Deliverables

6.1 Attachment 1 of the Basic Contract

Sequence numbers 1 and 5 listed in attachment 1 to the basic contract apply to all orders. Guidance for preparing R&D Status Reports (sequence 1) is contained in the Handbook, section 4. In addition, the sequence numbers and dates listed below are applicable to this order:

Sequence No.	Para No.	Block 10 (freq.)	Block 11 (as of date)	Block 12 (date of 1st. submit.)	Block 13 (date of final report)	Block 14 (no. of copies)
3 (NETWORK ANALYSIS)	I.1.4.1a	QTRLY	12APR93	30APR93	a	4
4 (WORK PLAN)	I.1.4.1b	ONE/R	12APR93	30MAY93	30JULY93	b
4 (WORK PLAN ADDENDUM)	I.1.4.1b	ONE/R		2WKSDOA	15SEPT94	m
4 (SAP)	I.1.1.4c	ONE/R	12APR93	30MAY93	30JULY93	b
4 (SAP ADDENDUM)	I.1.4.1c	ONE/R		3WKSDOA	15SEPT94	n
4 (HSP)	I.1.4.1d	OTIME	12APR93	30MAY93	-	10
4 (HSP ADDENDUM)	I.1.4.1d	OTIME		2WKSDOA		5
4 (COMM. REL. PLAN)	I.1.1.4c	ONE/R	12APR93	30MAY93	31DEC93	b
16 (SPECIAL NOTIF.)	I.1.4.2	OTIME	c	c	-	3
9 (PRESNT. MATERIAL)	I.1.4.3	ASREQ	d	d	-	10
18 (MTG. RPTS)	I.1.4.4	ONE/R	e	e	-	5
3 (NEWSLETTER)	I.1.4.5	QTRLY	12APR93	30NOV93	a	f
3 (FACT SHEETS)	I.1.4.6	ASREQ	12APR93	15JUL93	g	-
3 (PUBLIC NOTICES)	I.1.4.7	ASREQ	12APR93	15JUL93	g	h
9 (PHOTO NOTEBOOK)	I.1.4.8	OTIME	12APR93	15JUL93	-	1
3 (MAILING LIST)	I.1.4.9	QTRLY	12APR93	15JUL93	a	-
3 (MAPS)	I.1.4.10	OTIME	12APR93	15JUL93	-	2
4 INFO REPOS	I.1.4.11	OTIME	31JUL93	-	31JAN94	2
3 (IRPMS Data ITIR) (Data Management) BCHCON BCHLDI BCHSLI BCHWCI BCHSAMP BCHCALC BCHLTD BCHTEST BCHRES BCHGWD	I.1.4.12	OTIME	31JUL93	31JAN94	31MAR94	2
4 DECISION DOC	I.1.4.13	ONE/R	i	i	31OCT94	b
4 RI REPORT	I.1.4.14.1	ONE/R	15SEP93	15FEB94	30APR94	b
4 RISK ASSESSMENT	I.1.4.14.2	ONE/R	1OCT93	16MAY94	15JUL94	b
4 FEASIB. STUDY	I.1.4.14.3	ONE/R	30SEPT93	30AUG94	-	b
4 RI/FS Report	I.1.4.14.4	ONE/R	30SEP93	30SEP94	1JAN95	b
4 IRP DOCUMENT	I.14.15	ONE/R	31JUL93	31OCT93	10DEC93	b
3 ANALYTICAL DATA ITIR		OTIME		01DEC94		2
3 SCREENING ALTER ITIR	I.1.4.16a	OTIME	30SEP93	30DEC93	-	10
3 DETAL ANALYSIS ALTER ITIR	I..1.4.16.b	OTIME	28 FEB94	30MAR94	-	10
1 DPM SCORING	I.1.4.16c	OTIME	30SEP93	j	j	3
3 MYLAR MAP	I.1.4.16d	OTIME	k	k	-	5
3 GEOPHYS CONT	I.1.4.16.e	OTIME	l	l	-	10
3 SOIL GAS MAP	I.1.4.16f	OTIME	l	l	-	10
4 SCS ITIR	I.1.4.16g	ONE/R	-	01FEB95	01APR95	g
~~4 SCS ITIR~~	~~I.1.4.16g~~	~~ONE/R~~	~~15SEP93~~	~~30NOV93~~	~~15FEB94~~	~~5~~
4 WEEKLY ACT REP	I.1.4.16h	WEEKLY	13AUG93	13AUG93	-	1

6.2 Reserved.

6.3 Notes

a. Submit Quarterly Thereafter.

b. One (1) first draft plan (8 copies), one (1) second draft plan (8 copies), and one (1) final plan (10 copies) are required. Incorporate Air Force comments into the second draft and final plan as specified by the RTC. Supply AFCEE/ESR with an advance copy of the first draft, second draft, and final plan for acceptance prior to distribution. Distribute the remaining copies of each plan as specified by the RTC. The second and final reports shall be submitted within three (3) weeks of receipt of comments from the RTC.

c. Primary and Secondary Documents. One first draft report (25 copies), one second draft report (25 copies), and one final report (35 bound copies plus the original camera-ready copy and a 3.5 inch disk formatted in WordPerfect 5.1 containing the document file) are required. Incorporate Air Force comments into the second draft and final reports as specified by the RTC. Supply the RTC with an advance copy of the first draft, second draft, and final reports for acceptance prior to distribution. Distribute the remaining copies as specified by the RTC .

d. Provide written notice with supporting documentation within three (3) days of telephone notification and at the direction of the RTC. Assume a maximum of 100 pages.

e. Provide within one (1) week of task/meeting completion.

f. Provide 500 copies of the Newsletters and distribute as agreed to by the RTC. This includes mailing the final product to on-base personnel and addresses on the existing mailing list.

g. Provide draft and final deliverables. Provide two advance copies to the AFCEE RTC and to the 11 CEOS Community Relations Coordinator for acceptance prior to preparation of the final deliverables.

h. Provide poster-size map.

i. Submit with the second draft Technical Report.

j. Submit with the Technical Report.

k. Provide with the Technical Report.

l. Provide within four (4) weeks of task completion.

m. Both a draft and a final addendum to the existing work plan is required for the removal actions specified in paragraph I.1.3.14. Field removal activities performed at Cape Lisburne LRRS pursuant to paragraph I.1.3.14 of this SOW shall commence upon submittal of the draft work plan to AFCEE for review. The Contractor shall distribute both versions of the work plan as specified by AFCEE.

n. The SAP addendum shall focus on the sampling and analysis activities to be conducted under the removal actions specified in paragraph I.1.3.14 of this SOW. The Contractor shall incorporate any Government comments into the final project-specific SAP. The Contractor shall distribute the SAP as specified by AFCEE.

o. A Site Characterization Summary ITIR must be prepared based on the findings of sampling and analyses conducted pursuant to the removal action specified in paragraph I.1.3.14. The Contractor shall incorporate any Government comments into the final ITIR. The Contractor shall distribute the ITIR as specified by AFCEE.

Notes:

a. Unless an abbreviated list of analytes is specified under "Parameter" above, the analytical protocol shall include all analytes listed in the referenced analytical method. The methods cited are from the following sources:

"A" Methods — Standard Methods for the Examination of Water and Wastewater, 16th Edition (1985)

"E" Methods — Methods for Chemical Analysis of Water and Wastes, EPA Manual, 600/4-79-020 (USEPA, 1983--with additions)

"SW" Methods — Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition (USEPA, 1986)

"ASTM" Methods — American Society for Testing and Materials, 1919 Race Street, Philadelphia, PA 19103

b. The maximum number of second-column confirmation analyses shall not exceed fifty (50) percent of the actual number of field samples (to include duplicates, replicates, ambient, condition blanks, trip blanks, and equipment blanks). If the number of samples requiring second-column confirmation exceeds this allowance, contact the HSD Technical Project Manager. The total number of samples listed in Tables A-4 and A-5 includes the allowance applicable to each GC method. IF GC/MS, or a combination of second-column GC and GC/MS, is used, the total cost of all such analyses for a particular parameter shall not exceed the funding allowed for positive confirmation using only second-column GC.

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 3

2. PROC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. BCC/DMS RATING
F33615-90-D-4010	002205	20SEP94	FY7624-94-08822	

7. ISSUED BY CODE FA8900

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIAL COMMAND
HUMAN SYSTEMS CENTER
BROOKS AFB TX 78235-5320

Buyer: EDWIN CUSTODIO HSC/PKVBC
Phone: (210)536-4493

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A

DCMAO BALTIMORE
ATTN: CHESAPEAKE
200 TOWSONTOWN BLVD, WEST
TOWSON, MD 21204-5299

DUPLICATE ORIGINAL

9. CONTRACTOR NAME AND ADDRESS CODE 69148 FACILITY CODE

IF "0" FOR MULTIPLE FACILITIES SEE SECT "K"

ICF TECHNOLOGY
9300 LEE HIGHWAY
FAIRFAX VA 22031-1207

PHONE: (703)934-3000
COUNTRY: FAIRFAX

MAIL DATE

SEP 23 1994

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT

1ST	%	DAYS	NET DAYS
2ND	%	DAYS	OTHER IF "0" SEE SECT "E"
3RD	%	DAYS	

12. PURCHASE OFFICE POINT OF CONTACT

MVH/M1E/MVH

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLITCITATIONS

☐ The above numbered solicitation is amended as set forth in block 17. The hour and date specified for receipt of Offers ☐ is extended ☐ is not extended

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO _____
THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVED NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF _____
IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO FAR 52.232-7 PAYMENT UNDER T&M OR LABOR HOURS

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
C			$ SEE SECTION G			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS *(Except as provided herein, all terms and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)* SUBJECT: INCREASE CEILING AMOUNT/ FUND OVERRUN
PROJECT MANAGER: SAMER N. KARMI, AFCEE/ERDW, BROOKS AFB, TX 78235-5328
FINANCE OFFICE: (SC1030) DFAS-COLUMBUS CENTER, DFAS-CO/CHESAPEAKE DIV
COLUMBUS, OH 43218-2262

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR *(Signature of person authorized to sign)*
BY

20. NAME AND TITLE OF SIGNER *(Type or print)*

21. DATE SIGNED

22. UNITED STATES OF AMERICA *(Signature of Contracting Officer)*
BY

23. NAME OF CONTRACTING OFFICER *(Type or print)*
DEAN M. CARSELLO

24. DATE SIGNED
20 SEP 1994

AFMC FORM 702, JUL 92 REPLACES AFSC FORM 702, AUG 84 WHICH IS OBSOLETE

1. Pursuant to FAR 52.232-7 Payment Under Time-and-Material and Labor-Hours Contracts and in accordance with the provisions of the Basic Contract F33615-90-D-4010 and Delivery Order 0022, Mod. 05 the above delivery order is amended. The purpose of this modification is to increase the ceiling amount of this order by $330,000.00 to cover the total cost of the efforts being requested. The ceiling is being increased to cover existing work.

2. As a result of paragraph 1 above, said order is more specifically modified as follows:

a. SECTION A Cover Page: The ceiling amount in Block 20 (cover page) is increased by $330,000.00 from $3,528,878.00 to $3,858,878.00.

b. SECTION B Supplies/Services: is amended as set forth below.

Item No.	Supplies Schedule	Qty Purch Unit	Unit Price
0001	CLIN Change Sec Class: U Noun: Sampling, Analysis, and Data Acm: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N
0002	CLIN Change Sec Class: U Noun: Support Acm: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N
0004	CLIN Change Sec Class: U Noun: Chemical Analysis & Data Acm: XA nsn: N Sites Codes: pqa: D acp: D fob: D pr/mipr data: FY7624-94-08822		N

b. SECTION G Accounting Classification Data: is amended as set forth below:

ACRN	Acct Class Data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification	Obligation Amount
AD	Account Establish		$330,000.00
	Unclassified	5743400 F74400	
		304 7434 434419 040000 53475 000000 674400	

pr/mipr data: FY7624-94-08822 (PR Complete)

descriptive data: AF Form 616 H94-SR-365 dated: 18 Aug 94 expiration: 22 Sep 94

XA Special ACRN Establish

descriptive data: Special ACRN XA Funds CLINs 0001, 0002, and 0004 and includes the following:

AA: $ 299,855.00 (Basic DO)
AB: 99,986.00 (Mod. -01)
2,899,511.00 (Mod. -02)
AC: 229,526.00 (Mod. -04)
AD: 330,000.00 (Mod. -05)
TOTAL $3,858,878.00

Finance Officer: Pay funds in alphabetical order.

3. Concurrence to this Unilateral Agreement is evidenced by contractor's (ICF) letter dated 8 Jun 94, incorporated herein by reference.

4. All other terms and conditions remain unchanged and in full force and effect.

REF 68X 68X

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. PAGE 1 OF 4

2. PROC INSTRUMENT ID NO. (PIIN)	3. SPIIN	4. EFFECTIVE DATE	5. REQUISITION/PURCHASE REQUEST PROJECT NO.	6. SOC/DMS RATING
F33615-90-D-4010	002206	27MAR95	FY7624-95-08452	DO-C9

7. ISSUED BY CODE FA8900

DEPARTMENT OF THE AIR FORCE
AIR FORCE MATERIEL COMMAND
HUMAN SYSTEMS CENTER
8005 9TH STREET
BROOKS AFB TX 78235-5353
Buyer: EDWIN CUSTODIO /PKVBA
Phone: (210) 536-4493

8. ADMINISTERED BY (IF OTHER THAN BLOCK 7) CODE S2404A

DCMAO BALTIMORE
ATTN: CHESAPEAKE
200 TOWSONTOWN BOULEVARD, WEST
TOWSON MD 21204-5299

9. CONTRACTOR NAME AND ADDRESS CODE 69418 FACILITY CODE

ICF TECHNOLOGY, INC.
9300 LEE HIGHWAY
FAIRFAX, VA 22301-3000

COUNTY: FAIRFAX
PHONE: (703)934-3000

IF "X" FOR MULTIPLE FACILITIES SEE SECT "K"

ADVANCE COPY

10. SECURITY CLAS U

11. DISCOUNT FOR PROMPT PAYMENT

1 ST	%	DAYS	NET DAYS
2 ND	%	DAYS	OTHER (SEE "B")
3 RD	%	DAYS	SEE SECT "E"

12. PURCHASE OFFICE POINT OF CONTACT

MVH/M1U/MVH

13. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 17. The hour and date specified for receipt of Offer ☐ is extended ☐ is not extended

Offeror must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

14. THIS BLOCK APPLIES ONLY TO MODIFICATION OF CONTRACTS

☐ THIS CHANGE IS ISSUED PURSUANT TO _____
THE CHANGES SET FORTH HEREIN ARE MADE TO THE ABOVE NUMBERED CONTRACT/ORDER.

☐ THE ABOVE NUMBERED CONTRACT IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (SUCH AS CHANGES IN PAYING OFFICE, APPROPRIATION DATA, ETC.) SET FORTH HEREIN.

☐ THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF _____
IT MODIFIES THE ABOVE NUMBERED CONTRACT AS SET FORTH HEREIN.

☒ THIS MODIFICATION IS ISSUED PURSUANT TO IAW FAR 52.232-7 PAYMENT UNDER T&M AND LABOR HOURS

15. CONTRACT ADMINISTRATION DATA

A. KIND OF MOD	B. MOD ABST RECIPIENT ADP PT	C. DATE OF SIGNATURE MODIFICATION	D. CHANGE IN CONTRACT AMOUNT INCREASE (+) DECREASE (-)	E. LOSING PO/CAO ON TRANSFER	F. GAINING PO/CAO ON TRANSFER	G. SVC/AGENCY USE
B			$ SEE SECTION G			

16. ENTER ANY APPLICABLE CHANGES

A. PAY CODE	B. EFFECTIVE DATE OF AWARD	C. CONTRACT (1) TYPE (2) KIND	D. TYPE CONTR	E. SURV CRIT	F. SPL CONTR PROVISIONS	G. PAYING OFC CODE	H. DATE SIGNED	I. SECURITY (1) CLAS (2) DATE OF DD 254

17. REMARKS (Except as provided herein, all terms and conditions of the contract, as heretofore changed, remain unchanged and in full force and effect.)

SUBJECT: INCREASE TO THE CONTRACT CEILING PRICE
PROJECT MANAGER: SAMER KARMI, AFCEE/ERD, BROOKS AFB TX 78235-5353
FINANCE OFFICE: (SC1030) DFAS-COLUMBUS CENTER, DFAS-CO/CHESAPEAKE DIV
P O BOX 182264, COLUMBUS OH 43218-2264

18. ☒ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☐ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN _____ COPIES TO ISSUING OFFICE

19. CONTRACTOR/OFFEROR (Signature of person authorized to sign)
BY

20. NAME AND TITLE OF SIGNER (Type or print)

21. DATE SIGNED

22. UNITED STATES OF AMERICA (Signature of Contracting Officer)
BY Janelle J. Larrison

23. NAME OF CONTRACTING OFFICER (Type or print)
JANELLE J. LARRISON

24. DATE SIGNED
95 mar 27

1. Pursuant to FAR 52.232-7 Payment Under Time-and-Material and Labor-Hours Contracts and in accordance with the provisions of the Basic Contract F33615-90-D-4010 and Delivery Order 0022, Mod. 06 the above delivery order is amended. The purpose of this modification is to increase the ceiling amount of this order by $315,000.00 to cover the total cost of the efforts being requested. The ceiling is being increased to cover existing work in the revised Work Plan.

2. As a result of paragraph 1 above, said order is more specifically modified as follows:

a. SECTION A Cover Page: The ceiling amount in Block 20 (cover page) is increased by $315.000.00 from $3,858,878.00 to $4,173,878.00.

b. SECTION B Supplies/Services: is amended as set forth below.

Item No.	Supplies Schedule	Qty Purch Unit	Unit Price
0001	CLIN Change Sec Class: U Noun: Sampling, Analysis, and Data Acm: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N
0002	CLIN Change Sec Class: U Noun: Support Acm: XA nsn: N Sites Codes: pqa: D acp: D fob: D		N
0004	CLIN Change Sec Class: U Noun: Chemical Analysis & Data Acm: XA nsn: N Sites Codes: pqa: D acp: D fob: D pr/mipr data: FY76-95-08452		N

c. SECTION F Supplies schedule Data: The delivery schedule is modified as set forth below:

Item No.	Supplies Schedule Data		Delivery Quantity	Schedule Date
0001	CLIN Del Sch Change acm: XA ship to: U	Sec Class: U	1	96 Jan 31
0002	CLIN Del Sch Change acm: XA ship to: U	Sec Class: U	1	96 Jan 31
0004	CLIN Del Sch Change acm: XA ship to: U	Sec Class: U	1	96 Jan 31

b. SECTION G Accounting Classification Data: is amended as set forth below:

ACRN	Acct Class Data	Appropriation/Lmt Subhead/CPN Recip DODAAD Supplemental Accounting Classification	Obligation Amount
AE	Account Establish Unclassified	5753400 F74400 305 7434 434419 040000 53440 000000 674400	$315,000.00

pr/mipr data: FY7624-95-08452 (PR Complete)

descriptive data: AF Form 616 H95-SR-298 dated: 1 Mar 95, expiration 15 Sep 95.

XA Special ACRN Establish

descriptive data: Special ACRN XA Funds CLINs 0001, 0002, and 0004 includes the following:

AA:	$ 299,855.00	(Basic DO)
AB:	99,986.00	(Mod.-01)
	2,899,511.00	(Mod.-02)
AC:	229,526.00	(Mod.-04)
AD:	330.000.00	(Mod.-05)
AE:	315,000.00	(Mod.-06)
	$4,173,878.00	

Finance Officer: Pay funds in alphabetical order.

3. Concurrence to this Unilateral Agreement is evidenced by contractor's (ICF) letter dated 18 Jan 95, incorporated herein by reference.

4. All other terms and conditions remain unchanged and in full force and effect.

APPENDIX D

SAMPLE COLLECTION LOGS

SAMPLE COLLECTION LOGS FOR THE INSIDE TRANSFORMER (OT04)

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-S01

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 25' east from west edge of building at 90°, 3' north from south edge of building at 90°

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 16:55 DEPTH OF SAMPLE (feet): 0 to 0.5

SAMPLE DESCRIPTION/COMMENTS: Brown, sandy gravel, stone size 1/4" to 1.5"

SAMPLING METHOD: Grab sample, hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
16:55	NR	NR	NR	NR	

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-S02

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 33' east from west end of building at 90°, 22' north from south end of building at 90°

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 16:48 DEPTH OF SAMPLE (feet): 0 to 0.5

SAMPLE DESCRIPTION/COMMENTS: Brown, sandy gravel, 1/4 " to 1.5" stones.

SAMPLING METHOD: Grab sample, hand auger.

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:48	NR	NR	NR	NR	

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES	✓			TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-S03

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 29.5' east from west edge of building at 90°, 12.5' north of south edge of building at 90°

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 11:50 DEPTH OF SAMPLE (feet): 0 to 0.5

SAMPLE DESCRIPTION/COMMENTS: Brown sandy gravel, 1/4" to 1.5 " pebbles.

SAMPLING METHOD: Grab sample, hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:50	NR	NR	NR	NR	

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
RESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-S04

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 2' east and 1' north of northeast corner of Technical Services Building.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 16:40 DEPTH OF SAMPLE (feet): 0 to 0.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel (1/8" to 1.5" pebbles), brown.

SAMPLING METHOD: Grab sample, hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
16:40	NR	NR	NR	NR	

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES	✓			TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-S05

RADAR STATION: Bullen Point WEATHER: Overcast, windy, 3°C

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 2' east and 1' north of northeast corner of Technical Services Building.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 16:45 DEPTH OF SAMPLE (feet): 0 to 0.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, brown, 1/8" to 1.5" pebbles.

SAMPLING METHOD: Hand auger, grab sample

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID BUL-OT04-S04

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
16:45	NR	NR	NR	NR	

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES	✓				TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-2S06

RADAR STATION: Bullen Point WEATHER: _____

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: _____

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: _____

TIME SAMPLED: _____ DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

_____

SAMPLING METHOD: _____

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH		1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-WP01

RADAR STATION: Bullen Point WEATHER: Overcast, windy, 3°C

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: 3 and 2.5 MAGNETIC HEADING: _____

FIXED POINT: North and east walls of transformer room

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW) ■ Wipe (WP)

SAMPLERS: SS, RC

TIME SAMPLED: 16:00 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

SAMPLING METHOD: Wipe

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
	NR				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH		1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz
					PCB (Wipe)	✓			

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-WP02

RADAR STATION: Bullen Point WEATHER: Overcast, windy, 3°C

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 5.5 feet due south at north wall, 1.5 feet due west of east wall in transformer room.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW) ■ Wipe (WP)

SAMPLERS: SS, RC

TIME SAMPLED: 16:18 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

SAMPLING METHOD: Wipe

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH		1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz
					PCB (Wipe)	✓			

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-OT04-WP03

RADAR STATION: Bullen Point WEATHER: Overcast, windy, 3°C

SITE/AOC: OT04 Inside Transformer FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: Transformer room doorway, 1.5 feet west of east side of doorway.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW) ■ Wipe (WP)

SAMPLERS: SS, RC

TIME SAMPLED: 16:25 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

SAMPLING METHOD: Wipe

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH		1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz
					PCB (Wipe)	✓			

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR THE POL TANKS (ST05)

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S01

RADAR STATION: Bullen WEATHER: Overcast, 2°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 150' south, 50' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 09:45 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel (GW). SubA to subR gravel to 2.5". SubA to SubR, VF to C sand. Minor fines. Loose, saturated, 10 yr (5/1), gray, water in bore hole.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
09:45	90 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S02

RADAR STATION: Bullen WEATHER: Overcast, breezy, 34°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 45' south, 10' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 10:15 DEPTH OF SAMPLE (feet): 4

SAMPLE DESCRIPTION/COMMENTS: Took sample immediately above groundwater. Sandy gravel, brown-gray, vegetation, wet, particles from .25-1.5", hydrocarbon odor.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
10:20	37 ppm				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS	✓	1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S03-0.6

RADAR STATION: Bullen WEATHER: Overcast, 2°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 275' south, 40' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 10:35 DEPTH OF SAMPLE (feet): 8"

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel (GW). SubA to subR gravel to 2.5". SubA to subR VF to C sand. Minor fines. Loose, saturated, 10 yr (5/1) gray, water in bore hole.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
10:34	136 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES	✓				TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S04-1.5

RADAR STATION: Bullen WEATHER: Overcast, breezy, 34°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 75' south, 40' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 11:13 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, grayish-brown, .25-1.5" particles. Slight hydrocarbon smell. Lower 3 inches contained trace organics. Hole terminated at permafrost.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:09	15 from boring				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S05-2.5

RADAR STATION: Bullen WEATHER: Overcast, 2°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 50' south, 30' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 11:10 DEPTH OF SAMPLE (feet): 3-12.5"

SAMPLE DESCRIPTION/COMMENTS: Gravelly sand (SP) subA to subR, VF to M sand. SubA to subR gravel to 1". Minor fines. Loose, moist, 5 yr (5/2), red-gray.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S06-2.5

RADAR STATION: Bullen WEATHER: Overcast, breezy, 32°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 50' north, 50' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 11:45 DEPTH OF SAMPLE (feet): 2.5

SAMPLE DESCRIPTION/COMMENTS: Peat, silty sand, some gravel, wet. Hole stops at permafrost.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:35	BG - hole				
11:41	BG - hole				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S07-1.5

RADAR STATION: Bullen WEATHER: Overcast, 2°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 130' north, 60' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 11:30 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Gravelly peat. SubA to subR gravel to .5 inch. Firm, moist, 7.5 yr (4/1) dark gray.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:30	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S08-0.5

RADAR STATION: Bullen WEATHER: Overcast, 1°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 150' north, 120' east

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 11:50 DEPTH OF SAMPLE (feet): 0.5

SAMPLE DESCRIPTION/COMMENTS: Peat, gravelly peat, silt. Small peat unit, sample was collected across it from overlying gravel to underlying silt. 7.5 yr (4/1) dark gray.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:50	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S09-3

RADAR STATION: Bullen WEATHER: Overcast, 1°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 150' north, 120' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 12:00 DEPTH OF SAMPLE (feet): 3

SAMPLE DESCRIPTION/COMMENTS: Just over permafrost. Clayey silt. Firm, moist, mottled brown and gray, 5 yr (7/1), light gray.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
12:00	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S10-2.0

RADAR STATION: Bullen WEATHER: Overcast, breezy, 32°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 150' north, 200' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 13:20 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Dark brown to gray silty peat, moist, some gravel.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
13:14	BG				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S11-1.5

RADAR STATION: Bullen WEATHER: Overcast

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 50' north, 240' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 13:25 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Peat, with some overlying gray silt. This package was directly below gravel (silt layer was 1-inch thick). Firm, moist, 7.5 yr (4/1), dark gray.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
13:20	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S12-1.5

RADAR STATION: Bullen WEATHER: Overcast, breezy, 32°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 50' south, 240' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 13:50 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Clayey silt, medium gray with lignite and gravel pebbles (3/8-1"). Slight petroleum odor. Sample collected above clay.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
13:48	BG				
13:56	BG				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS			
		WATER	SOIL			WATER		SOIL	
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz	
PCB				SVOC (8270)		1 liter		8 oz	
PESTICIDES				TOTAL METALS		1 liter		8 oz	
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter		---	
VOC-BTEX 8020	✓			TDS		250 ml		---	
				TSS		250 ml		---	
				TOC		500 ml		4 oz	
				TCLP		2 liters		2 x 8 oz	

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S13-1.5

RADAR STATION: Bullen WEATHER: Overcast, breezy, 32°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 100' south, 250' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 14:10 DEPTH OF SAMPLE (feet): 1.5-2.0

SAMPLE DESCRIPTION/COMMENTS: Gray-brown clayey silt, some sand and gravel, moist.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
14:05	BG				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S14-2

RADAR STATION: Bullen WEATHER: Overcast, 1°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 150' south, 150' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 13:45 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, just above permafrost. SubA to subR gravel to 1 inch. VF to C sand. GW. Loose, saturated, 10 yr (5/1), gray. No peat or silt encountered. Standing water in hole.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
13:45	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S15-0.5

RADAR STATION: Bullen WEATHER: Overcast, 2°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 50' south, 110' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 14:25 DEPTH OF SAMPLE (feet): 0.5

SAMPLE DESCRIPTION/COMMENTS: Sandy, gravel (GW). SubA to subR gravel to 1-inch. VF to C subA to subR sand. Loose, moist, 10 yr (5/1), gray.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
14:25	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S16-2.5

RADAR STATION: Bullen WEATHER: Overcast, 1°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 50' south, 110' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 14:15 DEPTH OF SAMPLE (feet): 2.5

SAMPLE DESCRIPTION/COMMENTS: Sandy, gravel, just above permafrost. GW. SubA to subR gravel to 1 inch, subA to subR VF to C sand. Loose, moist, 10 yr (5/1), gray. No peat or silt encountered in bore hole.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
14:15	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S17-2

RADAR STATION: Bullen WEATHER: Overcast, drizzle, 1°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 10' south, 125' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 14:45 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Peat, with some overlying gravel and underlying silt. Peat was 6" thick. Firm, moist, 7.5 yr (4/1), dark gray.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
14:15	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S18-2.0

RADAR STATION: Bullen WEATHER: Overcast, breezy, 32°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 100' south, 250' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 14:30 DEPTH OF SAMPLE (feet): 2.0-2.5

SAMPLE DESCRIPTION/COMMENTS: Brown silty clay, trace organics and sand, very wet, gray sandy gravel.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
14:20	BG				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S19-1.5

RADAR STATION: Bullen WEATHER: Overcast, windy, 32°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 90' south, 190' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 15:25 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Gray-brown sandy gravel, very wet.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
15:23	BG				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S20

RADAR STATION: Bullen WEATHER: Overcast, breezy, 32°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 150' south, 240' east

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 15:45 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Brown sandy silt, very wet, some gravel. Sample taken at groundwater level.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
15:40	BG				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S21-1.5

RADAR STATION: Bullen WEATHER: Overcast, 1°C

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 100' south, 300' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 15:15 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel (GW). SubA to subR gravel to 1.5". SubA to subR, VF to C sand. Loose, moist, 10 yr (5/1), gray.

SAMPLING METHOD: Soil - auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
15:15	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB				SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S22

RADAR STATION: Bullen WEATHER: Overcast, breezy, 34°F

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 45' south, 10' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 10:45 DEPTH OF SAMPLE (feet): 4

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, gray-brown, very wet, particles .25-1.5 inches.

SAMPLING METHOD: Hand auger, soil sample

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID BUL-ST05-S02

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
10:20	37 ppm				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS	✓	1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S23-2.0

RADAR STATION: Bullen WEATHER: Overcast, breezy, 32°F

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 100' south, 250' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 14:35 DEPTH OF SAMPLE (feet): 20.-2.5

SAMPLE DESCRIPTION/COMMENTS: Gray sandy gravel, wet, brown, very wet silty clay.

SAMPLING METHOD: Hand auger, soil sample

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID BUL-ST05-S18

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
14:30	BG				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-S24

RADAR STATION: Bullen WEATHER: Overcast, light snow, 2°C

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 190' south, 285' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DN, JD, JP

TIME SAMPLED: 15:50 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Matrix waste pile. Sandy gravel (GW), subA to subR, VF to C sand. Loose, moist, 10 yr (5/1), gray.

SAMPLING METHOD: Composite (soil scoop)

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
15:50	HS				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/26/93 SAMPLE ID: BUL-ST05-S25

RADAR STATION: Bullen WEATHER: Overcast, light snow, 0°C

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 190' south, 300' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 16:10 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Matrix waste pile. Sandy gravel (GW), subA to subR, VF to C sand. SubA to subR gravel to 1.5 inches, loose, moist, 10 yr (5/1), gray.

SAMPLING METHOD: Composite

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB				SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/26/93 SAMPLE ID: BUL-ST05-S26

RADAR STATION: Bullen WEATHER: Overcast, light snow, 0°C

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 170' south, 310' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN, JD

TIME SAMPLED: 16:00 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Matrix waste pile. Sandy gravel (GW), subA to subR gravel to 1 inch. SubA to subR, VF to C sand. Loose, moist, 10 YR (5/1), gray.

SAMPLING METHOD: Composite

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
16:00	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S27-1

RADAR STATION: Bullen WEATHER: Partly cloudy, breezy, 45°F

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 20' south, 200' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: AP, SS

TIME SAMPLED: 13:15 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: Taken at silty clay - sandy, gravel, some silty clay, medium to coarse sand, .25-1 inch gravel, moist.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
16:00	0 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S28-1.75

RADAR STATION: Bullen WEATHER: Partly cloudy, breezy, 45°F

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 350' south, 170' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: AP, SS

TIME SAMPLED: 14:00 DEPTH OF SAMPLE (feet): 1.75

SAMPLE DESCRIPTION/COMMENTS: Wet sandy gravel, medium to coarse sand, .25-1 inch gravel, taken above peat.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S29-2

RADAR STATION: Bullen WEATHER: Partly cloudy, breezy, 45°F

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 200' south, 70' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, AP

TIME SAMPLED: 13:30 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Saturated, sandy gravel, medium to coarse sand, .25-1 inch gravel.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S30-2.5

RADAR STATION: Bullen WEATHER: Overcast, windy, light drizzle

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 351' south, 34' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, AP

TIME SAMPLED: 13:45 DEPTH OF SAMPLE (feet): 2.5

SAMPLE DESCRIPTION/COMMENTS: Sample taken above permafrost, wet sandy gravel, medium to coarse sand, .25-1 inch gravel.

SAMPLING METHOD: _____

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020				TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S31-2

RADAR STATION: Bullen WEATHER: Overcast, windy, 45°F

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 237' south, 85' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DN, SS

TIME SAMPLED: 15:00 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Taken immediately above permafrost. Wet, sandy gravel, medium to coarse sand, .25-1 inch gravel.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB				SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S32

RADAR STATION: Bullen WEATHER: Overcast, windy, 45°F

SITE/AOC: ST05 POL Tanks FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 140' south, 60' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, RC

TIME SAMPLED: 14:00 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Saturated sandy gravel, medium to coarse sand, .25-1 inch gravel, above peat.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S33-1.5

RADAR STATION: Bullen WEATHER: Partly cloudy, windy, 40°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 90' south, 120' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, AP

TIME SAMPLED: 11:40 DEPTH OF SAMPLE (feet): 1.5-2.0

SAMPLE DESCRIPTION/COMMENTS: Wet, sandy gravel; medium to coarse gravel .25-1 inch gravel, taken above peat.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S34-2.5

RADAR STATION: Bullen WEATHER: Cloudy, windy, 45°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 40' south, 70' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, AP

TIME SAMPLED: 11:45 DEPTH OF SAMPLE (feet): 2.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, saturated, taken above peat, medium to coarse sand, .25-1 inch gravel.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S35-2.5

RADAR STATION: Bullen WEATHER: Cloudy, windy, 45°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 231' south, 117' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: AP, RC

TIME SAMPLED: 14:45 DEPTH OF SAMPLE (feet): 2.5

SAMPLE DESCRIPTION/COMMENTS: Wet, sandy gravel, .25-1 inch gravel, medium to coarse sand.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S36-2

RADAR STATION: Bullen WEATHER: Overcast, windy, 45°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 237' south, 85' west of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DN, SS

TIME SAMPLED: 15:00 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Taken above peat, sandy gravel, moist, medium to coarse sand, .25-1 inch gravel.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID BUL-ST05-2S31

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background: BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-ST05-2S37-1.33

RADAR STATION: Bullen WEATHER: Cloudy, windy, rain, 45°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 444' south, 90' east of POL grid.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, JD

TIME SAMPLED: 14:40 DEPTH OF SAMPLE (feet): 1.33

SAMPLE DESCRIPTION/COMMENTS: Sample taken off south edge of gravel pad, above permafrost. Sandy gravel, wet, medium to coarse sand, .25-1 inch gravel.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH		1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-SW01

RADAR STATION: Bullen WEATHER: Sleet, 33°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 110' north, 100' east of POL grid.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD

TIME SAMPLED: 15:00 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Pond (tundra) with light yellow sheen.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
15:00	8.4	1,970	4°C	1.002	

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS			
		WATER	SOIL			WATER		SOIL	
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz	
PCB				SVOC (8270)		1 liter		8 oz	
PESTICIDES				TOTAL METALS		1 liter		8 oz	
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter		---	
VOC-BTEX 8020	✓			TDS		250 ml		---	
				TSS		250 ml		---	
				TOC		500 ml		4 oz	
				TCLP		2 liters		2 x 8 oz	

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-SW02

RADAR STATION: Bullen WEATHER: Slight breeze, 33°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 400' north, 310' east of POL grid.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD

TIME SAMPLED: 15:20 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Tundra pond.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
15:20	8.5	1,710	5°C	1.001	

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/16/93 SAMPLE ID: BUL-ST05-GW01

RADAR STATION: Bullen WEATHER: _____

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 275' south, 40' west of POL grid.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ■ Groundwater (GW)

SAMPLERS: JD

TIME SAMPLED: 11:40 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Possible high values of petroleum products, heavy smell.

SAMPLING METHOD: Bailer

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
11:35	7.6	1,280	3°C	1.00025	

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

		BARROW LAB					ANCHORAGE LAB		
ANALYSES	✓	CONTAINERS			ANALYSES	✓	CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS	✓	250 ml		---
					TSS	✓	250 ml		---
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/10/93 SAMPLE ID: BUL-ST05-GW02

RADAR STATION: Bullen WEATHER: Overcast, sunny, breezy, 32°F

SITE/AOC: ST05 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 100' south, 250' east of POL grid.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ■ Groundwater (GW)

SAMPLERS: RC

TIME SAMPLED: 10:25 DEPTH OF SAMPLE (feet): 2

SAMPLE DESCRIPTION/COMMENTS: Collected from S13 location.

SAMPLING METHOD: Bailer

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:18	7.3	1,600	3°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS	✓	250 ml		---
					TSS	✓	250 ml		---
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR THE OLD LANDFILL/DUMP SITE EAST (LF06)

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S01

RADAR STATION: Bullen WEATHER: Overcast, windy, 2°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 340 MAGNETIC HEADING: 301.5°

FIXED POINT: Central point surveyed from TSB building; d=155, A=96.5.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 13:30 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Soil boring sample. 2" deep (surface sample). Sandy gravel (SW), subA to subR gravel to 1/2 inch. Loose, moist, 5 yr (2.5/2). Dark, reddish brown. Sediments create a sheen on water.

SAMPLING METHOD: Soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S01

RADAR STATION: Bullen WEATHER: Overcast, windy, 2°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 340 MAGNETIC HEADING: 301.5°

FIXED POINT: Central point surveyed from building; d=155, A=96.5.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 15:10 DEPTH OF SAMPLE (feet): Surface (5")

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel. SubA to subR gravel to 1/4 inch. Loose, moist, 5 yr (2.5/2), dark reddish brown. Sediments create a sheen on water.

SAMPLING METHOD: Soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S02

RADAR STATION: Bullen WEATHER: Overcast, windy, 4°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 260 MAGNETIC HEADING: 305.5°

FIXED POINT: SE corner of new TSB building (central point surveyed from) d=155, A=96.5

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 15:00 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Exposed landfill sample (exposed face). Sand (SW). SubA to subR, VF to C. Minor fines, gravel, 10 yr (3/2) very dark gray-brown.

SAMPLING METHOD: Surface sample (grab), Soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S03

RADAR STATION: Bullen WEATHER: Overcast, windy, 4°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 180 MAGNETIC HEADING: 278.5°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 14:40 DEPTH OF SAMPLE (feet): Surface

SAMPLE DESCRIPTION/COMMENTS: Grab sample. Sand (SW). SubA to subR, VF to C. Minor fines. 2.5 Y (4/3). Olive brown. Sampled 2 inches in from face.

SAMPLING METHOD: Grab, soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S04

RADAR STATION: Bullen WEATHER: Overcast, windy, 4°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 88 MAGNETIC HEADING: 312°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 14:30 DEPTH OF SAMPLE (feet): Surface, 4-6 inches deep

SAMPLE DESCRIPTION/COMMENTS: Grab sample from soil boring. Silty gravel. SubA to subR gravel to 1.25 inches. Loose, wet, 5 Y (4/1). Dark gray.

SAMPLING METHOD: Grab sample from soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S05-0.6

RADAR STATION: Bullen WEATHER: Overcast, windy, 5°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 80 MAGNETIC HEADING: 6°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 14:15 DEPTH OF SAMPLE (feet): 8 inches

SAMPLE DESCRIPTION/COMMENTS: Soil sample from landfill. Peat. Minor silt and clay. Firm, very moist, 5 Y (4/1), dark gray.

SAMPLING METHOD: Soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S06

RADAR STATION: Bullen WEATHER: Overcast, cloudy, windy, 5°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 135 MAGNETIC HEADING: 28.5°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 13:55 DEPTH OF SAMPLE (feet): Surface (3" deep)

SAMPLE DESCRIPTION/COMMENTS: Soil sample from landfill. Sandy gravel (GW). SubA to subR gravel to 1/4 inch. Loose, moist, 5 YR (2.5/2).

SAMPLING METHOD: Soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S07

RADAR STATION: Bullen WEATHER: Overcast, windy, 5°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 135 MAGNETIC HEADING: 151°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 13:40 DEPTH OF SAMPLE (feet): Surface (1" deep)

SAMPLE DESCRIPTION/COMMENTS: Soil sample from landfill. Surface sample (1" deep). Sandy gravel, subA to subR gravel to 1/2 inch, GW, loose, moist, 5 YR (2.5/2).

SAMPLING METHOD: Shovel, soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓			SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S08

RADAR STATION: Bullen WEATHER: Overcast, windy, 2°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 0 MAGNETIC HEADING: 0

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 13:30 DEPTH OF SAMPLE (feet): Surface (2" deep)

SAMPLE DESCRIPTION/COMMENTS: Soil sample from landfill. Sandy gravel (SW). SubA to subR gravel to 1/2 inch. Loose, moist, 5 YR (2.5/2), black.

SAMPLING METHOD: Soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES	✓				TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-S09

RADAR STATION: Bullen WEATHER: Overcast, windy, 5°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 135 MAGNETIC HEADING: 28.5°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 13:55 DEPTH OF SAMPLE (feet): Surface (3" deep)

SAMPLE DESCRIPTION/COMMENTS: Soil sample from landfill. Sandy gravel (GW). SubA to subR gravel to 1/4 inch. Loose, moist, 5 YR (2.5/2).

SAMPLING METHOD: Soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID BUL-LF06-S06

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-SD01

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 3 MAGNETIC HEADING: 207°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 15:56 DEPTH OF SAMPLE (feet): Sediment

SAMPLE DESCRIPTION/COMMENTS: Sediment sample from landfill. Small pond just west of landfill. Same location as BUL-LF06-SW01. Orange organics and sand.

SAMPLING METHOD: Grab, soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-SD02

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 3 MAGNETIC HEADING: 207°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 16:10 DEPTH OF SAMPLE (feet): Sediment

SAMPLE DESCRIPTION/COMMENTS: Sediment sample from landfill. Small pond just west of landfill. Same location as BUL-LF06-SW01.

SAMPLING METHOD: Grab, soil scoop

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID BUI-LF06-SD01

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH		1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-SW01

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 3 MAGNETIC HEADING: 207°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 16:36 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Offshore in small pond west of south landfill. Same location as BUL-LF06-SD01.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
16:35	8.6	880 μS	4°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB	✓			SVOC (8270)	✓	1 liter	8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS	✓	1 liter	---
VOC-BTEX 8020	✓			TDS	✓	250 ml	---
				TSS	✓	250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-SW02

RADAR STATION: Bullen WEATHER: Overcast, raining, 2°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 75 MAGNETIC HEADING: 117°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 17:40 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Collected from possible leachate stream at south landfill.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
17:38	8.2	940 μS	2°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓			SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-LF06-SW03

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: LF06 FEET FROM FIXED POINT: 3 MAGNETIC HEADING: 207°

FIXED POINT: Central point surveyed from SE corner of TSB building d=155, A=96.5

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, DN

TIME SAMPLED: 16:36 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Offshore in small pond west of south landfill. Same location as BUL-LF06-SD01. Sample time on bottle = 16:50.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ■ Duplicate of Water Sample ID BUL-LF06-SW01

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS	✓	1 liter		---
VOC-BTEX 8020	✓				TDS	✓	250 ml		---
					TSS	✓	250 ml		---
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR THE FUEL STORAGE AREA (ST09)
(Formerly identified as AOC11)

SAMPLE COLLECTION LOG

DATE: 9-3-93 SAMPLE ID: BUL-ST09-2S06-1.5

RADAR STATION: Bullen WEATHER: Partly cloudy, breezy, 45°F

SITE/AOC: AOC11 FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 60' South, 225' West

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, AP

TIME SAMPLED: 12:10 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Taken above peat. Sandy gravel, wet, medium to coarse sand, 1/4" to 1" gravel.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-ST09-S01-1.0

RADAR STATION: Bullen Point WEATHER: Overcast, snowing, 32°F

SITE/AOC: Fuel Storage Area FEET FROM FIXED POINT: _____ MAGNETIC HEADING: 45 (235)

FIXED POINT: POL Grid, 0' North, 120' West

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RC, JP

TIME SAMPLED: 17:00 DEPTH OF SAMPLE (feet): 1

SAMPLE DESCRIPTION/COMMENTS: Gray, sandy gravel and peat, wet. TPH and VOC-BTEX 8020 were all combined into one 8 ounce jar.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
17:00	BG				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-ST09-S02-0.5

RADAR STATION: Bullen Point WEATHER: Snow, 32°F

SITE/AOC: Fuel Storage Area FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 40 feet North, 150 feet West

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, DN

TIME SAMPLED: 17:00 DEPTH OF SAMPLE (feet): 6"

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, just above peat. BUL-AOC11-S05 is a replicate. TPH and VOC-BTEX 8020 were combined into one 8 ounce jar.

SAMPLING METHOD: Composite

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings: HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-ST09-S03-0.5

RADAR STATION: Bullen Point WEATHER: Overcast, snowing, 32°F

SITE/AOC: Fuel Storage Area FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 40' South, 200' West

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DN

TIME SAMPLED: 17:15 DEPTH OF SAMPLE (feet): 0.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, strong odor, sample from water table area. TPH and VOC-BTEX 8020 were combined into one 8 ounce jar.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB				SVOC (8270)		1 liter		8 oz
PESTICIDES				TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-ST09-S04-1.5

RADAR STATION: Bullen Point WEATHER: Overcast, snowing, 32°F

SITE/AOC: Fuel Storage Area FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 30' South, 155' West

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: AP

TIME SAMPLED: 17:10 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Grey-brown sandy gravel, strong petroleum odor. TPH and VOC-BTEX 8020 were combined into one 8 ounce jar.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
17:10	NR				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-ST09-S05-0.5

RADAR STATION: Bullen Point WEATHER: Cloudy, snowing

SITE/AOC: Fuel Storage Area FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 40' North, 150' West

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, DN

TIME SAMPLED: 17:00 DEPTH OF SAMPLE (feet): 0.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, just above peat. TPH and VOC-BTEX 8020 were combined into one 8 ounce jar.

SAMPLING METHOD: Composite

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ■ Replicate of Soil Sample ID BUL-AOC11-S02

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-ST09-SD01

RADAR STATION: Bullen Point WEATHER: Overcast, snowing, 32°F

SITE/AOC: Fuel Storage Area FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 50' North, 190' West

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RC

TIME SAMPLED: 17:15 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Light brown, sandy gravel. TPH and VOC-BTEX 8020 were combined into one 8 ounce jar.

SAMPLING METHOD: _____

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-ST09-SW01

RADAR STATION: Bullen Point WEATHER: 36°F cloudy, 2 mph wind

SITE/AOC: Fuel Storage Area FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 50' North, 190' West

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: AP

TIME SAMPLED: 15:30 DEPTH OF SAMPLE (feet): Surface Water

SAMPLE DESCRIPTION/COMMENTS: 5" of standing water in a gravel bed pool created by construction activities. Water is pale yellow color, but clear enough to see bottom.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
15:30	8.3	1,800	5°C	1.0005	

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml	4 oz
PCB				SVOC (8270)	✓	1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS	✓	250 ml	---
				TSS	✓	250 ml	---
				TOC	✓	500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR THE DRUM STORAGE AREA (SS10)
(Formerly identified as AOC12)

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-SS10-S01

RADAR STATION: Bullen Point WEATHER: Snowing

SITE/AOC: Drum Storage FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 30' North, 270' East

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: AP, SS

TIME SAMPLED: 16:15 DEPTH OF SAMPLE (feet): 20"

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel, 1/4" to 2" diameter, grey brown. TPH, HVOC 8010, VOC-BTEX 8020, and PCBs were all combined into one 8 ounce jar.

SAMPLING METHOD: Grab - Soil Auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
	20				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB	✓				SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-SS10-S02-1.5

RADAR STATION: Bullen Point WEATHER: Overcast, snow, 32°F

SITE/AOC: Drum Storage FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 5' South, 260' East

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP, DN

TIME SAMPLED: 16:15 DEPTH OF SAMPLE (feet): 1.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel (GW). Sub A to Sub R gravel, 1". Sub A to Sub R, VF TOC loose sand moist, gray-brown, kerosene odor. TPH, HVOC 8010, VOC-BTEX 8020, and PCBs were all combined into one 8 ounce jar.

SAMPLING METHOD: Grab - Soil Auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
16:15	15 S				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES					TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-18-93 SAMPLE ID: BUL-SS10-S03-0.5

RADAR STATION: Bullen Point WEATHER: _____

SITE/AOC: Drum Storage FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: POL Grid, 100' North, 265' East

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: DN, AP

TIME SAMPLED: 16:30 DEPTH OF SAMPLE (feet): 0.5

SAMPLE DESCRIPTION/COMMENTS: Sandy gravel. TPH, HVOC 8010, VOC-BTEX 8020, and PCB were all combined into one 8 ounce jar.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ■ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH	✓	1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB	✓			SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR BACKGROUND (BKGD)

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-BKGD-S01

RADAR STATION: Bullen WEATHER: Overcast, windy, 3°C

SITE/AOC: Background FEET FROM FIXED POINT: 205 MAGNETIC HEADING: 254° from radio tower

FIXED POINT: Radio tower.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 13:45 DEPTH OF SAMPLE (feet): 0-0.5

SAMPLE DESCRIPTION/COMMENTS: Firm, very moist, trace organics, brown-gray, sandy silt.

SAMPLING METHOD: Hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:45	NR				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-BKGD-S02

RADAR STATION: Bullen WEATHER: Overcast, windy, 2°C

SITE/AOC: Background FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 268° from radio tower, 286° from NE corner SRR new tower, 308° from new tan matrix building 196° from airstrip weather sock.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, JP

TIME SAMPLED: 11:45 DEPTH OF SAMPLE (feet): 0-0.5'

SAMPLE DESCRIPTION/COMMENTS: Gray-brown, clayey silt, saturated, firm.

SAMPLING METHOD: Hand auger grab sample

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-BKGD-S03

RADAR STATION: Bullen WEATHER: Overcast, windy, 2° C

SITE/AOC: Background FEET FROM FIXED POINT: 104 MAGNETIC HEADING: 180°

FIXED POINT: Benchmark 89 feet from runway at 90°

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, JP

TIME SAMPLED: 10:30 DEPTH OF SAMPLE (feet): 0-0.5

SAMPLE DESCRIPTION/COMMENTS: Dark brown, silty clay, trace organics, very moist, firm.

SAMPLING METHOD: Grab sample, hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
10:30	NR				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-BKGD-S04

RADAR STATION: Bullen WEATHER: Overcast, windy, 2° C

SITE/AOC: Background FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 154° to windsock on runway, 330° to radio tower, 342° to SE corner of SRR tower, 346° to SE corner of new maintenance shop.

SAMPLE MATRIX: ■ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JD, JP

TIME SAMPLED: 11:00 DEPTH OF SAMPLE (feet): 0-0.5

SAMPLE DESCRIPTION/COMMENTS: Thin peat layer above sample layer. Dark brown, clayey silt, trace organics, firm, very moist.

SAMPLING METHOD: Grab sample, hand auger

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:00	NR				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-BKGD-SD01

RADAR STATION: Bullen WEATHER: Overcast, windy, 2°C

SITE/AOC: Background FEET FROM FIXED POINT: 150 MAGNETIC HEADING: See below

FIXED POINT: Large log south of pond. 268° to NE tower of new SRR, 243° to radio tower.

SAMPLE MATRIX: ☐ Soil (S) ■ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 14:05 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Sediment sample. Gray, sandy silt, saturated.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
14:05	NR				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-BKGD-SW01

RADAR STATION: Bullen WEATHER: Overcast, windy, 2°C

SITE/AOC: Background FEET FROM FIXED POINT: 150 MAGNETIC HEADING: See below

FIXED POINT: Large log south of pond. 268° to NE tower of new SRR, 243° to radio tower.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: SS, RC

TIME SAMPLED: 14:00 DEPTH OF SAMPLE (feet):

SAMPLE DESCRIPTION/COMMENTS: Water sample.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
14:00	8.3	>1,990 μS	4°C		

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
14:00	NR				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS WATER		BARROW LAB CONTAINERS SOIL	ANALYSES	✓	ANCHORAGE LAB CONTAINERS WATER		ANCHORAGE LAB CONTAINERS SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS	✓	1 liter		---
VOC-BTEX 8020	✓				TDS	✓	250 ml		---
					TSS	✓	250 ml		---
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 08/15/93 SAMPLE ID: BUL-BKGD-SW02

RADAR STATION: Bullen WEATHER: Overcast, windy, 2°C

SITE/AOC: Background FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: 269° to radio tower, 300° to SRR tower (NE corner), 304° to new tan maintenance building, 200° to airstrip windsock.

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ■ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RC, JD

TIME SAMPLED: 11:20 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

SAMPLING METHOD: Grab sample

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY
11:20	8.2	430 μS	3°C		Clear

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		
11:20	NR				

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓				SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS	✓	1 liter		---
VOC-BTEX 8020	✓				TDS	✓	250 ml		---
					TSS	✓	250 ml		---
					TOC	✓	500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOGS FOR QA/QC

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-AB01

RADAR STATION: Bullen Point WEATHER: Cold and cloudy

SITE/AOC: Ambient Condition FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: Taken in the tank farm

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: AP

TIME SAMPLED: 11:35 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Odor of insinolet - toilet of the Matrix Construction crew.

SAMPLING METHOD: _____

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

■ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH		1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-EB01

RADAR STATION: Bullen WEATHER: Cold

SITE/AOC: _____ FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: _____

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: RC, SS

TIME SAMPLED: 17:25 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: Equipment blank of sampling scoops. Grade II water over disposal scoops, no other sample tools used today.

SAMPLING METHOD: _____

QA/QC SAMPLES COLLECTED: ■ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

		BARROW LAB				ANCHORAGE LAB		
ANALYSES	✓	CONTAINERS		ANALYSES	✓	CONTAINERS		
		WATER	SOIL			WATER		SOIL
TPH	✓	1 liter	8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB	✓			SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓			TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml	4 oz	DISS METALS	✓	1 liter		---
VOC-BTEX 8020	✓			TDS		250 ml		---
				TSS		250 ml		---
				TOC		500 ml		4 oz
				TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-EB02

RADAR STATION: Bullen Point WEATHER: Cloudy and cold, 36°F

SITE/AOC: Equipment Blank FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: _____

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: AP

TIME SAMPLED: 10:10 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: 10:45 for SVOC only.

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ■ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH	✓	1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)	✓	1 liter		8 oz
PESTICIDES	✓				TOTAL METALS	✓	1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 09/03/93 SAMPLE ID: BUL-2EB03

RADAR STATION: Oliktok WEATHER: _____

SITE/AOC: _____ FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: _____

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: JP

TIME SAMPLED: 15:33 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

SAMPLING METHOD: Grab

QA/QC SAMPLES COLLECTED: ■ Equipment Blank (EB) ☐ QA/QC Extra Volumes

☐ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH		1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020	✓				TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-15-93 SAMPLE ID: BUL-TB01

RADAR STATION: Bullen WEATHER: _____

SITE/AOC: Trip Blank FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: _____

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ICF KE

TIME SAMPLED: _____ DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

SAMPLING METHOD: _____

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

■ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH		1 liter		8 oz	VOC (8260)		3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010		1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 8-16-93 SAMPLE ID: BUL-TB02

RADAR STATION: Bullen Point WEATHER: Cloudy and cold

SITE/AOC: Trip Blank FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: _____

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ICF KE

TIME SAMPLED: 08:00 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

SAMPLING METHOD: Sent from laboratory.

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

■ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS			ANALYSES	✓	ANCHORAGE LAB CONTAINERS		
		WATER		SOIL			WATER		SOIL
TPH		1 liter		8 oz	VOC (8260)	✓	3 x 40 ml		4 oz
PCB					SVOC (8270)		1 liter		8 oz
PESTICIDES					TOTAL METALS		1 liter		8 oz
HVOC 8010	✓	1 x 40 ml		4 oz	DISS METALS		1 liter		---
VOC-BTEX 8020					TDS		250 ml		---
					TSS		250 ml		---
					TOC		500 ml		4 oz
					TCLP		2 liters		2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

SAMPLE COLLECTION LOG

DATE: 9-3-93 SAMPLE ID: BUL-2TB03

RADAR STATION: Bullen WEATHER: Nice and cold, partly cloudy

SITE/AOC: Trip Blank FEET FROM FIXED POINT: _____ MAGNETIC HEADING: _____

FIXED POINT: _____

SAMPLE MATRIX: ☐ Soil (S) ☐ Sediment (SD) ☐ Surface Water (SW) ☐ Groundwater (GW)

SAMPLERS: ICF KE

TIME SAMPLED: 10:00 DEPTH OF SAMPLE (feet): _____

SAMPLE DESCRIPTION/COMMENTS: _____

SAMPLING METHOD: Prepared by FBI

QA/QC SAMPLES COLLECTED: ☐ Equipment Blank (EB) ☐ QA/QC Extra Volumes

■ Trip Blank (TB) ☐ Duplicate of Water Sample ID _____

☐ Ambient Condition Blank (AB) ☐ Replicate of Soil Sample ID _____

WATER PARAMETERS					
TIME	PH	CONDUCTIVITY	TEMPERATURE	SPECIFIC GRAVITY	TURBIDITY

MONITORING READINGS					
TIME	PID READING (ppm)	CG/LEL (%)	HANBY SCREENING (standard/ppm)		

BG=Background; BZ=Breathing Zone; BH=Borehole; NR=No Readings; HS=Headspace; S=Sample (uncontained)

✓ CHECK ANALYSES REQUESTED

ANALYSES	✓	BARROW LAB CONTAINERS		ANALYSES	✓	ANCHORAGE LAB CONTAINERS	
		WATER	SOIL			WATER	SOIL
TPH		1 liter	8 oz	VOC (8260)		3 x 40 ml	4 oz
PCB				SVOC (8270)		1 liter	8 oz
PESTICIDES				TOTAL METALS		1 liter	8 oz
HVOC 8010		1 x 40 ml	4 oz	DISS METALS		1 liter	---
VOC-BTEX 8020	✓			TDS		250 ml	---
				TSS		250 ml	---
				TOC		500 ml	4 oz
				TCLP		2 liters	2 x 8 oz

Preservation: HVOC and VOC: HCl to pH <2; metals: HNO_3 to pH <2; Ice all samples to 4°C

Sample ID Format: Radar Station - site identifier - matrix + sample number - depth (feet)
(i.e., BUL-ST05-SW07, BTR-EB04, WRT-SS08-S09-5.0)

Radar Station Codes: Bullen=BUL; Oliktok=OLI; Barter=BTR; Lonely=LON; Barrow=BRW; Wainwright=WRT; Lay=LAY; Lisburne=LIS

APPENDIX E

CHAIN-OF-CUSTODY FORMS

ICF KAISER ENGINEERS — CHAIN OF CUSTODY RECORD

NO. 0504

PROJ. NO. 4/096-412--01

PROJECT NAME DEW Line RI/FS

SAMPLERS: (Signature) [illegible] ICF Dennis Robert Coughlin

YR MO NO.

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Arch.	VOC	SVOC	TOC				REMARKS
BULLEN	8/15	1400		✓	BUL-BKGD-SW01	5	3	1	1					
		1120			BUL-BKGD-SW02	5	3	1	1					
		~~1100~~ 1136	97		BUL-LF06-SW01		3	1	1					
					~~BUL-LF06-SW02~~									97
		1650			BUL-LF06-SW03		9	3	3					(QA/QC)
97	97	1725		3	BUL-EB01		3	1						
		0800			BUL-TB01	2	2							

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	8/15/93 2130				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0505

PROJ. NO.	PROJECT NAME
41096-412 -01	DEW LINE RI/FS

SAMPLERS: (Signature) CFKE. Robert C Cartwright ICF KE

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	BARROW LAB	HVOC	BTEX	TPH	PCB	Pesticides			REMARKS
BULLEN	8-15	1400		✓	BUL-BKGD-SW01	4		←3→	←1→						NOTE: 4 more water samples coming tomorrow
		1120		✓	BUL-BKGD-SW02	4		←3→	←1→						
✓		1636		✓	BUL-~~BKGD-SW03~~ LF06-SW01 JP	4		←3→	←1→						
✓		1740		✓	BUL-LF06-SW02	4		←3→	←1→						
✓		1650		-	BUL-LF06-SW03	12		←9→	←3→						(QA/QC)
✓		0800		✓	BUL-TB01	2		←2→							
✓	↓	1725		✓	BUL-EB01	4		←3→	←1→						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8/15/93 930 am				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0506

PROJ. NO.	PROJECT NAME
41096-412-01	DEW LINE RI/FS

SAMPLERS: (Signature) J Pierce ICF / Heyward LF

STAT. NO.	DATE 1997	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	SVOC	Total Metals	REMARKS
BULLEN	8-15	1345		V	BUL-BKGD-SØ1	3	← 3 →			BKGD - BACKGROUNDS
		1145			BUL-BKGD-SØ2	3	← 3 →			
		1030			BUL-BKGD-SØ3	3	← 3 →			
		1100			BUL-BKGD-SØ4	3	← 3 →			
		1405			~~LF06~~ BUL-~~BKGD~~-SDØ1 BKGD	3	← 3 →			~~LF06~~ ~~LANDFILL~~ BUL-BKGD-SDØ1 LANDFILL LF
		1500			~~LF06~~ BUL-~~BKGD~~-SØ2	3	← 3 →			
		1440			~~LF06~~ BUL-~~BKGD~~-SØ3	3	← 3 →			
		1556			BUL-LFØ6-SDØ1	3	← 3 →			
					~~BUL LF06 SDP~~					
					~~BUL~~ SP					

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
J Pierce	9/15/97 1430				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0507

PROJ. NO.	PROJECT NAME
41096-H2-01	DEW Line RI/FS

SAMPLERS: (Signature)

[signature] Jeppesen ICF Kaiser Related

YR MO NO.

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Total Metals	Dissolved Metals	TSS	TDS				REMARKS
Bulkl	8/15	1400		✓	BUL-BKGD-SW01	4	1	1	1	1				More H2O samples coming
		1120		✓	BUL-BKGD-SW02	4	1	1	1	1				
					~~BUL BKGD SW 27~~									
		1636			BUL-LF06-SW01		1	1	1	1				
		1650			BUL-LF06-SW03,		2	2	2	2				QA/QC.
		1725		✓	BUL-EB01	2	1	1						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Robert C Cartright	7/15/93 2130				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0508

PROJ. NO.	PROJECT NAME
41096-412-01	DEW LINE R1/FS

SAMPLERS: (Signature) J. Ward ICF D. Nace

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH	PCB	PESTICIDES	HVOC	VOC-BTEX	REMARKS
BULLEN	8-15	1345		✓	BUL-BKGD-S01	1	← 1	→	→	→		BKGD BACKGROUND SAMPLES
		11:45			BUL-BKGD-S02	1	← 1	→	→	→		
		10:30			BUL-BKGD-S03	1	← 1	→	→	→		
		11:00			BUL-BKGD-S04	1	← 1	→	→	→		
		1405			BUL-~~BKGD~~ LF06-SD01 BKGD	1	← 1	→	→	→		~~LF06 - LANDFILL~~ BUL-~~BKGD~~ -SD01
		1300			BUL-LF06-S01	1	← 1	→	→	→		LANDFILL SAMPLES
		1500			BUL-LF06-S02	1	← 1	→	→	→		
		1440			BUL-LF06-S03	1	← 1	→	→	→		
		1430			BUL-LF06-S04	1	← 1	→	→	→		
		1415			BUL-LF06-S05	1	← 1	→	→	→		
		1355			BUL-LF06-S06	1	← 1	→	→	→		
		1340			BUL-LF06-S07	1	← 1	→	→	→		
		1330			BUL-LF06-S08	2	← 2	→	→	→		QA/QC
		1405			BUL-LF06-S09	1	← 1	→	→	→		
		1556			BUL-LF06-SD01	1	← 1	→	→	→		
		1610		✓	BUL-LF06-SD02	1	← 1	→	→	→		

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
J. Ward	9/15/93 2130				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0509

PROJ. NO.	PROJECT NAME
41096-412-01	DEW LINE RI/FS

SAMPLERS: (Signature) ICF ICF

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PCB	REMARKS
BULLEN	8-15	1600		✓	BUL-OTØ4-WØ1	1	1	
↓	↓	1618		✓	BUL-OTØ4 WØ2	1	1	
↓	↓	1625		✓	BUL-OTØ4 WØ3	1	1	

YR MO
NO.

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	9/15/93 2130				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0510

PROJ. NO.	PROJECT NAME
41096-412-01	DEW LINE RI/FS

SAMPLERS: (Signature) [signature] ICF [signature] ICF

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	PCB	PESTICIDES						REMARKS
BULLTEN	8-15	1650		✓	BUL-OTØ4-SØ1	1	1 →							
		1648		✓	BUL-OTØ4-SØ2	1	1 →							
		1655		✓	BUL-OTØ4-SØ3	1	1 →							
		1640		✓	BUL-OTØ4-SØ4	1	1 →							
		1645		✓	BUL-OTØ4-SØ5	1	1 →							

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8/17/93 2130				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0511
1 of 2

PROJ. NO.	PROJECT NAME
41096-412-01	DEW Line RI/FS

SAMPLERS: (Signature) ICF

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Barrow Lab	★ HVOC	VOC-BTEX	TPH	Pesticides	PCB	REMARKS
Bullen	B-16	9:45		X	BUL-ST05-S01	1		1	→				
		10:15			BUL-ST05-S02	1		1	→				
		10:35			BUL-ST05-S03	1		1		→			
		11:13			BUL-ST05-S04	1		1	→				
		11:10			BUL-ST05-S05-2.5	1		1	→				
		11:15			BUL-ST05-S06	1		1	→				
		11:30			BUL-ST05-S07	1		1	→				
		11:50			BUL-ST05-S08	1		1	→				
		12:00			BUL-ST05-S09	1		1	→				
		13:20			BUL-ST05-S10	1		1	→				
		13:25			BUL-ST05-S11-1.5	1		1	→				
		13:50			BUL-ST05-S12	1		1	→				
		14:10			BUL-ST05-S13-1.5	2		2	→				QA/QC
		13:45			BUL-ST05-S14	1		1	→				
		14:25			BUL-ST05-S15-0.5	1		1	→				
		14:15			BUL-ST05-S16	1		1	→				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/4/93 7:20				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0512 2 of 2

PROJ. NO.	PROJECT NAME
41096-412-C1	DEW Line RI/FS

SAMPLERS: (Signature) ICF

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Burlew Lab	HVOC	VOC - BTEX	TPH	Pesticides	PCB	REMARKS
BULLEN	8-10	14:45		X	BUL-ST05-S17-2.0	1		1					
		14:30			BUL-ST05-S18	1		1					
		1525			BUL-ST05-S19	1		1					
		15:45			BUL-ST05-S20	1		1					
		15:15			BUL-ST05-S21 *1	1		1					
		1045			BUL-ST05-S22	*1		1					
		14:35			BUL-ST05-S23	1		1					
					~~BUL-EB02~~ SC			3	1				SC

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8.11.93 2100				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0513

PROJ. NO.	PROJECT NAME
21096-412-01	DEW-Line RI/FS

SAMPLERS: (Signature) ICF

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	SVOC	Total metals	Dissolved metals	TDS	TSS	TOC	REMARKS
Bulker	8-16	1010		X	BUL-EB02	4	3		1					
		1045			BUL-EB02	1		1						
		1135			BUL-AB01	3	3							
		1140			BUL-ST05-GW01	7	3	1			1	1	1	possible high values
		1530			BUL-AOC11-SW01	7	3	1			1	1	1	possible high values
		16:20			BUL-ST05-GW02	7	3	1			1	1	1	
		0800			BUL-TB02	2	2							

YR MO NO.

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8-16 2100				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0514

PROJ. NO.	PROJECT NAME
41094-41201	DEW-Line RI/FS

SAMPLERS: (Signature) ICF

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	HVOC-BTEX	VOC-BTEX TPH	PESTICIDES PCB	REMARKS
✓ Billen	8-16	10:10		X	BUL-EB02	4	3	1 →		
✓		11:40			BUL-ST05-GW01	4	3	1		possible high values
✓		1500			BUL-ST05-SW01	4	3	1		
✓		1520			BUL-ST05-SW02	4	3	1		
✓		1530			BUL-AOC11-SW01	4	3	1		possible high values
✓		1620			BUL-ST05-GW02	4	3	1		
✓		0800			BUL-TB02	2	2			

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8-16-93 2100				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0515

PROJ. NO.	PROJECT NAME
4106-4-12-01	DEWLine RI/FS

SAMPLERS: (Signature) ICF

STAT. NO.	DATE 1993	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	VOC	SVOC	Total metals	Dissolved metals	TDS	TSS	TOC	REMARKS
Bullen	8/6	10:15		X	BUL-ST05-S02	3	1	1	1					
		11:45			BUL-ST05-S06	2	1	1						
		14:10			BUL-ST05-S13	3	1	1	1					~~DUP~~ DUP QC2
		10:45			BUL-ST05-S22	3	1	1	1					
		16 15			BUL-AOC12-S02	3	1	1	1					
		1700			BUL-AOC11-S01	2	1	1						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8.11.93 2100				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0516

PROJ. NO.	PROJECT NAME
41096-412-C1	DEW-Line RI/FS

SAMPLERS: (Signature) ICF

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	VOC	IOC-BTEX	TPH	PESTICIDES	PCB	REMARKS
Bullen	8-16	1550		X	BUL-ST05-S24	1		1				
		1610			BUL-ST05-S25	1		1				
		1600			BUL-ST05-S26	1		1				
		1615			BUL-AOC12-S01	1	1					
		1615			BUL-AOC12-S02	1	1					
		1630			BUL-AOC12-S03	2	2					QA/QC
		1700			BUL-AOC11-S01	1		1				
		1659			BUL-AOC11-S02	1		1				
		1715			BUL-AOC11-S03	1		1				possible high values
		1710			BUL-AOC11-S04	1		1				possible high values
		1710			BUL-AOC11-S05	1		1				
		1715			BUL-AOC11-SD01	1		1				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/16/93 2100				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

ICF KAISER ENGINEERS

CHAIN OF CUSTODY RECORD

NO. 0576

PROJ. NO.	PROJECT NAME
41091-4112-01	DEW Line RI/FS

SAMPLERS: (Signature)

STAT. NO.	DATE 1993	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TPH	VOC BTEX	PCB	REMARKS
Bulkan	9-3	1315		X	BUL-ST05-2527	1	1			
		1400			BUL-ST05-2528	1	1			
		1330			BUL-ST05-2529	1	1			
		1345			BUL-ST05-2530	1	1			
		1500			BUL-ST05-2531	1	1			
		1400			BUL-ST05-2532	1	1			
		1140			BUL-ST05-2533	1	1			
		1145			BUL-ST05-2534	1	1			
		1445			BUL-ST05-2535	1	1			
		1500			BUL-ST05-2536	1	1			
		1210			BUL-AOC11-2506	2	1	1		
		1328			BUL-OT04-2506	1			1	
		1533			BUL-2EB03	3		3		
		1000			BUL-2TB03	2		2		
		1512			BUL-ST05-2537	1	1			

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	9.3.93 1620				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks:	

APPENDIX F

ANALYTICAL DATA

1. SUMMARY TABLES OF ANALYTICAL DATA (presented in Sections 3.0 and 4.0)
2. CROSS-REFERENCE TABLE FOR SAMPLE IDENTIFICATION
3. ANALYTICAL DATA (for each site CT&E Data is presented first followed by F&B Data)

1. SUMMARY TABLES OF ANALYTICAL DATA (presented in Sections 3.0 and 4.0)

2. CROSS-REFERENCE TABLE FOR SAMPLE IDENTIFICATION

J:\AK-RIFS\BULLEN\410968\1301\APP-F.TBL

CROSS-REFERENCE SAMPLE IDENTIFICATION

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Outside Transformer (OT04)									
BUL-OT04-S01	BUL-OT04-S01	OT04		510		127		#5-08/19/93	Soil
BUL-OT04-S02	BUL-OT04-S02	OT04		510		128		#5-08/19/93	Soil
BUL-OT04-S03	BUL-OT04-S03	OT04		510		129		#5-08/19/93	Soil
BUL-OT04-S04	BUL-OT04-S04	OT04		510		130		#5-08/19/93	Soil
BUL-OT04-S05	BUL-OT04-S05	OT04		510		131		#5-08/19/93	Soil
BUL-OT04-2S06	BUL-OT04-2S06	OT04		576		1862		#5-09/03/93 #5-09-06/93	Soil
BUL-OT04-WP01	BUL-OT04-W01	OT04	509		93.4124-1		93.4124		Wipe
BUL-OT04-WP02	BUL-OT04-W02	OT04	509		93.4124-2		93.4124		Wipe
BUL-OT04-WP03	BUL-OT04-W03	OT04	509		93.4124-3		93.4124		Wipe

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
POL Tanks (ST05)									
BUL-ST05-S01	BUL-ST05-S01	ST05	511		93.4200-1		93.4200		Soil
BUL-ST05-S01DP	BUL-ST05-S01DP	ST05	511		93.4200-3		93.4200		Soil Spike Duplicate
BUL-ST05-S01	BUL-ST05-S01S	ST05	511		93.4200-2		93.4200		Soil Spike
BUL-ST05-S02	BUL-ST05-S02	ST05	511 515		93.4177-1 93.4200-4		93.4177 93.4200		Soil
BUL-ST05-S03	BUL-ST05-S03	ST05	511		93.4200-5		93.4200		Soil
BUL-ST05-S03DP	BUL-ST05-S03DP	ST05	511		93.4200-7		93.4200		Soil Spike Duplicate
BUL-ST05-S03	BUL-ST05-S03S	ST05	511		93.4200-6		93.4200		Soil Spike
BUL-ST05-S04	BUL-ST05-S04	ST05	511		93.4200-8		93.4200		Soil
BUL-ST05-S05	BUL-ST05-S05	ST05	511		93.4200-9		93.4200		Soil
BUL-ST05-S06	BUL-ST05-S06	ST05	515		93.4177-2 93.4200-10		93.4177 93.4200		Soil
BUL-ST05-S07	BUL-ST05-S07	ST05	511		93.4200-11		93.4200		Soil
BUL-ST05-S08	BUL-ST05-S08	ST05	511		93.4200-12		93.4200		Soil
BUL-ST05-S09	BUL-ST05-S09	ST05	511		93.4200-13		93.4200		Soil
BUL-ST05-S10	BUL-ST05-S10	ST05	511		93.4200-14		93.4200		Soil
BUL-ST05-S11	BUL-ST05-S11	ST05	511		93.4200-15		93.4200		Soil
BUL-ST05-S12	BUL-ST05-S12	ST05	511		93.4200-16		93.4200		Soil
BUL-ST05-S13	BUL-ST05-S13	ST05	511 515		93.4177-3 93.4200-17		93.4177 93.4200		Soil

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
POL TANKS (ST05)									
BUL-ST05-S14	BUL-ST05-S14	ST05	511		93.4200-18		93.4200		Soil
BUL-ST05-S15	BUL-ST05-S15	ST05	511		93.4200-19		93.4200		Soil
BUL-ST05-S16	BUL-ST05-S16	ST05	511		93.4200-20		93.4200		Soil
BUL-ST05-S17	BUL-ST05-S17	ST05	512		93.4200-21		93.4200		Soil
BUL-ST05-S18	BUL-ST05-S18	ST05	512		93.4200-22		93.4200		Soil
BUL-ST05-S19	BUL-ST05-S19	ST05	512		93.4200-23		93.4200		Soil
BUL-ST05-S20	BUL-ST05-S20	ST05	512		93.4200-24		93.4200		Soil
BUL-ST05-S21	BUL-ST05-S21	ST05	512		93.4200-25		93.4200		Soil
BUL-ST05-S21DP	BUL-ST05-S21DP	ST05	512		93.4200-27		93.4200		Soil Spike Duplicate
BUL-ST05-S21	BUL-ST05-S21S	ST05	512		93.4200-26		93.4200		Soil Spike
BUL-ST05-S22	BUL-ST05-S22	ST05	512 515		93.4177-4 93.4200-28		93.4177 93.4200		Soil
BUL-ST05-S23	BUL-ST05-S23	ST05	512		93.4200-29		93.4200		Soil
BUL-ST05-S24	BUL-ST05-S24	ST05	516		93.4201-1		93.4201		Soil
BUL-ST05-S25	BUL-ST05-S25	ST05	516		93.4201-2		93.4201		Soil
BUL-ST05-S26	BUL-ST05-S26	ST05	516		93.4201-3		93.4201		Soil
BUL-ST05-2S27	BUL-ST05-2S27	ST05		576		1850		#5-09/06/93	Soil
BUL-ST05-2S28	BUL-ST05-2S28	ST05		576		1851		#5-09/06/93	Soil
BUL-ST05-2S29	BUL-ST05-2S29	ST05		576		1852		#5-09/06/93	Soil

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
POL TANKS (ST05)									
BUL-ST05-2S30	BUL-ST05-2S30	ST05		576		1853		#5-09/06/93	Soil
BUL-ST05-2S31	BUL-ST05-2S31	ST05		576		1854		#5-09/06/93	Soil
BUL-ST05-2S32	BUL-ST05-2S32	ST05		576		1855		#5-09/06/93	Soil
BUL-ST05-2S33	BUL-ST05-2S33	ST05		576		1856		#5-09/06/93	Soil
BUL-ST05-2S34	BUL-ST05-2S34	ST05		576		1857		#5-09/06/93	Soil
BUL-ST05-2S35	BUL-ST05-2S35	ST05		576		1858		#5-09/06/93	Soil
BUL-ST05-2S36	BUL-ST05-2S36	ST05		576		1859		#5-09/06/93	Soil
BUL-ST05-2S37	BUL-ST05-2S37	ST05		576		1868		#5-09/06/93	Soil
BUL-ST05-SW01	BUL-ST05-SW01	ST05	514		93.4205-3		93.4205		Surface Water
BUL-ST05-SW02	BUL-ST05-SW02	ST05	514		93.4205-4		93.4205		Surface Water
BUL-ST05-GW01	BUL-ST05-GW01	ST05	513 514		93.4180-6 93.4205-2		93.4180 93.4205		Ground Water
BUL-ST05-GW02	BUL-ST05-GW02	ST05	513 514		93.4205-6 93.4180-8		93.4205 93.4180		Ground Water

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Old Landfill/Dump Site East (LF06)									
BUL-LF06-S01	BUL-LF06-S01	LF06	508		93.4202-6		93.4202		Soil
BUL-LF06-S01DP	BUL-LF06-S01DP	LF06	508		93.4202-8		93.4202		Soil Duplicate
BUL-LF06-S01	BUL-LF06-S01S	LF06	508		93.4202-7		93.4202		Soil Spike
BUL-LF06-S02	BUL-LF06-S02	LF06	506 508		93.4123-8 93.4202-9		93.4123 93.4202		Soil
BUL-LF06-S03	BUL-LF06-S03	LF06	506 508		93.4202-10		93.4202		Soil
BUL-LF06-S03DP	BUL-LF06-S03DP	LF06	504 507		93.4122-9 93.4121-6		93.4122 93.4121		Water Duplicate
BUL-LF06-S03S	BUL-LF06-S03S	LF06	504 503 505		93.4122-5 93.4121-5 93.4204-6		93.4122 93.4204		Water Spike
BUL-LF06-S03SD	BUL-LF06-S03SD	LF06	504 505		93.4122-6 93.4204-7		93.4122 93.4204		Water Spike Duplicate
BUL-LF06-S04	BUL-LF06-S04	LF06	508		93.4202-11		93.4202		Soil
BUL-LF06-S05	BUL-LF06-S05	LF06	508		93.4202-12		93.4202		Soil
BUL-LF06-S06	BUL-LF06-S06	LF06	508		93.4202-13		93.4202		Soil
BUL-LF06-S07	BUL-LF06-S07	LF06	508		93.4202-14		93.4202		Soil
BUL-LF06-S08	BUL-LF06-S08	LF06	508		93.4202-15		93.4202		Soil
BUL-LF06-S09	BUL-LF06-S09	LF06	508		93.4202-16		93.4202		Soil
BUL-LF06-SD01	BUL-LF06-SD01	LF06	506 508		93.4123-9 93.4202-17		93.4123 93.4202		Sediment
BUL-LF06-SD02	BUL-LF06-SD02	LF06	508		93.4202-18		93.4202		Sediment

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CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Old Landfill/Dump Site East (LF06)									
BUL-LF06-SW01	BUL-LF06-SW01	LF06	504 505 507		93.4121-3 93.4122-3 93.4204-3		93.4121 93.4122 93.4204		Surface Water
BUL-LF06-SW02	BUL-LF06-SW02	LF06	505		93.4204-4		93.4204		Surface Water
BUL-LF06-SW03	BUL-LF06-SW03	LF06	504 505 507		93.4121-4 93.4122-4 93.4204-5		93.4121 93.4122 93.4204		Surface Water
BUL-LF06-SW03DP	BUL-LF06-SW03DP	LF06	504 507		93.4122-9 93.4121-6		93.4122 93.4121		Water Duplicate
BUL-LF06-SW03	BUL-LF06-SW03S	LF06	504 507 505		93.4122-5 93.4121-5 93.4204-6		93.4122 93.4204		Water Spike
BUL-LF06-SW03SD	BUL-LF06-SW03SD	LF06	504 505		93.4122-6 93.4204-7		93.4122 93.4204		Water Spike Duplicate

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Fuel Storage Area (ST09)									
BUL-ST09-S01	BUL-ST09-S01	ST09	515 516		93.4177-6 93.4201-9		93.4177 93.4201		Soil
BUL-ST09-S02	BUL-ST09-S02	ST09	516		93.4201-10		93.4201		Soil
BUL-ST09-S03	BUL-ST09-S03	ST09	516		93.4201-11		93.4201		Soil
BUL-ST09-S04	BUL-ST09-S04	ST09	516		93.4201-12		93.4201		Soil
BUL-ST09-S05	BUL-ST09-S05	ST09	516		93.4201-13		93.4201		Soil
BUL-ST09-2S06	BUL-ST09-2S06	ST09		576		1860		#5-09/06/93	Soil
BUL-ST09-SW01	BUL-ST09-SW01	ST09	513 514		93.4205-5		93.4205		Surface Water
BUL-ST09-SD01	BUL-ST09-SD01	ST09	516		93.4201-14		93.4201		Sediment

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Drum Storage Area (SS10)									
BUL-SS10-S01	BUL-ST10-S01	SS10	516		93.4201-4		93.4201		Soil
BUL-SS10-S01	BUL-SS10-S01S	SS10	516		93.4201-5		93.4201		Soil Spike
BUL-SS10-S01DP	BUL-SS10-S01DP	SS10	516		93.4201-6		93.4201		Soil Spike Duplicate
BUL-SS10-S02	BUL-ST10-S02	SS10	515 516		93.4177-5 93.4201-7		93.4177 93.4201		Soil
BUL-SS10-S03	BUL-ST10-S03	SS10	516		93.4201-8		93.4201		Soil

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
Background (BKGD)									
BUL-BKGD-S01	BUL-BKGD-S01	BKGD	506 508		93.4123-1 93.4202-1		93.4123 93.4202		Soil
BUL-BKGD-S01DP	BUL-BKGD-S01DP	BKGD	506		93.4123-3		93.4123		Soil Duplicate
BUL-BKGD-S01	BUL-BKGD-S01S	BKGD	506		93.4123-2		93.4123		Soil Spike
BUL-BKGD-S01SD	BUL-BKGD-S01SD	BKGD	506		93.4123-10		93.4123		Soil Spike Duplicate
BUL-BKGD-S02	BUL-BKGD-S02	BKGD	506 508		93.4123-4 93.4202-2		93.4123 93.4202		Soil
BUL-BKGD-S03	BUL-BKGD-S03	BKGD	506 508		93.4123-5 93.4202-3		93.4123 93.4202		Soil
BUL-BKGD-S04	BUL-BKGD-S04	BKGD	506 508		93.4123-6 93.4202-4		93.4123 93.4202		Soil
BUL-BKGD-SD01	BUL-BKGD-SD01	BKGD	506 508		93.4123-7 93.4202-5		93.4123 93.4202		Sediment
BUL-BKGD-SW01	BUL-BKGD-SW01	BKGD	504 505 507		93.4121-1 93.4122-1 93.4204-1		93.4121 93.4122 93.4204		Surface Water
BUL-BKGD-SW02	BUL-BKGD-SW02	BKGD	504 505 507		93.4121-2 93.4122-2 93.4204-2		93.4121 93.4122 93.4204		Surface Water

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CROSS-REFERENCE SAMPLE IDENTIFICATION (CONTINUED)

RI/FS TEXT AND TABLE SAMPLE IDENTIFICATION	FIELD CHAIN-OF-CUSTODY AND DATA VALIDATION SAMPLE IDENTIFICATION	SITE IDENTIFICATION	FIELD BATCH IDENTIFICATION		LABORATORY IDENTIFICATION		LABORATORY BATCH IDENTIFICATION		SAMPLE DESCRIPTION
			CT&E	F&B	CT&E	F&B	CT&E	F&B	
QA/QC									
BUL-AB01	BUL-AB01	QA/QC	513		93.4180-3		93.4180		Ambient Blank
BUL-AB01	BUL-AB01S	QA/QC	513		93.4180-4		93.4180		Soil Spike
BUL-AB01SD	BUL-AB01SD	QA/QC	513		93.4180-5		93.4180		Soil Spike Duplicate
BUL-EB01	BUL-EB01	QA/QC	504 505 507		93.4121-7 93.4122-7 93.4204-9		93.4121 93.4122 93.4204		Equipment Blank
BUL-EB02	BUL-EB02	QA/QC	513 514		93.4180-1 93.4180-2 93.4205-1		93.4180 93.4180 93.4205		Equipment Blank
BUL-2EB03	BUL-2EB03	QA/QC		576		1864		#1-09/07/93	Equipment Blank
BUL-TB01	BUL-TB01	QA/QC	504 505		93.4122-8 93.4204-8		93.4122 93.4204		Trip Blank
BUL-TB02	BUL-TB02	QA/QC	513 514		93.4180-9 93.4205-7		93.4180 93.4205		Trip Blank
BUL-2TB03	BUL-2TB03	QA/QC		576		1866		#1-09/07/93	Trip Blank

CT&E - Commercial Testing and Engineering Co.
F&B - Friedman and Bruya, Inc.

3. ANALYTICAL DATA

ANALYTICAL DATA SHEETS FOR THE INSIDE TRANSFORMER (OT04)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4124-1
Client Sample ID :BUL-0T04-W01 BULLEN
Matrix :OTHER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69696
Report Completed :08/25/93
Collected :08/15/93 @ 16:00 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J. PURA ICF AND S.S. SEPPOVEN. MATRIX = WIPES.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
PCBs in Wipe	18.9		microg	EPA 8080		08/19	08/19	ECG
------Aroclor 1254								

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B S[illegible]
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4124-2
Client Sample ID :BUL-0T04-W02 BULLEN
Matrix :OTHER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69696
Report Completed :08/25/93
Collected :08/15/93 @ 16:18 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J. PURA ICF AND S.S. SEPPOVEN. MATRIX = WIPES.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
PCBs in Wipe	391.1		microg	EPA 8080		08/19	08/19	ECG
------Aroclor 1254								

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyze[illegible]
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4124-3
Client Sample ID :BUL-0T04-W03 BULLEN
Matrix :OTHER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69696
Report Completed :08/25/93
Collected :08/15/93 @ 16:25 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J. PURA ICF AND S.S. SEPPOVEN. MATRIX = WIPES.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
PCBs in Wipe	194		microg	EPA 8080		08/19	08/19	ECG
------Aroclor 1254								

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ICF ID	BUL-OT04-S01	BUL-OT04-S02	BUL-OT04-S03	BUL-OT04-S04
F&BI Number	127	128	129	130
Sample Type	soil	soil	soil	soil
Date Received	8/17/93	8/17/93	8/17/93	8/17/93
% Dry Weight	97.5	95.4	96.3	94
Sequence Date				
Leaded Gas				
JP-4				
Lube Oil				
Diesel				
Spike Level				
Unknown Semi-volatile				
Pentacosane				
Sequence Date	#5-08/19/93	#5-08/19/93	#5-08/19/93	#5-08/19/93
PCB 1221	<0.1 R	<0.1 J	<0.1 J	<0.1 J
PCB 1232	<0.1	<0.1	<0.1	<0.1
PCB 1016	<0.1	<0.1	<0.1	<0.1
PCB 1242	<0.1	<0.1	<0.1	<0.1
PCB 1248	<0.1	<0.1	<0.1	<0.1
PCB 1254	<0.1	0.9	<0.1	~~0.1~~ 0.31 J
PCB 1260	<0.1	<0.1	<0.1	<0.1 J
Spike Level				
Dibutyl Chlorendate	96	99	93	93
Sequence Date	#5-08/19/93	#5-08/19/93	#5-08/19/93	#5-08/19/93
alpha-BHC	<0.01 R	<0.01 J	<0.01 J	<0.01 J
beta-BHC	<0.01	<0.01	<0.01	<0.01
gamma-BHC	<0.01	<0.01	<0.01	<0.01
delta-BHC	<0.01	<0.01	<0.01	<0.01
Heptachlor	<0.01	<0.01	<0.01	<0.01
Aldrin	<0.01	<0.01	<0.01	<0.01
Heptachlor Epoxide	<0.01	<0.01	<0.01	<0.01
Endosulfan I	<0.01	<0.01	<0.01	<0.01
DDE	<0.01	<0.01	<0.01	<0.01
Dieldrin	<0.01	<0.01	<0.01	<0.01
Endrin	<0.01	<0.01	<0.01	<0.01
Endosulfan II	<0.01	<0.01	<0.01	<0.01
DDD	<0.01	<0.01	<0.01	<0.01
Endrin Aldehyde	<0.01	<0.01	<0.01	<0.01
DDT	<0.01	<0.01	<0.01	<0.01
Endosulfan Sulfate	<0.01	<0.01	<0.01	<0.01
Endrin Ketone	<0.01	<0.01	<0.01	<0.01
Methoxy Chlor	<0.5	<0.5	<0.5	<0.5
Chlordane	<0.5	<0.5	<0.5	<0.5
Dibutyl Chlorendate	96	99	93	93
Spike Level				
Vol Sequence				
CCl4				
TCA				
Benzene				
TCE				
Toluene				
PCE				
Ethylbenzene				
Xylenes				
Gasoline				
Spike level				
BFB				

compiled by SJM 9/01/95

ICF ID	BUL-OT04-S04	BUL-OT04-S04	BUL-OT04-S04	BUL-OT04-S05
F&BI Number	130 dup	130 ms	130 msd	131
Sample Type	soil	soil	soil	soil
Date Received	8/17/93	8/17/93	8/17/93	8/17/93
% Dry Weight				95.3
Sequence Date				
Leaded Gas				
JP-4				
Lube Oil				
Diesel				
Spike Level				
Unknown Semi-volat				
Pentacosane				
Sequence Date	#5-08/19/93	#5-08/19/93	#5-08/19/93	#5-08/19/93
PCB 1221	<0.1			<0.1 J
PCB 1232	<0.1			<0.1
PCB 1016	<0.1			<0.1
PCB 1242	<0.1			<0.1
PCB 1248	<0.1			<0.1
PCB 1254	1	115	140	~~0.1~~ 0.63 J
PCB 1260	<0.1			<0.1 J
Spike Level		5	5	
Dibutyl Chlorendate	98	106	109	105
Sequence Date	#5-08/19/93			#5-08/19/93
alpha-BHC	<0.01			<0.01 J
beta-BHC	<0.01			<0.01
gamma-BHC	<0.01			<0.01
delta-BHC	<0.01			<0.01
Heptachlor	<0.01			<0.01
Aldrin	<0.01			<0.01
Heptachlor Epoxide	<0.01			<0.01
Endosulfan I	<0.01			<0.01
DDE	<0.01			<0.01
Dieldrin	<0.01			<0.01
Endrin	<0.01			<0.01
Endosulfan II	<0.01			<0.01
DDD	<0.01			<0.01
Endrin Aldehyde	<0.01			<0.01
DDT	<0.01			<0.01
Endosulfan Sulfate	<0.01			<0.01
Endrin Ketone	<0.01			<0.01
Methoxy Chlor	<0.5			<0.5
Chlordane	<0.5			<0.5
Dibutyl Chlorendate	98			105
Spike Level				
Vol Sequence				
CCl4				
TCA				
Benzene				
TCE				
Toluene				
PCE				
Ethylbenzene				
Xylenes				
Gasoline				
Spike level				
BFB				

Compiled by SGM 09/01/95

ICF ID	BUL-OT04-2S06	BUL-OT04-2S06	BUL-OT04-2S06	BUL-OT04-2S06
F&BI Number	1862	1862 dup	1862 ms	1862 msd
Sample Type	soil	soil	soil	soil
Date Received	9/3/93	9/3/93	9/3/93	9/3/93
% Dry Weight	95			
Sequence Date			#5-09/06/93	#5-09/06/93
Leaded Gas				
JP-4				
Lube Oil				
Diesel			87	82
Spike Level			500	500
Unknown Semi-volat				
Pentacosane			103	102
Sequence Date	#5-09/03/93	#5-09/03/93	#5-09/03/93	#5-09/03/93
PCB 1221	<0.1 J	<0.5		
PCB 1232	<0.1	<0.5		
PCB 1016	<0.1	<0.5		
PCB 1242	<0.1	<0.5		
PCB 1248	<0.1	<0.5		
PCB 1254	<0.1	<0.5	92	93
PCB 1260	<0.1	<0.5		
Spike Level			5	5
Dibutyl Chlorendate	75	94	100	102
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence				
CCl4				
TCA				
Benzene				
TCE				
Toluene				
PCE				
Ethylbenzene				
Xylenes				
Gasoline				
Spike level				
BFB				

compiled by SJM 09/01/95

ANALYTICAL DATA SHEETS FOR THE POL TANKS (ST05)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-1
Client Sample ID :BUL-ST05-S01 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 09:45 hr:
Received :08/19/93 @ 18:45 hr:
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	98.1		%	SM17 2540G			08/20	MDC
Hydrocarbons EPH	841	D	mg/Kg	3510/3550/8100M		08/20	08/21	JBF
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	17.0		mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.031		mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	0.261		mg/Kg	EPA 8020		08/20	08/23	KWM
p&m Xylene	0.527		mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	0.423		mg/Kg	EPA 8020		08/20	08/23	KWM

See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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SINCE 1908

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-2
Client Sample ID :BUL-ST05-S01 BULLEN SPIKE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 09:45 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - FOR SPIKE RECOVERY SEE QA/QC PACKAGE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	98.1		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	756	D	mg/Kg	3510/3550/8100M		08/20	08/21	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	22.1		mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.161		mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.929		mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	0.269		mg/Kg	EPA 8020		08/20	08/23	KWM
p&m Xylene	1.05		mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	0.403		mg/Kg	EPA 8020		08/20	08/23	KWM

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UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-3
Client Sample ID :BUL-ST05-S01 BULLEN SPIKE DUPLICATE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 09:45 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - FOR SPIKE RECOVERY SEE QA/QC PACKAGE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	98.1		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	829	D	mg/Kg	3510/3550/8100M		08/20	08/21	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	21.6		mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.151		mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.867		mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	0.257		mg/Kg	EPA 8020		08/20	08/23	KWM
p&m Xylene	0.965		mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	0.367		mg/Kg	EPA 8020		08/20	08/23	KWM

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UA = Unavailable
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LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-4
Client Sample ID :BUL-ST05-S02 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
AWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 10:15 hrs:s
Received :08/19/93 @ 18:45 hrs:s
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Qualifiers / Comments

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init t
Percent Solids	96.0		%	SM17 2540G			08/20	MDU U
Hydrocarbons EPH	2250	D	mg/Kg	3510/3550/8100M		08/20	08/23	JBH H
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	114	D	mg/Kg	EPA 5030/8015m (J)-I.		08/20	08/23	KWM M
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM M
Toluene	0.026		mg/Kg	EPA 8020		08/20	08/23	KWM M
Ethylbenzene	0.356		mg/Kg	EPA 8020		08/20	08/23	KWM M
p&m Xylene	0.511		mg/Kg	EPA 8020		08/20	08/23	KWM M
o-Xylene	1.10		mg/Kg	EPA 8020		08/20	08/23	KWM M

08 1-31-94

See Special Instructions Above
See Sample Remarks Above
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= Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4177-1
Client Sample ID :BUL-ST05-S02 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69708
Report Completed :09/23/93
Collected :08/16/93 @ 10:15 hr
Received :08/19/93 @ 10:50 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.F. AND S.S.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics (VALIDATION QUALIFIER → (COMMENT))				EPA 8260				
Benzene	0.100	UJ (A)	mg/Kg	EPA 8260		08/20	08/31	KW
Bromobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Bromochloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Bromodichloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Bromoform	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Bromomethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
n-Butylbenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
sec-Butylbenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
tert-Butylbenzne	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Carbon Tetrachloride	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Chlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Chloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Chloroform	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Chloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
2-Chlorotoluene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
4-Chlorotoluene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Dibromochloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
12Dibromo3Chloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,2-Dibromoethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Dibromomethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,2-Dichlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,3-Dichlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,4-Dichlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Dichlorodifluoromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,1-Dichloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,2-Dichloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,1-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
cis-1,2-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
transi,2-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,2-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,3-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
2,2-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,1-Dichloropropene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Ethylbenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Hexachlorobutadiene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Isopropylbenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
p-Isopropyltoluene	0.100	UJ	mg/Kg	EPA 8260		08/20	08/31	KW

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE '80

REPORT of ANALYSIS

Chemlab Ref.# :93.4177-1
Client Sample ID :BUL-ST05-S02 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

		VALIDATION QUALIFIER	(COMMENT)				
Methylene Chloride	0.100	UJ	(A)	mg/Kg	EPA 8260	08/20 08/31	KW
Napthalene	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
n-Propylbenzene	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
Styrene	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
1112-Tetrachloroethane	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
1122-Tetrachloroethane	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
Tetrachloroethene	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
Toluene	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
1,2,3-Trichlorobenzene	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
1,2,4-Trichlorobenzene	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
1,1,1-Trichloroethane	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
1,1,2-Trichloroethane	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
Trichloroethene	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
Trichlorofluoromethane	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
1,2,3-Trichloropropane	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
1,2,4-Trimethylbenzene	0.837	DJ		mg/Kg	EPA 8260	08/20 08/31	KW
1,3,5-Trimethylbenzene	5.04	DJ		mg/Kg	EPA 8260	08/20 08/31	KW
Vinyl Chloride	0.100	UJ		mg/Kg	EPA 8260	08/20 08/31	KW
p+m-Xylene	0.109	DJ		mg/Kg	EPA 8260	08/20 08/31	KW
o-Xylene	0.682	DJ		mg/Kg	EPA 8260	08/20 08/31	KW
Semivolatile Organics					EPA 8270		
Phenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
bis(2-Chloroethyl)ether	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2-Chlorophenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
1,3-Dichlorobenzene	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
1,4-Dichlorobenzene	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
Benzyl Alcohol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
1,2-Dichlorobenzene	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2-Methylphenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
bis(2-Chloroisopropyl)e	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
4-Methylphenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
n-Nitroso-di-n-Propylam	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
Hexachloroethane	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
Nitrobenzene	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
Isophorone	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2-Nitrophenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2,4-Dimethylphenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
Benzoic Acid	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
bis(2-Chloroethoxy)Meth	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2,4-Dichlorophenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
1,2,4-Trichlorobenzene	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
Naphthalene	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
4-Chloroaniline	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
Hexachlorobutadiene	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
4-Chloro-3-Methylphenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2-Methylnaphthalene	0.488			mg/Kg	EPA 8270	08/26 09/13	GV
Hexachlorocyclopentadie	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2,4,6-Trichlorophenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2,4,5-Trichlorophenol	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV
2-Chloronaphthalene	0.210	U		mg/Kg	EPA 8270	08/26 09/13	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4177-1
Client Sample ID :BUL-ST05-S02 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
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2-Nitroaniline	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Dimethylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Acenaphthylene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
2,6-Dinitrotoluene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
3-Nitroaniline	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Acenaphthene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
2,4-Dinitrophenol	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
4-Nitrophenol	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Dibenzofuran	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
2,4-Dinitrotoluene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Diethylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
4-Chlorophenyl-Phenylet	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Fluorene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
4-Nitroaniline	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
4,6-Dinitro-2-Methylphe	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
n-Nitrosodiphenylamine	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
4-Bromophenyl-Phenyleth	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Hexachlorobenzene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Pentachlorophenol	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Phenanthrene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Anthracene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
di-n-Butylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Fluoranthene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Pyrene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Butylbenzylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
3,3-Dichlorobenzidine	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Benzo(a)Anthracene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Chrysene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
bis(2-Ethylhexyl)Phthal	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
di-n-Octylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Benzo(b)Fluoranthene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Benzo(k)Fluoranthene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Benzo(a)Pyrene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Indeno(1,2,3-cd)Pyrene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Dibenz(a,h)Anthracene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Benzo(g,h,i)Perylene	0.210	U	mg/Kg	EPA 8270		08/26 09/13	G
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA	n/a		
Aluminum	1300		mg/Kg	EPA 6010		08/24 08/25	DFL
Antimony	52	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Arsenic	5.2	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Barium	17		mg/Kg	EPA 6010		08/24 08/25	DFL
Beryllium	2.6	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Cadmium	2.6	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Calcium	55000	J	mg/Kg G.I	EPA 6010		08/24 08/25	DFL
Chromium	2.8		mg/Kg	EPA 6010		08/24 08/25	DFL
Cobalt	52	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Copper	3.7		mg/Kg	EPA 6010		08/24 08/25	DFL
Iron	4100		mg/Kg	EPA 6010		08/24 08/25	DFL

All chgs S.L 2/2/94

COMMERCIAL TESTING & ENGINEERING CO.
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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4177-1
Client Sample ID :BUL-ST05-S02 BULLEN
Matrix :SOIL

		Qualifier			Comment			
Lead	5.2	U	mg/Kg		EPA 6010	08/24	08/25	DF
Magnesium	1500		mg/Kg	G, I, J4	EPA 6010	08/24	08/25	DF
Manganese	56		mg/Kg	J4	EPA 6010	08/24	08/25	DF
Molybdenum	2.6	U	mg/Kg		EPA 6010	08/24	08/25	DF
Nickel	4.5		mg/Kg		EPA 6010	08/24	08/25	DF
Potassium	260	U	mg/Kg		EPA 6010	08/24	08/25	DF
Selenium	52	U	mg/Kg		EPA 6010	08/24	08/25	DF
Silver	2.6	U	mg/Kg		EPA 6010	08/24	08/25	DF
Sodium	32		mg/Kg		EPA 6010	08/24	08/25	DF
Thallium	0.25	U	mg/Kg		EPA 7841	08/24	08/26	KA
Vanadium	4.0		mg/Kg		EPA 6010	08/24	08/25	DF
Zinc	16		mg/Kg		EPA 6010	08/24	08/25	DF

All charges o.k. 2/2/94

* See Special Instructions Above
** See Sample Remarks Above
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NA = Not Analyze
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREE
ANCHORAGE, AK 9951
TEL. (907) 562-234
FAX (907) 561-530

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-5
Client Sample ID :BUL-ST05-S03 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/30/93
Collected :08/16/93 @ 10:35 h
Received :08/19/93 @ 18:45 h
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. FINAL RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Percent Solids	98.2		%	SM17 2540G			08/20	ME
Hydrocarbons EPH	1180	D	mg/Kg	3510/3550/8100M		08/20	08/22	JE
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	170	D	mg/Kg	EPA 5030/8015m		08/20	08/24	KW
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KW
Toluene	0.081		mg/Kg	EPA 8020		08/20	08/23	KW
Ethylbenzene	1.29		mg/Kg	EPA 8020		08/20	08/23	KW
p&m Xylene	1.41		mg/Kg	EPA 8020		08/20	08/23	KW
o-Xylene	3.02		mg/Kg	EPA 8020		08/20	08/23	KW
Organochlorine Pest				EPA 8080				
Aldrin	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Alpha-BHC	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Beta-BHC	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Delta-BHC	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Gamma-BHC	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Chlordane	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NR
4,4'-DDD	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
4,4'-DDE	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
4,4'-DDT	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Dieldrin	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Endosulfan I	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Endosulfan II	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Endosulfan Sulfate	0.005	U	mg/Kg	EPA 8080		08/21	08/25	NR
Endrin	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Endrin Aldehyde	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Heptachlor	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Heptachlor Epoxide	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Methoxychlor	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NR
Toxaphene	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NR
PCB-1016	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NR
PCB-1221	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NR
PCB-1232	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NR
PCB-1242	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NR
PCB-1248	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NR
PCB-1254	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NR

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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-5
Client Sample ID :BUL-ST05-S03 BULLEN
Matrix :SOIL

PCB-1260	0.030	U	mg/Kg	EPA 8080	08/21 08/25	NRC

* See Special Instructions Above
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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-6
Client Sample ID :BUL-ST05-S03 BULLEN SPIKE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/30/93
Collected :08/16/93 @ 10:35 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. SEE QC SHEETS FOR SAMPLES RECOVERIES AND RPD VALVES.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Organochlorine Pest				EPA 8080				
Aldrin	0.230		mg/Kg	EPA 8080		08/21	08/25	NRC
Alpha-BHC	0.170		mg/Kg	EPA 8080		08/21	08/25	NRC
Beta-BHC	0.102		mg/Kg	EPA 8080		08/21	08/25	NRC
Delta-BHC	0.213		mg/Kg	EPA 8080		08/21	08/25	NRC
Gamma-BHC	0.070		mg/Kg	EPA 8080		08/21	08/25	NRC
Chlordane	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDD	0.192		mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDE	0.246		mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDT	0.019		mg/Kg	EPA 8080		08/21	08/25	NRC
Dieldrin	0.297		mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan I	0.222		mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan II	0.228		mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan Sulfate	0.153		mg/Kg	EPA 8080		08/21	08/25	NRC
Endrin	0.096		mg/Kg	EPA 8080		08/21	08/25	NRC
Endrin Aldehyde	0.216		mg/Kg	EPA 8080		08/21	08/25	NRC
Heptachlor	0.031		mg/Kg	EPA 8080		08/21	08/25	NRC
Heptachlor Epoxide	0.229		mg/Kg	EPA 8080		08/21	08/25	NRC
Methoxychlor	0.0010		mg/Kg	EPA 8080		08/21	08/25	NRC
Toxaphene	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1016	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1221	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1232	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1242	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1248	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1254	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1260	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC

* See Special Instructions Above
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COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-7
Client Sample ID :BUL-ST05-S03 BULLEN SPIKE DUPLICATE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/30/93
Collected :08/16/93 @ 10:35 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: SEE QC PACKAGE FOR SPIKE DUPLICATE RECOVERIES AND RPD VALVES.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Organochlorine Pest				EPA 8080				
Aldrin	0.231		mg/Kg	EPA 8080		08/21	08/25	NRC
Alpha-BHC	0.168		mg/Kg	EPA 8080		08/21	08/25	NRC
Beta-BHC	0.102		mg/Kg	EPA 8080		08/21	08/25	NRC
Delta-BHC	0.215		mg/Kg	EPA 8080		08/21	08/25	NRC
Gamma-BHC	0.069		mg/Kg	EPA 8080		08/21	08/25	NRC
Chlordane	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDD	0.201		mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDE	0.281		mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDT	0.097		mg/Kg	EPA 8080		08/21	08/25	NRC
Dieldrin	0.302		mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan I	0.227		mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan II	0.236		mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan Sulfate	0.158		mg/Kg	EPA 8080		08/21	08/25	NRC
Endrin	0.099		mg/Kg	EPA 8080		08/21	08/25	NRC
Endrin Aldehyde	0.238		mg/Kg	EPA 8080		08/21	08/25	NRC
Heptachlor	0.030		mg/Kg	EPA 8080		08/21	08/25	NRC
Heptachlor Epoxide	0.232		mg/Kg	EPA 8080		08/21	08/25	NRC
Methoxychlor	0.001		mg/Kg	EPA 8080		08/21	08/25	NRC
Toxaphene	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1016	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1221	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1232	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1242	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1248	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1254	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1260	0.030	U	mg/Kg	EPA 8080		08/21	08/25	NRC

* See Special Instructions Above
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COMMERCIAL TESTING & ENGINEERING CO.
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SINCE 1908

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-8
Client Sample ID :BUL-ST05-S04 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 11:13 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN, C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	87.7		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	1960	D	mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	42.7		mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.025	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.060		mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	0.463		mg/Kg	EPA 8020		08/20	08/23	KWM
[redacted] Xylene	0.323		mg/Kg	EPA 8020		08/20	08/23	KWM
[redacted]Xylene	0.199		mg/Kg	EPA 8020		08/20	08/23	KWM

* [redacted]See Special Instructions Above
* [redacted]See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
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LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-9
Client Sample ID :BUL-ST05-S05-2.5 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 11:10 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	95.3		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	2440	D	mg/Kg	3510/3550/8100M		08/20	08/23	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	137	D	mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.056		mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	1.14		mg/Kg	EPA 8020		08/20	08/23	KWM
p&m Xylene	1.18		mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	0.349		mg/Kg	EPA 8020		08/20	08/23	KWM

* See Special Instructions Above
** See Sample Remarks Above
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GT = Greater Than

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ANCHORAGE, AK 99518
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FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-10
Client Sample ID :BUL-ST05-S06 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 11:45 hrs. h
Received :08/19/93 @ 18:45 hrs. h
Technical Director:STEPHEN C. EDE
Released By : C. Ede

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. 1200 PPM EPH IS NOT CONSISTENT WITH A MIDDLE DISTILLATE FUEL.

Qualifier Comments

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init	In
Percent Solids	8.97		%	SM17 2540G			08/20	MDU	M
Hydrocarbons EPH	5860	D	mg/Kg	3510/3550/8100M		08/20	08/22	JBH	JI
VPH & BTEX Hydrocarbons VPH	20.1		mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/20	08/23	KWM	JI
Benzene	0.350	U	mg/Kg	EPA 8020		08/20	08/23	KWM	JI
Toluene	0.423		mg/Kg	EPA 8020 (N)-L.1		08/20	08/23	KWM	JI
Ethylbenzene	0.350	U	mg/Kg	EPA 8020		08/20	08/23	KWM	JI
p&m Xylene	1.95		mg/Kg	EPA 8020 (N)-L.1		08/20	08/23	KWM	JI
o-Xylene	0.960		mg/Kg	EPA 8020 (N)-L.1		08/20	08/23	KWM	JI

CDP
3-4-94

* See Special Instructions Above
** See Sample Remarks Above
J = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4177-2
Client Sample ID :BUL-ST05-S06 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69708
Report Completed :09/23/93
Collected :08/16/93 @ 11:45 hr
Received :08/19/93 @ 10:50 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.F. AND S.S. J = INDICATES AN ANALYTE WHOSE CONCENTRATION IS ESTIMATED BECAUSE THE ANALYTE'S CONCENTRATION IS DETECTED BELOW THE CALIBRATION RANGE.

Parameter	Results	QC Qual (VALIDATION QUALIFIER)	Units (COMMENT)	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics				EPA 8260				
Benzene	0.100	UJ (A)	mg/Kg	EPA 8260		08/20	09/01	KW
Bromobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromochloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromodichloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromoform	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromomethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
n-Butylbenzene	0.174	J	mg/Kg	EPA 8260		08/20	09/01	KW
sec-Butylbenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
tert-Butylbenzne	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Carbon Tetrachloride	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloroform	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
2-Chlorotoluene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
4-Chlorotoluene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Dibromochloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
12Dibromo3Chloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dibromoethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Dibromomethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,3-Dichlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,4-Dichlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Dichlorodifluoromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
cis-1,2-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
trans1,2-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,3-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
2,2-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloropropene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Ethylbenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Hexachlorobutadiene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW

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FAX: (907) 561-5301

REPORT of ANALYSIS DEC

Chemlab Ref.# :93.4177-2
Client Sample ID :BUL-ST05-S06 BULLEN
Matrix :SOIL

VALIDATION QUALIFIER → (COMMENTS)

Isopropylbenzene	0.100	UJ	(A) mg/Kg	EPA 8260	08/20	09/01	KW
p-Isopropyltoluene	0.112	J	mg/Kg	EPA 8260	08/20	09/01	KW
Methylene Chloride	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
Napthalene	0.902	J	mg/Kg	EPA 8260	08/20	09/01	KW
n-Propylbenzene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
Styrene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
1112-Tetrachloroethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
1122-Tetrachloroethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
Tetrachloroethene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
Toluene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
1,2,3-Trichlorobenzene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
1,2,4-Trichlorobenzene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
1,1,1-Trichloroethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
1,1,2-Trichloroethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
Trichloroethene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
Trichlorofluoromethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
1,2,3-Trichloropropane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
1,2,4-Trimethylbenzene	0.672	J	mg/Kg	EPA 8260	08/20	09/01	KW
1,3,5-Trimethylbenzene	0.262	J	mg/Kg	EPA 8260	08/20	09/01	KW
Vinyl Chloride	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
p+m-Xylene	0.194	J	mg/Kg	EPA 8260	08/20	09/01	KW
o-Xylene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KW
Semivolatile Organics				EPA 8270			
Phenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
bis(2-Chloroethyl)ether	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Chlorophenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
1,3-Dichlorobenzene	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
1,4-Dichlorobenzene	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
Benzyl Alcohol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
1,2-Dichlorobenzene	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Methylphenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
bis(2-Chloroisopropyl)e	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
4-Methylphenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
n-Nitroso-di-n-Propylam	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
Hexachloroethane	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
Nitrobenzene	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
Isophorone	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Nitrophenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
2,4-Dimethylphenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
Benzoic Acid	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
bis(2-Chloroethoxy)Meth	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
2,4-Dichlorophenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
1,2,4-Trichlorobenzene	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
Naphthalene	0.457	J	mg/Kg	EPA 8270	08/26	09/16	GV
4-Chloroaniline	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
Hexachlorobutadiene	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
4-Chloro-3-Methylphenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Methylnaphthalene	0.946		mg/Kg	EPA 8270	08/26	09/16	GV
Hexachlorocyclopentadie	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV
2,4,6-Trichlorophenol	0.640	U	mg/Kg	EPA 8270	08/26	09/16	GV

COMMERCIAL TESTING & ENGINEERING CO.
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REPORT of ANALYSIS

Chemlab Ref.# :93.4177-2
Client Sample ID :BUL-ST05-S06 BULLEN
Matrix :SOIL

5633 B STREET
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TEL: (907) 562-2343
FAX: (907) 561-5301

2,4,5-Trichlorophenol	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
2-Chloronaphthalene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
2-Nitroaniline	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Dimethylphthalate	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Acenaphthylene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
2,6-Dinitrotoluene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
3-Nitroaniline	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Acenaphthene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
2,4-Dinitrophenol	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
4-Nitrophenol	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Dibenzofuran	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
2,4-Dinitrotoluene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Diethylphthalate	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
4-Chlorophenyl-Phenylet	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Fluorene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
4-Nitroaniline	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
4,6-Dinitro-2-Methylphe	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
n-Nitrosodiphenylamine	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
4-Bromophenyl-Phenyleth	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Hexachlorobenzene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Pentachlorophenol	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Phenanthrene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Anthracene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
di-n-Butylphthalate	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Fluoranthene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Pyrene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Butylbenzylphthalate	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
3,3-Dichlorobenzidine	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Benzo(a)Anthracene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Chrysene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
bis(2-Ethylhexyl)Phthal	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
di-n-Octylphthalate	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Benzo(b)Fluoranthene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Benzo(k)Fluoranthene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Benzo(a)Pyrene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Indeno(1,2,3-cd)Pyrene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Dibenz(a,h)Anthracene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G
Benzo(g,h,i)Perylene	0.640	U	mg/Kg	EPA 8270	08/26 09/16	G

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

hemlab Ref.# :93.4200-11
lient Sample ID :BUL-ST05-S07 BULLEN
latrix :SOIL

lient Name :ICF KAISER ENGINEERING
rdered By :RAY MORRIS
roject Name :DEW LINE RI/FS
roject# :41096-412-01
WSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 11:30 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

ample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	50.2		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	154		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	1.00	U	mg/Kg	EPA 5030/8015m		08/20	08/22	JBH
Benzene	0.060	U	mg/Kg	EPA 8020		08/20	08/22	JBH
Toluene	0.060	U	mg/Kg	EPA 8020		08/20	08/22	JBH
Ethylbenzene	0.060	U	mg/Kg	EPA 8020		08/20	08/22	JBH
p&m Xylene	0.060	U	mg/Kg	EPA 8020		08/20	08/22	JBH
o-Xylene	0.060	U	mg/Kg	EPA 8020		08/20	08/22	JBH

e Special Instructions Above
* See Sample Remarks Above
= Undetected, Reported value is the practical quantification limit.
= Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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5633 B STREET
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FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-12
Client Sample ID :BUL-ST05-S08 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 11:50 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	68		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	27.9		mg/Kg	3510/3550/8100M		08/20	08/23	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.600	U	mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.030	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	0.030	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.030	U	mg/Kg	EPA 8020		08/20	08/22	KWM
p&m Xylene	0.030	U	mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.030	U	mg/Kg	EPA 8020		08/20	08/22	KWM

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-13
Client Sample ID :BUL-ST05-S09 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 12:00 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	61.2		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	32.5		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.800	U	mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.040	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	0.040	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.040	U	mg/Kg	EPA 8020		08/20	08/22	KWM
para Xylene	0.040	U	mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.040	U	mg/Kg	EPA 8020		08/20	08/22	KWM

*See Special Instructions Above
*See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-14
Client Sample ID :BUL-ST05-S10 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 13:20 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	80.8		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	27.6		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.600	U	mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.030	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.030	U	mg/Kg	EPA 8020		08/20	08/23	
Ethylbenzene	0.030	U	mg/Kg	EPA 8020		08/20	08/23	
p&m Xylene	0.030	U	mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	0.030	U	mg/Kg	EPA 8020		08/20	08/23	KWM

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-15
Client Sample ID :BUL-ST05-S11-1.5 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 13:25 hrs.
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN, C. EDE
Released By : C. Ede

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	83.5		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	174	D	mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.500	U	mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.025	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.025	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	0.025	U	mg/Kg	EPA 8020		08/20	08/23	KWM
p&m Xylene	0.025	U	mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	0.025	U	mg/Kg	EPA 8020		08/20	08/23	KWM

See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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5633 B STREET
ANCHORAGE, AK 99518
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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-16
Client Sample ID :BUL-ST05-S12 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 13:50 hrs.
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - 155 MG/KG OF PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	66.9		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	708	D	mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	21.4		mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.035	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.091		mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	0.084		mg/Kg	EPA 8020		08/20	08/23	KWM
p&m Xylene	1.52		mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	1.37		mg/Kg	EPA 8020		08/20	08/23	KWM

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

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NA = Not Analyzed
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GT = Greater Than

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ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-17
Client Sample ID :BUL-ST05-S13-1.5 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/30/93
Collected :08/16/93 @ 14:10 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL. FINAL RESULTS.

Qualifier/Comments

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	84.7		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	225	D	mg/Kg	3510/3550/8100M	(J)-K.1	08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	10.7		mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.031		mg/Kg	EPA 8020	(N)-L.1	08/20	08/22	KWM
Toluene	0.040		mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.069		mg/Kg	EPA 8020		08/20	08/22	KWM
p&m Xylene	0.220		mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.137		mg/Kg	EPA 8020		08/20	08/22	KWM
Organochlorine Pest				EPA 8080				
Aldrin	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDE	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan II	0.004	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Endosulfan Sulfate	0.003	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Endrin	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Heptachlor	0.004	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Heptachlor Epoxide	0.008	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Methoxychlor	0.002	U	mg/Kg	EPA 8080		08/21	08/25	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080		08/21	08/25	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080		08/21	08/25	NRC

original by: CBJ 2-4-94

1-25-94

Compiled: SMF 11/29/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-17
Client Sample ID :BUL-ST05-S13-1.5 BULLEN
Matrix :SOIL

PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21 08/25	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21 08/25	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4177-3
Client Sample ID :BUL-ST05-S13 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69708
Report Completed :09/23/93
Collected :08/16/93 @ 14:10 hr
Received :08/19/93 @ 10:50 hr
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.F. AND S.S.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics (VALIDATION QUALIFIER → (COMMENT))				EPA 8260				
Benzene	0.025	UJ (A)	mg/Kg	EPA 8260		08/20	08/31	KW
Bromobenzene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Bromochloromethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Bromodichloromethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Bromoform	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Bromomethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
n-Butylbenzene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
sec-Butylbenzene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
tert-Butylbenzne	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Carbon Tetrachloride	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Chlorobenzene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Chloroethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Chloroform	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Chloromethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
2-Chlorotoluene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
4-Chlorotoluene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Dibromochloromethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
12Dibromo3Chloropropane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,2-Dibromoethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Dibromomethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,2-Dichlorobenzene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,3-Dichlorobenzene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,4-Dichlorobenzene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Dichlorodifluoromethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,1-Dichloroethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,2-Dichloroethane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,1-Dichloroethene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
cis-1,2-Dichloroethene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
transi,2-Dichloroethene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,2-Dichloropropane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,3-Dichloropropane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
2,2-Dichloropropane	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
1,1-Dichloropropene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Ethylbenzene	0.059	J	mg/Kg	EPA 8260		08/20	08/31	KW
Hexachlorobutadiene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
Isopropylbenzene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW
p-Isopropyltoluene	0.025	UJ	mg/Kg	EPA 8260		08/20	08/31	KW

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REPORT of ANALYSIS

Chemlab Ref.# :93.4177-3
Client Sample ID :BUL-ST05-S13 BULLEN
Matrix :SOIL

VALIDATION QUALIFIER → (COMMENT)

Methylene Chloride	0.025	UJ	(A) mg/Kg	EPA 8260	08/20	08/31	KW
Napthalene	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
n-Propylbenzene	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
Styrene	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
1112-Tetrachloroethane	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
1122-Tetrachloroethane	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
Tetrachloroethene	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
Toluene	0.033	J	mg/Kg	EPA 8260	08/20	08/31	KW
1,2,3-Trichlorobenzene	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
1,2,4-Trichlorobenzene	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
1,1,1-Trichloroethane	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
1,1,2-Trichloroethane	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
Trichloroethene	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
Trichlorofluoromethane	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
1,2,3-Trichloropropane	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
1,2,4-Trimethylbenzene	0.072	J	mg/Kg	EPA 8260	08/20	08/31	KW
1,3,5-Trimethylbenzene	0.025	J	mg/Kg	EPA 8260	08/20	08/31	KW
Vinyl Chloride	0.025	UJ	mg/Kg	EPA 8260	08/20	08/31	KW
p+m-Xylene	0.179	J	mg/Kg	EPA 8260	08/20	08/31	KW
o-Xylene	0.120	J	mg/Kg	EPA 8260	08/20	08/31	KW
Semivolatile Organics				EPA 8270			
Phenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
bis(2-Chloroethyl)ether	0.240	U	mg/Kg	EPA 8270	08/26	09/16	
2-Chlorophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
1,3-Dichlorobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
1,4-Dichlorobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
Benzyl Alcohol	1.00	U	mg/Kg	EPA 8270	08/26	09/16	G
1,2-Dichlorobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
2-Methylphenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
bis(2-Chloroisopropyl)e	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
4-Methylphenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
n-Nitroso-di-n-Propylam	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
Hexachloroethane	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
Nitrobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
Isophorone	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
2-Nitrophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
2,4-Dimethylphenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
Benzoic Acid	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
bis(2-Chloroethoxy)Meth	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
2,4-Dichlorophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
1,2,4-Trichlorobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
Naphthalene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
4-Chloroaniline	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
Hexachlorobutadiene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
4-Chloro-3-Methylphenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
2-Methylnaphthalene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
Hexachlorocyclopentadie	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
2,4,6-Trichlorophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
2,4,5-Trichlorophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G
2-Chloronaphthalene	0.240	U	mg/Kg	EPA 8270	08/26	09/16	G

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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4177-3
Client Sample ID :BUL-ST05-S13 BULLEN
Matrix :SOIL

		Qualifier		Comment			
2-Nitroaniline	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Dimethylphthalate	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Acenaphthylene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
2,6-Dinitrotoluene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
3-Nitroaniline	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Acenaphthene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
2,4-Dinitrophenol	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
4-Nitrophenol	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Dibenzofuran	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
2,4-Dinitrotoluene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Diethylphthalate	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
4-Chlorophenyl-Phenylet	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Fluorene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
4-Nitroaniline	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
4,6-Dinitro-2-Methylphe	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
n-Nitrosodiphenylamine	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
4-Bromophenyl-Phenyleth	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Hexachlorobenzene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Pentachlorophenol	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Phenanthrene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Anthracene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
di-n-Butylphthalate	0.571		mg/Kg		EPA 8270	08/26 09/16	G
Fluoranthene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Pyrene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Butylbenzylphthalate	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
3,3-Dichlorobenzidine	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Benzo(a)Anthracene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Chrysene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
bis(2-Ethylhexyl)Phthal	0.306		mg/Kg		EPA 8270	08/26 09/16	G
di-n-Octylphthalate	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Benzo(b)Fluoranthene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Benzo(k)Fluoranthene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Benzo(a)Pyrene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Indeno(1,2,3-cd)Pyrene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Dibenz(a,h)Anthracene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Benzo(g,h,i)Perylene	0.240	U	mg/Kg		EPA 8270	08/26 09/16	G
Sample Preparation					EPA 3050 Digest		
Total Metals Analysis	---				-		
ICP Screen, ICF					EPA	n/a	
Aluminum	11000		mg/Kg		EPA 6010	08/24 08/25	DFL
Antimony	58	U	mg/Kg		EPA 6010	08/24 08/25	DFL
Arsenic	5.8	U	mg/Kg		EPA 6010	08/24 08/25	DFL
Barium	130		mg/Kg		EPA 6010	08/24 08/25	DFL
Beryllium	3.8		mg/Kg		EPA 6010	08/24 08/25	DFL
Cadmium	2.9	U	mg/Kg		EPA 6010	08/24 08/25	DFL
Calcium	5800	J	mg/Kg	G.1	EPA 6010	08/24 08/25	DFL
Chromium	18		mg/Kg		EPA 6010	08/24 08/25	DFL
Cobalt	58	U	mg/Kg		EPA 6010	08/24 08/25	DFL
Copper	12		mg/Kg		EPA 6010	08/24 08/25	DFL
Iron	15000		mg/Kg		EPA 6010	08/24 08/25	DFL

AM charges
12/2/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B [redacted] T
ANCHORAGE, AK [redacted]18
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4177-3
Client Sample ID :BUL-ST05-S13
Matrix :SOIL

		BULLEN Qualifier		Comment				
Lead	5.8	U	mg/Kg		EPA 6010	08/24	08/25	DF
Magnesium	3000		mg/Kg	G.1,J.4	EPA 6010	08/24	08/25	DF
Manganese	73		mg/Kg	J.4	EPA 6010	08/24	08/25	DF
Molybdenum	2.9	U	mg/Kg		EPA 6010	08/24	08/25	DF
Nickel	16		mg/Kg		EPA 6010	08/24	08/25	DF
Potassium	950		mg/Kg		EPA 6010	08/24	08/25	DF
Selenium	58	U	mg/Kg		EPA 6010	08/24	08/25	DF
Silver	2.9	U	mg/Kg		EPA 6010	08/24	08/25	DF
Sodium	220		mg/Kg		EPA 6010	08/24	08/25	DF
Thallium	0.30	U	mg/Kg		EPA 7841	08/24	08/26	KA
Vanadium	28		mg/Kg		EPA 6010	08/24	08/25	DF
Zinc	29		mg/Kg		EPA 6010	08/24	08/25	DF

All charges
J.C 4/2/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyz[redacted]
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-18
Client Sample ID :BUL-ST05-S14 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 13:45 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	89.7		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	33.0		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	14.1		mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.073		mg/Kg	EPA 8020		08/20	08/22	KWM
m Xylene	0.113		mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.102		mg/Kg	EPA 8020		08/20	08/22	KWM

See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

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TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4200-19
Client Sample ID :BUL-ST05-S15-0.5 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 14:25 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	96.7		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	67.3		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.701		mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-20
Client Sample ID :BUL-ST05-S16 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 14:15 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	97.6		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	4.05		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.023		mg/Kg	EPA 8020		08/20	08/23	KWM
[illegible]nylbenzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
[illegible] Xylene	0.033		mg/Kg	EPA 8020		08/20	08/23	KWM
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM

** See Special Instructions Above
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D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-21
Client Sample ID :BUL-ST05-S17-2.0 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 14:45 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	96.4		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	67.0		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-22
Client Sample ID :BUL-STO5-S18 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 14:30 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	88.9		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	71.5		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	2.82		mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
[illegible]hylbenzene	0.033		mg/Kg	EPA 8020		08/20	08/22	KWM
[illegible] Xylene	0.065		mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.040		mg/Kg	EPA 8020		08/20	08/22	KWM

[illegible] See Special Instructions Above
[illegible] See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-23
Client Sample ID :BUL-ST05-S19 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 15:25 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal. Date	Init
Percent Solids	94.7		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	18.8		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/20	08/22	KWH
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWH
Toluene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWH
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWH
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWH
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWH

* See Special Instructions Above
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D = Secondary dilution.

UA = Unavailable
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GT = Greater Than

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REPORT of ANALYSIS

[redacted]lab Ref.# :93.4200-24
C[redacted]ent Sample ID :BUL-ST05-S20 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 15:45 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	82.7		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	25.8		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/20	08/23	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Toluene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM
[redacted]Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/23	KWM

* See Special Instructions Above
** See Sample Remarks Above
J [redacted]ndetected, Reported value is the practical quantification limit.
D [redacted]econdary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-25
Client Sample ID :BUL-ST05-S21 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 15:15 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	93.1		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	57.2		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM

* See Special Instructions Above
** See Sample Remarks Above
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D = Secondary dilution.

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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-26
Client Sample ID :BUL-ST05-S21 BULLEN SPIKE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :09/07/93
Collected :08/16/93 @ 15:15 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. FOR SPIKE RECOVERY SEE QA/QC PACKAGE. CORRECTED CLIENT SAMPLE ID.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	93.1		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	94.4		mg/Kg	3510/3550/8100M		08/20	08/22	JBH
VPH & BTEX								
Hydrocarbons VPH	11.4		mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.174		mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	1.16		mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.212		mg/Kg	EPA 8020		08/20	08/22	KWM
p&m Xylene	0.791		mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.320		mg/Kg	EPA 8020		08/20	08/22	KWM

* See Special Instructions Above
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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-27
Client Sample ID :BUL-ST05-S21 BULLEN SPIKE DUPLICATE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :09/07/93
Collected :08/16/93 @ 15:15 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. FOR SPIKE RECOVERY SEE QA/QC PACKAGE. CORRECTED CLIENT SAMPLE ID.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	93.1		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	87.1		mg/Kg	3510/3550/8100M		08/20	08/23	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	11.3		mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.213		mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	1.14		mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.220		mg/Kg	EPA 8020		08/20	08/22	KWM
p&m Xylene	0.810		mg/Kg	EPA 8020		08/20	08/22	
o-Xylene	0.333		mg/Kg	EPA 8020		08/20	08/22	

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GT = Greater Than

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REPORT of ANALYSIS

Lab Ref.# :93.4200-28
Client Sample ID :BUL-ST05-S22 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 10:45 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	96.0		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	1940	D	mg/Kg	3510/3550/8100M		08/20	08/23	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	12.6		mg/Kg	EPA 5030/8015m (J). I.1		08/20	08/22	KWM
Benzene	0.020	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	0.020	U	mg/Kg	EPA 8020 (J), I.1		08/20	08/22	KWM
Ethylbenzene	0.096		mg/Kg	EPA 8020		08/20	08/22	KWM
p&m Xylene	0.139		mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.264		mg/Kg	EPA 8020		08/20	08/22	KWM

Compiled: SMB 11/29/94

DSP 1-31-94

* See Special Instructions Above
** See Sample Remarks Above
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D = Secondary dilution.

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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4177-4
Client Sample ID :BUL-ST05-S22 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69708
Report Completed :09/23/93
Collected :08/16/93 @ 10:45 hr
Received :08/19/93 @ 10:50 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.F. AND S.S.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics				EPA 8260				
Benzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Bromobenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Bromochloromethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Bromodichloromethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Bromoform	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Bromomethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
n-Butylbenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
sec-Butylbenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
tert-Butylbenzne	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Carbon Tetrachloride	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Chlorobenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Chloroethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Chloroform	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Chloromethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
2-Chlorotoluene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
4-Chlorotoluene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Dibromochloromethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
12Dibromo3Chloropropane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dibromoethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Dibromomethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichlorobenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,3-Dichlorobenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,4-Dichlorobenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Dichlorodifluoromethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloroethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichloroethane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloroethene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
cis-1,2-Dichloroethene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
transi,2-Dichloroethene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichloropropane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,3-Dichloropropane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
2,2-Dichloropropane	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloropropene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Ethylbenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Hexachlorobutadiene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
Isopropylbenzene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW
p-Isopropyltoluene	0.100	U	mg/Kg	EPA 8260		08/20	09/01	KW

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REPORT of ANALYSIS

Chemlab Ref.# :93.4177-4
Client Sample ID :BUL-ST05-S22 BULLEN
Matrix :SOIL

Methylene Chloride	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
Napthalene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
n-Propylbenzene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
Styrene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
1112-Tetrachloroethane	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
1122-Tetrachloroethane	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
Tetrachloroethene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
Toluene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
1,2,3-Trichlorobenzene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
1,2,4-Trichlorobenzene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
1,1,1-Trichloroethane	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
1,1,2-Trichloroethane	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
Trichloroethene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
Trichlorofluoromethane	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
1,2,3-Trichloropropane	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
1,2,4-Trimethylbenzene	0.944	D	mg/Kg	EPA 8260	08/20	09/01	KW
1,3,5-Trimethylbenzene	5.82	D	mg/Kg	EPA 8260	08/20	09/01	KW
Vinyl Chloride	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
p+m-Xylene	0.100	U	mg/Kg	EPA 8260	08/20	09/01	KW
o-Xylene	0.501	D	mg/Kg	EPA 8260	08/20	09/01	KW
Semivolatile Organics				EPA 8270			
Phenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
bis(2-Chloroethyl)ether	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Chlorophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
1,3-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
1,4-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
Benzyl Alcohol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
1,2-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
bis(2-Chloroisopropyl)e	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
4-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
n-Nitroso-di-n-Propylam	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
Hexachloroethane	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
Nitrobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
Isophorone	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Nitrophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2,4-Dimethylphenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
Benzoic Acid	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
bis(2-Chloroethoxy)Meth	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2,4-Dichlorophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
1,2,4-Trichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
Naphthalene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
4-Chloroaniline	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
Hexachlorobutadiene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
4-Chloro-3-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Methylnaphthalene	1.20		mg/Kg	EPA 8270	08/26	09/16	GV
Hexachlorocyclopentadie	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2,4,6-Trichlorophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2,4,5-Trichlorophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV
2-Chloronaphthalene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	GV

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REPORT of ANALYSIS DCE

Chemlab Ref.# :93.4177-4
Client Sample ID :BUL-ST05-S22 BULLEN
Matrix :SOIL

2-Nitroaniline	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Dimethylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Acenaphthylene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
2,6-Dinitrotoluene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
3-Nitroaniline	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Acenaphthene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
2,4-Dinitrophenol	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
4-Nitrophenol	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Dibenzofuran	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
2,4-Dinitrotoluene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Diethylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
4-Chlorophenyl-Phenylet	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Fluorene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
4-Nitroaniline	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
4,6-Dinitro-2-Methylphe	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
n-Nitrosodiphenylamine	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
4-Bromophenyl-Phenyleth	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Hexachlorobenzene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Pentachlorophenol	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Phenanthrene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Anthracene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
di-n-Butylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Fluoranthene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Pyrene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Butylbenzylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
3,3-Dichlorobenzidine	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Benzo(a)Anthracene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Chrysene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
bis(2-Ethylhexyl)Phthal	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
di-n-Octylphthalate	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Benzo(b)Fluoranthene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Benzo(k)Fluoranthene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Benzo(a)Pyrene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Indeno(1,2,3-cd)Pyrene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Dibenz(a,h)Anthracene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Benzo(g,h,i)Perylene	0.210	U	mg/Kg	EPA 8270		08/26 09/16	G
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA	n/a		
Aluminum	**1000**		mg/Kg	EPA 6010		08/24 08/25	DFL
Antimony	52	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Arsenic	5.2	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Barium	**14**		mg/Kg	EPA 6010		08/24 08/25	DFL
Beryllium	2.6	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Cadmium	2.6	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Calcium	**19000**		mg/Kg	EPA 6010		08/24 08/25	DFL
Chromium	2.6	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Cobalt	52	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Copper	3.0	U	mg/Kg	EPA 6010		08/24 08/25	DFL
Iron	3700		mg/Kg	EPA 6010		08/24 08/25	DFL

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REPORT of ANALYSIS

Chemlab Ref.# :93.4177-4
Client Sample ID :BUL-ST05-S22 BULLEN
Matrix :SOIL

Lead	5.2	U	mg/Kg	EPA 6010	08/24	08/25	DF
Magnesium	1600		mg/Kg	EPA 6010	08/24	08/25	DF
Manganese	49		mg/Kg	EPA 6010	08/24	08/25	DF
Molybdenum	2.6	U	mg/Kg	EPA 6010	08/24	08/25	DF
Nickel	3.7		mg/Kg	EPA 6010	08/24	08/25	DF
Potassium	260	U	mg/Kg	EPA 6010	08/24	08/25	DF
Selenium	52	U	mg/Kg	EPA 6010	08/24	08/25	DF
Silver	2.6	U	mg/Kg	EPA 6010	08/24	08/25	DF
Sodium	30		mg/Kg	EPA 6010	08/24	08/25	DF
Thallium	0.26	U	mg/Kg	EPA 7841	08/24	08/26	KA
Vanadium	3.3		mg/Kg	EPA 6010	08/24	08/25	DF
Zinc	10		mg/Kg	EPA 6010	08/24	08/25	DF

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4200-29
Client Sample ID :BUL-ST05-S23 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69795
Report Completed :08/25/93
Collected :08/16/93 @ 14:35 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal. Date	Init
Percent Solids	58.7		%	SM17 2540G			08/20	MDU
Hydrocarbons EPH	364	D	mg/Kg	3510/3550/8100M		08/20	08/23	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	1.00	U	mg/Kg	EPA 5030/8015m		08/20	08/22	KWM
Benzene	0.055	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Toluene	0.055	U	mg/Kg	EPA 8020		08/20	08/22	KWM
Ethylbenzene	0.055	U	mg/Kg	EPA 8020		08/20	08/22	KWM
p&m Xylene	0.055	U	mg/Kg	EPA 8020		08/20	08/22	KWM
o-Xylene	0.055	U	mg/Kg	EPA 8020		08/20	08/22	

* See Special Instructions Above
** See Sample Remarks Above
J = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT OF ANALYSIS

Chemlab Ref.# :93.4201-1
Client Sample ID :BUL-ST05-S24 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69701
Report Completed :03/25/93
Collected :03/16/93 @ 15:50 hrs
Received :03/19/93 @ 16:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. FOR EPH OTHER = 11.4 MG/KG OF PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	88.7		%	SM17 2540G			03/21	MCU
Hydrocarbons EPH	96.7		mg/Kg	3510/3550/8100M		03/21	03/23	JBH
VPH & BTEX								
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 8015M/8020 EPA 5030/8015m		03/21	03/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		03/21	03/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		03/21	03/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		03/21	03/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		03/21	03/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		03/21	03/22	WLS

* See Special Instructions Above
* See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4201-2
Client Sample ID :BUL-ST05-S03 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69794
Report Completed :08/25/93
Collected :08/16/93 @ 16:10 hrs
Received :08/19/93 @ 15:45 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH OTHER = 7.15 MG/KG OF EPH PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	96.3		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	21.7		mg/Kg	3510/3550/8100M		08/21	08/23	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT OF ANALYSIS

Chemlab Ref.# :93.4201-3
Client Sample ID :BUL-ST05-S26 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :CEW LINE RI/FS
Project# :41090-412-01
PWSID :UA

RUSH Order :69794
Report Completed :08/[illegible]/93
Collected :08/10/93 @ 16:00 hrs.
Received :08/10/93 @ 18:45 hrs.
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH OTHER = 76.8 MG/KG OF EPH PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	85.7		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	80.7		mg/Kg	3510/3550/8100M		08/21	08/23	DSH
VPH & BTEX								
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 8015M/8020				
	---			EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS

* See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4205-3
Client Sample ID :BUL-ST05-SW01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69804
Report Completed :08/25/93
Collected :08/16/93 @ 15:00 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	0.200	U	mg/L	3510/3550/8100M		08/21	08/22	JBH
VPH & BTEX Hydrocarbons VPH	0.020	U	mg/L	EPA 8015M/8020 EPA 5030/8015m		08/23	08/23	WLS
Benzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Toluene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
o-Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	[illegible]

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4205-4
Client Sample ID :BUL-ST05-SW02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69804
Report Completed :08/25/93
Collected :08/16/93 @ 15:20 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN. EPH PATTERN NOT CONSISTANT WITH A MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	0.298		mg/L	3510/3550/8100M		08/21	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.020	U	mg/L	EPA 5030/8015m		08/23	08/23	WLS
Benzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Toluene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
o-Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS

* See Special Instructions Above
See Sample Remarks Above
U Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1968

5633 B STREET
ANCHORAGE, AK 99
TEL: (907) 562-
FAX: (907) 561-53

REPORT of ANALYSIS

Chemlab Ref.# :93.4205-2
Client Sample ID :BUL-ST05-GW01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69804
Report Completed :08/25/93
Collected :08/16/93 @ 11:40 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	423	D	mg/L	3510/3550/8100M		08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.723	D	mg/L	EPA 5030/8015m		08/23	08/23	WLS
Benzene	0.0010	U	mg/L	EPA 8020		08/24	08/24	WLS
Toluene	0.0040		mg/L	EPA 8020		08/24	08/24	WLS
Ethylbenzene	0.013		mg/L	EPA 8020		08/24	08/24	WLS
p&m Xylene	0.020		mg/L	EPA 8020		08/24	08/24	WLS
o-Xylene	0.014		mg/L	EPA 8020		08/24	08/24	WLS

(N)-J.1

3-4-94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-6
Client Sample ID :BUL-ST05-GW01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 11:40 hrs
Received :08/19/93 @ 10:50 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN. 8270: BECAUSE THE SAMPLE WAS DILUTED, THERE IS NO SURROGATE RECOVERY.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
transl,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B ST
ANCHORAGE, AK
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-6
Client Sample ID :BUL-ST05-GW01 BULLEN
Matrix :WATER

p-Isopropyltoluene	0.015		mg/L	EPA 8260	08/21	08/21	KWM
Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Napthalene	0.0087		mg/L	EPA 8260	08/21	08/21	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Styrene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Toluene	0.0014		mg/L	EPA 8260	08/21	08/21	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,2,4-Trimethylbenzene	0.035		mg/L	EPA 8260	08/21	08/21	KWM
1,3,5-Trimethylbenzene	0.062		mg/L	EPA 8260	08/21	08/21	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
p+m-Xylene	0.0056		mg/L	EPA 8260	08/21	08/21	KWM
o-Xylene	0.0051		mg/L	EPA 8260	08/21	08/21	KWM
	VALIDATION QUALIFIER		(Comment)				
Semivolatile Organics				EPA 8270			
Phenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
bis(2-Chloroethyl)ether	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
2-Chlorophenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
1,3-Dichlorobenzene	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
1,4-Dichlorobenzene	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
Benzyl Alcohol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
1,2-Dichlorobenzene	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
2-Methylphenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
bis(2-Chloroisopropyl)e	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
4-Methylphenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
n-Nitroso-di-n-Propylam	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
Hexachloroethane	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
Nitrobenzene	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
Isophorone	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
2-Nitrophenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
2,4-Dimethylphenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
Benzoic Acid	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
bis(2-Chloroethoxy)Meth	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
2,4-Dichlorophenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
1,2,4-Trichlorobenzene	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
Naphthalene	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
4-Chloroaniline	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
Hexachlorobutadiene	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
4-Chloro-3-Methylphenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
2-Methylnaphthalene	6.50	DJ	mg/L	EPA 8270	08/22	08/24	MTT
Hexachlorocyclopentadie	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
2,4,6-Trichlorophenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT
2,4,5-Trichlorophenol	1.00	UJ	mg/L	EPA 8270	08/22	08/24	MTT

1-24-94

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-6
Client Sample ID :BUL-ST05-GW01 BULLEN
Matrix :WATER

VALIDATION QUALIFIER (COMMENT)

2-Chloronaphthalene	1.00	UJ (H)	mg/L	EPA 8270		08/22	08/24	MT
2-Nitroaniline	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Dimethylphthalate	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Acenaphthylene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
2,6-Dinitrotoluene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
3-Nitroaniline	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Acenaphthene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
2,4-Dinitrophenol	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
4-Nitrophenol	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Dibenzofuran	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
2,4-Dinitrotoluene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Diethylphthalate	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
4-Chlorophenyl-Phenylet	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Fluorene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
4-Nitroaniline	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
4,6-Dinitro-2-Methylphe	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
n-Nitrosodiphenylamine	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
4-Bromophenyl-Phenyleth	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Hexachlorobenzene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Pentachlorophenol	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Phenanthrene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Anthracene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
di-n-Butylphthalate	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Fluoranthene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Pyrene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Butylbenzylphthalate	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
3,3-Dichlorobenzidine	1.00	UJ(b)	mg/L	EPA 8270		08/22	08/24	MT
Benzo(a)Anthracene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Chrysene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
bis(2-Ethylhexyl)Phthal	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
di-n-Octylphthalate	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Benzo(b)Fluoranthene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Benzo(k)Fluoranthene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Benzo(a)Pyrene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Indeno(1,2,3-cd)Pyrene	1.00	UJ(b)	mg/L	EPA 8270		08/22	08/24	MT
Dibenz(a,h)Anthracene	1.00	UJ	mg/L	EPA 8270		08/22	08/24	MT
Benzo(g,h,i)Perylene	1.00	UJ(b)	mg/L	EPA 8270		08/22	08/24	MT
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	383-435		mg/L	EPA 9060			08/30	CMR
...TOC Concentration	409		mg/L	EPA 9060			08/30	CMR
Residue, Non-Filterable	1680		mg/L	EPA 160.2		08/24	08/24	GPP
Residue,Filterable(TDS)	850		mg/L	EPA 160.1	500	08/20	08/23	RJK

1-24-94

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* See Special Instructions Above
** See Sample Remarks Above
= Undetected, Reported value is the practical quantification limit.
= Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4205-6
Client Sample ID :BUL-ST05-GW02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69804
Report Completed :08/26/93
Collected :08/16/93 @ 16:20 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN. EPH PATTERN NOT CONSISTANT WITH A MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	0.899		mg/L	3510/3550/8100M		08/21	08/22	PHR
VPH & BTEX Hydrocarbons VPH	0.053		mg/L	EPA 8015M/8020 EPA 5030/8015m		08/23	08/23	WLS
Benzene	0.0018		mg/L	EPA 8020		08/23	08/23	WLS
Toluene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
o-Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-8
Client Sample ID :BUL-ST05-GW02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 16:20 hrs
Received :08/19/93 @ 10:50 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0020		mg/L	EPA 8260		08/21	08/21	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichloroethane	0.0026		mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4180-8
Client Sample ID :BUL-ST05-GW02 BULLEN
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
Napthalene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
Styrene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
Toluene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
Trichloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
o-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWI
Semivolatile Organics				EPA 8270			
Phenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2-Chlorophenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2-Methylphenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
4-Methylphenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
Hexachloroethane	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
Nitrobenzene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
Isophorone	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2-Nitrophenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
Benzoic Acid	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
Naphthalene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
4-Chloroaniline	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	08/22	08/24	MTT

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Chemlab Ref.# :93.4180-8
Client Sample ID :BUL-ST05-GW02 BULLEN
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2-Nitroaniline	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Dimethylphthalate	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Acenaphthylene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
3-Nitroaniline	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Acenaphthene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
4-Nitrophenol	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Dibenzofuran	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Diethylphthalate	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Fluorene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
4-Nitroaniline	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Pentachlorophenol	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Phenanthrene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Anthracene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Fluoranthene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Pyrene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Chrysene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		08/22 08/24	MT
TOC, Nonpurgable				EPA 9060	n/a		
...TOC Range	62.5-64.9		mg/L	EPA 9060		08/30	CM
...TOC Concentration	63.5		mg/L	EPA 9060		08/30	CM
Residue, Non-Filterable	2700		mg/L	EPA 160.2		08/24 08/24	GP
Residue,Filterable(TDS)	926		mg/L	EPA 160.1	500	08/20 08/23	RJK

* See Special Instructions Above
* See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ICF ID	BUL-ST05-2S27	BUL-ST05-2S27	BUL-ST05-2S27	BUL-ST05-2S27
F&BI Number	1850	1850 dup	1850 ms	1850 msd
Sample Type	soil	soil	soil	soil
Date Received	9/4/93	9/4/93	9/4/93	9/4/93
% Dry Weight	93			
Sequence Date	#5-09/06/93	#5-09/06/93	#5-09/06/93	#5-09/06/93
Leaded Gas				
JP-4	<50	<60		
Lube Oil	<100	<120		
Diesel	<50	<60	91	77
Spike Level			500	500
Unknown Semi-volat				
Pentacosane	110	105	150	150
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence				
CCl4				
TCA				
Benzene				
TCE				
Toluene				
PCE				
Ethylbenzene				
Xylenes				
Gasoline				
Spike level				
BFB				

ICF ID	BUL-ST05-2S27	BUL-ST05-2S28	BUL-ST05-2S29	BUL-ST05-2S30
F&BI Number	1850	1851	1852	1853
Sample Type	soil	soil	soil	soil
Date Received	9/3/93	9/3/93	9/3/93	9/3/93
% Dry Weight	74	92	68	95
Sequence Date	#5-09/06/93	#5-09/06/93	#5-09/06/93	#5-09/06/93
Leaded Gas				
JP-4	<80	<60	<80	<60
Lube Oil	<160	<120	<160	<120
Diesel	<80	<60	220 J	2400 J
Spike Level				
Unknown Semi-volat				
Pentacosane	105	93	104	96
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence				
CCl4				
TCA				
Benzene				
TCE				
Toluene				
PCE				
Ethylbenzene				
Xylenes				
Gasoline				
Spike level				
BFB				

Compiled by SAM 09/01/95

compiled by sgm 07/01/95

ICF ID	BUL-ST05-2S31	BUL-ST05-2S32	BUL-ST05-2S33	BUL-ST05-2S34
F&BI Number	1854	1855	1856	1857
Sample Type	soil	soil	soil	soil
Date Received	9/3/93	9/3/93	9/3/93	9/3/93
% Dry Weight	88	92	80	91
Sequence Date	#5-09/06/93	#5-09/06/93	#5-09/06/93	#5-09/06/93
Leaded Gas				
JP-4	<60	<60	<60	<60
Lube Oil	<120	<120	<120	<120
Diesel	3400 J	310 J	<60	3300 J
Spike Level				
Unknown Semi-volat				
Pentacosane	122	88	88	90
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence				
CCl4				
TCA				
Benzene				
TCE				
Toluene				
PCE				
Ethylbenzene				
Xylenes				
Gasoline				
Spike level				
BFB				

compiled by SAM 09/01/95

ICF ID	BUL-ST05-2S35	BUL-ST05-2S36-2	UL-ST05-2S37-1.3
F&BI Number	1858	1859	1868
Sample Type	soil	soil	soil
Date Received	9/3/93	34215	9/3/93
% Dry Weight	97	95	89
Sequence Date	#5-09/06/93	#5-09/06/93	#5-09/06/93
Leaded Gas			
JP-4	<60	<60	<60
Lube Oil	<120	<120	<120
Diesel	1600 J	3000 J	<60
Spike Level			
Unknown Semi-volat			
Pentacosane	83	110	96
Sequence Date			
PCB 1221			
PCB 1232			
PCB 1016			
PCB 1242			
PCB 1248			
PCB 1254			
PCB 1260			
Spike Level			
Dibutyl Chlorendate			
Sequence Date			
alpha-BHC			
beta-BHC			
gamma-BHC			
delta-BHC			
Heptachlor			
Aldrin			
Heptachlor Epoxide			
Endosulfan I			
DDE			
Dieldrin			
Endrin			
Endosulfan II			
DDD			
Endrin Aldehyde			
DDT			
Endosulfan Sulfate			
Endrin Ketone			
Methoxy Chlor			
Chlordane			
Dibutyl Chlorendate			
Spike Level			
Vol Sequence			
CCl4			
TCA			
Benzene			
TCE			
Toluene			
PCE			
Ethylbenzene			
Xylenes			
Gasoline			
Spike level			
BFB			

ANALYTICAL DATA SHEETS FOR THE OLD LANDFILL/DUMP SITE EAST (LF06)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

[redacted]emlab Ref.# :93.4202-6
Client Sample ID :BUL-LF06-S01 FBI #115 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 13:00 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH RESULT - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	77.9		%	SM17 2540G			08/21	MDC
Hydrocarbons EPH	34.9		mg/Kg	3510/3550/8100M		08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.600	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,1 Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,1 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Chloroform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Carbontetrachloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1, 2 Dichloropropane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Trichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,1,2 Trichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Dibromochloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Tetrachloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Chlorobenzene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Trans12Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,2 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,1,1 Trichoroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Bromodichloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Trans1,3Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
cis-1,3-Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Bromoform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Chloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Bromoethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Vinyl Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Chloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGI

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REPORT of ANALYSIS

5633 B STREET
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FAX: (907) 561-5301

Chemlab Ref.# :93.4202-6
Client Sample ID :BUL-LF06-S01 FBI #115 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
2-Chloroethylvinylether	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

[redacted]lab Ref.# :93.4202-8
Client Sample ID :BUL-LF06-S01 FBI #115 BULLEN DUPLICATE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 13:00 hrs;
Received :08/19/93 @ 18:45 hrs;
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. FOR SPIKING CONCENTRATIONS AND PERCENT RECOVERIES, SEE QA/QC PACKAGE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	77.9		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	136		mg/Kg	3510/3550/8100M		08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	16.2		mg/Kg	EPA 5030/8015m		08/21	08/21	WLS

Benzene	0.239		mg/Kg	EPA 8020		08/21	08/21	WLS
Toluene	1.30		mg/Kg	EPA 8020		08/21	08/21	WLS
Ethylbenzene	0.263		mg/Kg	EPA 8020		08/21	08/21	WLS
[redacted]&m Xylene	0.891		mg/Kg	EPA 8020		08/21	08/21	WLS
[redacted]-Xylene	0.384		mg/Kg	EPA 8020		08/21	08/21	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethylene	0.134		mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Carbontetrachloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1, 2 Dichloropropane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trichloroethylene	0.538		mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,2 Trichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Dibromochloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Tetrachloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chlorobenzene	0.441		mg/Kg	EPA 8010		08/21	08/21	SGM
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans12Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,2 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,1 Trichoroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromodichloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans1,3Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
cis-1,3-Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Vinyl Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B ST
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4202-8
Client Sample ID :BUL-LF06-S01 FBI #115 BULLEN DUPLICATE
Matrix :SOIL

1,4 Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
2-Chloroethylvinylether	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.229		mg/Kg	EPA 8080	08/21	08/22	NRC
Alpha-BHC	0.206		mg/Kg	EPA 8080	08/21	08/22	NRC
Beta-BHC	0.173		mg/Kg	EPA 8080	08/21	08/22	NRC
Delta-BHC	0.181		mg/Kg	EPA 8080	08/21	08/22	NRC
Gamma-BHC	0.137		mg/Kg	EPA 8080	08/21	08/22	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDD	0.292		mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDE	0.235		mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDT	0.027		mg/Kg	EPA 8080	08/21	08/22	NRC
Dieldrin	0.249		mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan I	0.213		mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan II	0.284		mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan Sulfate	0.135		mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin	0.162		mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin Aldehyde	0.195		mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor	0.098		mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor Epoxide	0.224		mg/Kg	EPA 8080	08/21	08/22	NRC
Methoxychlor	0.159		mg/Kg	EPA 8080	08/21	08/22	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

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NA = Not Analyze
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Commlab Ref.# :93.4202-7
Client Sample ID :BUL-LF06-S01 FBI #115 BULLEN SPIKE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 13:00 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. FOR SPIKING CONCENTRATIONS AND PERCENT RECOVERIES, SEE QA/QC PACKAGE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	77.9		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	124		mg/Kg	3510/3550/8100M		08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	16.2		mg/Kg	EPA 5030/8015m		08/21	08/22	WLS

Benzene	0.244		mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	1.33		mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.264		mg/Kg	EPA 8020		08/21	08/22	WLS
m Xylene	0.902		mg/Kg	EPA 8020		08/21	08/22	WLS
-Xylene	0.389		mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethylene	0.119		mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Carbontetrachloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1, 2 Dichloropropane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trichloroethylene	0.573		mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,2 Trichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Dibromochloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Tetrachloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chlorobenzene	0.461		mg/Kg	EPA 8010		08/21	08/21	SGM
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans12Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,2 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,1 Trichoroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromodichloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans1,3Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
cis-1,3-Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Vinyl Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STRE
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4202-7
Client Sample ID :BUL-LF06-S01 FBI #115 BULLEN SPIKE
Matrix :SOIL

1,4 Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
2-Chloroethylvinylether	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.224		mg/Kg	EPA 8080	08/21	08/22	NRC
Alpha-BHC	0.204		mg/Kg	EPA 8080	08/21	08/22	NRC
Beta-BHC	0.169		mg/Kg	EPA 8080	08/21	08/22	NRC
Delta-BHC	0.177		mg/Kg	EPA 8080	08/21	08/22	NRC
Gamma-BHC	0.134		mg/Kg	EPA 8080	08/21	08/22	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDD	0.291		mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDE	0.232		mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDT	0.027		mg/Kg	EPA 8080	08/21	08/22	NRC
Dieldrin	0.246		mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan I	0.210		mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan II	0.286		mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan Sulfate	0.138		mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin	0.156		mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin Aldehyde	0.191		mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor	0.093		mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor Epoxide	0.219		mg/Kg	EPA 8080	08/21	08/22	NRC
Methoxychlor	0.150		mg/Kg	EPA 8080	08/21	08/22	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-9
Client Sample ID :BUL-LF06-S02 FBI #116 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 15:00 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH RESULT - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	95.7		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	51.0		mg/Kg	3510/3550/8100M		08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/21	08/21	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/21	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/21	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS ACL

5633 B ST
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4202-9
Client Sample ID :BUL-LF06-S02 FBI #116 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/22	SG
2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21 08/22	SG
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/22	SG
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/22	SG
Organochlorine Pest				EPA 8080		
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endrin	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21 08/22	
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyze
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-8
Client Sample ID :BUL-LF06-S02 BULLEN LANDFILL
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 15:00 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Bromobenzene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Bromochloromethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Bromodichloromethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Bromoform	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Bromomethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
n-Butylbenzene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
sec-Butylbenzene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
tert-Butylbenzne	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Carbon Tetrachloride	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Chlorobenzene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Chloroethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Chloroform	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Chloromethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
2-Chlorotoluene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
4-Chlorotoluene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Dibromochloromethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
12Dibromo3Chloropropane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,2-Dibromoethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Dibromomethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,2-Dichlorobenzene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,3-Dichlorobenzene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,4-Dichlorobenzene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
Dichlorodifluoromethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,2-Dichloroethane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
cis-1.2-Dichloroethene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
trans1,2-Dichloroethene	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,2-Dichloropropane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
1,3-Dichloropropane	0.020	U	mg/L	EPA 8260		08/19	08/19	KWM
2,2-Dichloropropane	0.020	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloropropene	0.020	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Ethylbenzene	0.020	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Hexachlorobutadiene	0.020	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropylbenzene	0.020	U	mg/Kg	EPA 8260		08/19	08/19	KWM
p-Isopropyltoluene	0.020	U	mg/Kg	EPA 8260		08/19	08/19	KWM

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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-8
Client Sample ID :BUL-LF06-S02 BULLEN LANDFILL
Matrix :SOIL

Methylene Chloride	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
Napthalene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
n-Propylbenzene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
Styrene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1112-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
Tetrachloroethene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
Toluene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1,2,3-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1,2,4-Trichlorobenzene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1,1,1-Trichloroethane	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1,1,2-Trichloroethane	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
Trichloroethene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1,2,3-Trichloropropane	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1,2,4-Trimethylbenzene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
1,3,5-Trimethylbenzene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
p+m-Xylene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
o-Xylene	0.020	U	mg/Kg	EPA 8260	08/19 08/19	KWM
Semivolatile Organics				EPA 8270		
Phenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
bis(2-Chloroethyl)ether	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2-Chlorophenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
1,3-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
1,4-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
Benzyl Alcohol	1.00	U	mg/Kg	EPA 8270	08/19 08/19	MTT
1,2-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
bis(2-Chloroisopropyl)e	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
4-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
n-Nitroso-di-n-Propylam	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
Hexachloroethane	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
Nitrobenzene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
Isophorone	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2-Nitrophenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2,4-Dimethylphenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
Benzoic Acid	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
bis(2-Chloroethoxy)Meth	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2,4-Dichlorophenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
1,2,4-Trichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
Naphthalene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
4-Chloroaniline	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
Hexachlorobutadiene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
4-Chloro-3-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2-Methylnaphthalene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
Hexachlorocyclopentadie	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2,4,6-Trichlorophenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2,4,5-Trichlorophenol	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT
2-Chloronaphthalene	0.210	U	mg/Kg	EPA 8270	08/19 08/19	MTT

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ANCHORAGE, AK 99518
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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-8
Client Sample ID :BUL-LF06-S02 BULLEN LANDFILL
Matrix :SOIL

		Qualifier					
2-Nitroaniline	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Dimethylphthalate	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Acenaphthylene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
2,6-Dinitrotoluene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
3-Nitroaniline	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Acenaphthene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
2,4-Dinitrophenol	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
4-Nitrophenol	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Dibenzofuran	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
2,4-Dinitrotoluene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Diethylphthalate	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
4-Chlorophenyl-Phenylet	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Fluorene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
4-Nitroaniline	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
4,6-Dinitro-2-Methylphe	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
n-Nitrosodiphenylamine	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
4-Bromophenyl-Phenyleth	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Hexachlorobenzene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Pentachlorophenol	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Phenanthrene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Anthracene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
di-n-Butylphthalate	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Fluoranthene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Pyrene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Butylbenzylphthalate	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
3,3-Dichlorobenzidine	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Benzo(a)Anthracene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Chrysene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
bis(2-Ethylhexyl)Phthal	0.447		mg/Kg		EPA 8270	08/19 08/19	MT
di-n-Octylphthalate	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Benzo(b)Fluoranthene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Benzo(k)Fluoranthene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Benzo(a)Pyrene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Indeno(1,2,3-cd)Pyrene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Dibenz(a,h)Anthracene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Benzo(g,h,i)Perylene	0.210	U	mg/Kg		EPA 8270	08/19 08/19	MT
Sample Preparation	---				EPA 3050 Digest		
Total Metals Analysis	---				-		
ICP Screen, ICF					EPA	n/a	
Aluminum	2400		mg/Kg		EPA 6010	08/27 08/29	DFL
Antimony	53	U J	mg/Kg	J.3	EPA 6010	08/27 08/29	DFL
Arsenic	5.3	U	mg/Kg		EPA 6010	08/27 08/29	DFL
Barium	19		mg/Kg		EPA 6010	08/27 08/29	DFL
Beryllium	2.6	U	mg/Kg		EPA 6010	08/27 08/29	DFL
Cadmium	2.6	U	mg/Kg		EPA 6010	08/27 08/29	DFL
Calcium	16000	J	mg/Kg	J.3	EPA 6010	08/27 08/29	DFL
Chromium	18		mg/Kg		EPA 6010	08/27 08/29	DFL
Cobalt	53	U	mg/Kg		EPA 6010	08/27 08/29	DFL
Copper	13		mg/Kg		EPA 6010	08/27 08/29	DFL
Iron	7400		mg/Kg		EPA 6010	08/27 08/29	DFL

All chays J.L 2/2/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-8
Client Sample ID :BUL-LF06-S02 BULLEN LANDFILL
Matrix :SOIL

5633 B STREET
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Lead	40		mg/Kg	EPA 6010	08/27 08/29	DFT
Magnesium	1680		mg/Kg	EPA 6010	08/27 08/29	DFT
Manganese	76		mg/Kg	EPA 6010	08/27 08/29	DFT
Molybdenum	2.6	U	mg/Kg	EPA 6010	08/27 08/29	DFT
Nickel	6.7		mg/Kg	EPA 6010	08/27 08/29	DFT
Potassium	260	U	mg/Kg	EPA 6010	08/27 08/29	DFT
Selenium	53	U	mg/Kg	EPA 6010	08/27 08/29	DFT
Silver	2.6	U	mg/Kg	EPA 6010	08/27 08/29	DFT
Sodium	690		mg/Kg	EPA 6010	08/27 08/29	DFT
Thallium	0.3	U	mg/Kg	EPA 7841	08/26 08/28	KAW
Vanadium	8.0		mg/Kg	EPA 6010	08/27 08/29	DFT
Zinc	34		mg/Kg	EPA 6010	08/27 08/29	DFT

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4202-10
Client Sample ID :BUL-LF06-S03 FBI #117 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 14:40 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	84.0		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	4.00	U	mg/Kg	3510/3550/8100M		08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.600	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroform	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Carbontetrachloride	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1, 2 Dichloropropane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,2 Trichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Dibromochloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Tetrachloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chlorobenzene	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans12Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,2 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,1 Trichoroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromodichloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Transi,3Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
cis-1,3-Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoform	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Vinyl Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,4 Dichlorobenzene	0.030	U	mg/Kg	EPA 8010		08/21	08/22	SGM

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SINCE 1908
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REPORT of ANALYSIS

Chemlab Ref.# :93.4202-10
Client Sample ID :BUL-LF06-S03 FBI #117 BULLEN
Matrix :SOIL

2-Chloroethylvinylether	0.030	U	mg/Kg	EPA 8010	08/21 08/22	SGM
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21 08/22	SGM
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21 08/22	SGM
Organochlorine Pest				EPA 8080		
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyze
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-11
Client Sample ID :BUL-LF06-S04 FBI #118 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 14:30 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	87.1		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	145		mg/Kg	3510/3550/8100M		08/21	08/25	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.500	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
[redacted]ylene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethylene	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroform	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Carbontetrachloride	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1, 2 Dichloropropane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichloroethylene	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,2 Trichloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Dibromochloromethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Tetrachloroethylene	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chlorobenzene	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans12Dichloroethylene	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,2 Dichloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,1 Trichoroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromodichloromethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans1,3Dichloropropene	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
cis-1,3-Dichloropropene	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoform	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloromethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Vinyl Chloride	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,4 Dichlorobenzene	0.025	U	mg/Kg	EPA 8010		08/21	08/22	SGM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-11
Client Sample ID :BUL-LF06-S04 FBI #118 BULLEN
Matrix :SOIL

2-Chloroethylvinylether	0.025	U	mg/Kg	EPA 8010	08/21	08/22	SG
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8010	08/21	08/22	SG
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8010	08/21	08/22	SG
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Delta-BHC	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
Gamma-BHC	0.0020	U	mg/Kg	EPA 8080	08/21	08/22	NR
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endosulfan I	0.004	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Heptachlor Epoxide	0.030	U	mg/Kg	EPA 8080	08/21	08/22	NR
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
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UA = Unavailable
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LT = Less Than
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5633 B STREET
ANCHORAGE, AK 99518
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REPORT of ANALYSIS

Chemlab Ref.# :93.4202-12
Client Sample ID :BUL-LF06-S05 FBI #119 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 14:15 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	33.1		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	219		mg/Kg	3510/3550/8100M		08/21	08/25	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	1.50	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.085	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.085	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.085	U	mg/Kg	EPA 8020		08/21	08/22	WLS
m&p Xylene	0.085	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.085	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethylene	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroform	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Carbontetrachloride	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1, 2 Dichloropropane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichloroethylene	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,2 Trichloroethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Dibromochloromethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Tetrachloroethylene	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chlorobenzene	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichlorofluoromethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans12Dichloroethylene	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,2 Dichloroethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,1 Trichoroethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromodichloromethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans1,3Dichloropropene	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
cis-1,3-Dichloropropene	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoform	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1122-Tetrachloroethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloromethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Vinyl Chloride	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroethane	0.085	U	mg/Kg	EPA 8010		08/21	08/22	SGM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4202-12
Client Sample ID :BUL-LF06-S05 FBI #119 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.085	U	mg/Kg	EPA 8010	08/21 08/22	SGM
2-Chloroethylvinylether	0.085	U	mg/Kg	EPA 8010	08/21 08/22	SGM
1,3-Dichlorobenzene	0.085	U	mg/Kg	EPA 8010	08/21 08/22	SGM
1,2-Dichlorobenzene	0.085	U	mg/Kg	EPA 8010	08/21 08/22	SGM
Organochlorine Pest				EPA 8080		
Aldrin	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Alpha-BHC	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Beta-BHC	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Delta-BHC	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Gamma-BHC	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Chlordane	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC
4,4'-DDD	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
4,4'-DDE	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
4,4'-DDT	0.030	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Dieldrin	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endosulfan I	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endosulfan II	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endosulfan Sulfate	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endrin	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Endrin Aldehyde	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Heptachlor	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Heptachlor Epoxide	0.030	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Methoxychlor	0.006	U	mg/Kg	EPA 8080	08/21 08/22	NRC
Toxaphene	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1016	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1221	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1232	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1242	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1248	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1254	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC
PCB-1260	0.060	U	mg/Kg	EPA 8080	08/21 08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
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REPORT of ANALYSIS

Lab Ref.# :93.4202-13
Client Sample ID :BUL-LF06-S06 FBI #120 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 13:55 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	88.3		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	4.00	U	mg/Kg	3510/3550/8100M		08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4202-13
Client Sample ID :BUL-LF06-S06 FBI #120 BULLEN
Matrix :SOIL

2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21 08/22	SC
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/22	SC
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/22	SC
Organochlorine Pest				EPA 8080		
Aldrin	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
Alpha-BHC	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
Beta-BHC	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
Delta-BHC	0.010	U	mg/Kg	EPA 8080	08/21 08/22	NR
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endrin	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21 08/22	NR
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21 08/22	NR

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.
UA = Unavailable
NA = Not Analyz
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-14
Client Sample ID :BUL-LF06-S07 FBI #121 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 13:40 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH PATTERN IS NOT CONSISTENT WITH A MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	97.2		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	173		mg/Kg	3510/3550/8100M				
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400 ---	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI
Chloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGI

COMMERCIAL TESTING & ENGINEERING CO.
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SINCE 908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-14
Client Sample ID :BUL-LF06-S07 FBI #121 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	[redacted]
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/23	[redacted]
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
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REPORT of ANALYSIS

Chemlab Ref.# :93.4202-15
Client Sample ID :BUL-LF06-S08 FBI #122-23 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 13:30 hr
Received :08/19/93 @ 18:45 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH RESULT - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Percent Solids	95.8		%	SM17 2540G			08/21	MD
Hydrocarbons EPH	6.01		mg/Kg	3510/3550/8100M		08/21	08/25	JB
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WL
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WL
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WL
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WL
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WL
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WL
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG
Chloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SG

COMMERCIAL TESTING & ENGINEERING CO.
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SINCE 1908

5633 B ST
ANCHORAGE, AK 9
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-15
Client Sample ID :BUL-LF06-S08 FBI #122-23 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
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REPORT of ANALYSIS

mlab Ref.# :93.4202-16
Client Sample ID :BUL-LF06-S09 FBI #124 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 14:05 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	86.6		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	4.00	U	mg/Kg	3510/3550/8100M		08/21	08/25	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400 ---	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM

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5633 B STREET
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TEL: (907) 562-2343
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REPORT of ANALYSIS

Chemlab Ref.# :93.4202-16
Client Sample ID :BUL-LF06-S09 FBI #124 BULLEN
Matrix :SOIL

2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDE	0.004	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin Aldehyde	0.005	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-17
Client Sample ID :BUL-LF06-SD01 FBI #125 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 15:56 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By : Stephen C Ede

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. SAMPLE WAS RECEIVED WITH A BROKEN LID. EPH PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Qualifier Comments

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	75.6		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	111		mg/Kg	3510/3550/8100M (I)-K.1		08/21	08/25	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM

DP 1-25-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STR
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4202-17
Client Sample ID :BUL-LF06-SD01 FBI #125 BULLEN
Matrix :SOIL

Chloroethane	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Delta-BHC	0.003	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/23	[illegible]
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	[illegible]
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

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NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-9
Client Sample ID :BUL-LF06-SD01 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 15:56 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By : C. Ede

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN. HOLDING TIME MISSED FOR 8270.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromochloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromodichloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromoform	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromomethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
n-Butylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
sec-Butylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
tert-Butylbenzne	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Carbon Tetrachloride	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroform	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
4-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromochloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
12Dibromo3Chloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dibromoethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromomethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,4-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dichlorodifluoromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
cis-1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
trans1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloropropene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Ethylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Hexachlorobutadiene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-9
Client Sample ID :BUL-LF06-SD01 BULLEN
Matrix :SOIL

Methylene Chloride	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Napthalene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
n-Propylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Styrene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1112-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Tetrachloroethene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Toluene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,3-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,4-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,1,1-Trichloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,1,2-Trichloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Trichloroethene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,3-Trichloropropane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,4-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,3,5-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Vinyl Chloride	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
p+m-Xylene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
o-Xylene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	
bis(2-Chloroethyl)ether	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2-Chlorophenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
1,3-Dichlorobenzene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
1,4-Dichlorobenzene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
Benzyl Alcohol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
1,2-Dichlorobenzene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2-Methylphenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
bis(2-Chloroisopropyl)e	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
4-Methylphenol	0.58		mg/Kg	EPA 8270	08/31	09/08	GV
n-Nitroso-di-n-Propylam	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
Hexachloroethane	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
Nitrobenzene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
Isophorone	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2-Nitrophenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2,4-Dimethylphenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
Benzoic Acid	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
bis(2-Chloroethoxy)Meth	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2,4-Dichlorophenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
1,2,4-Trichlorobenzene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
Naphthalene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
4-Chloroaniline	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
Hexachlorobutadiene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
4-Chloro-3-Methylphenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2-Methylnaphthalene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
Hexachlorocyclopentadie	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2,4,6-Trichlorophenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2,4,5-Trichlorophenol	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV
2-Chloronaphthalene	0.24	U	mg/Kg	EPA 8270	08/31	09/08	GV

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-9
Client Sample ID :BUL-LF06-SD01
Matrix :SOIL

BULLEN

		Qual (1st)		Comment				
2-Nitroaniline	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Dimethylphthalate	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Acenaphthylene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
2,6-Dinitrotoluene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
3-Nitroaniline	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Acenaphthene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
2,4-Dinitrophenol	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
4-Nitrophenol	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Dibenzofuran	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
2,4-Dinitrotoluene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Diethylphthalate	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
4-Chlorophenyl-Phenylet	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Fluorene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
4-Nitroaniline	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
4,6-Dinitro-2-Methylphe	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
n-Nitrosodiphenylamine	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
4-Bromophenyl-Phenyleth	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Hexachlorobenzene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Pentachlorophenol	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Phenanthrene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Anthracene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
di-n-Butylphthalate	0.74		mg/Kg		EPA 8270		08/31 09/08	GV
Fluoranthene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Pyrene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Butylbenzylphthalate	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
3,3-Dichlorobenzidine	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Benzo(a)Anthracene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Chrysene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
bis(2-Ethylhexyl)Phthal	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
di-n-Octylphthalate	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Benzo(b)Fluoranthene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Benzo(k)Fluoranthene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Benzo(a)Pyrene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Indeno(1,2,3-cd)Pyrene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Dibenz(a,h)Anthracene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Benzo(g,h,i)Perylene	0.24	U	mg/Kg		EPA 8270		08/31 09/08	GV
Sample Preparation	---				EPA 3050 Digest			
Total Metals Analysis	---				-			
ICP Screen, ICF					EPA	n/a		
Aluminum	1700		mg/Kg		EPA 6010		08/21 08/23	DLG
Antimony	58	U J	mg/Kg	J.2	EPA 6010		08/21 08/23	DLG
Arsenic	5.8	U	mg/Kg		EPA 6010		08/21 08/23	DLG
Barium	32		mg/Kg		EPA 6010		08/21 08/23	DLG
Beryllium	2.9	U	mg/Kg		EPA 6010		08/21 08/23	DLG
Cadmium	2.9	U	mg/Kg		EPA 6010		08/21 08/23	DLG
Calcium	34500		mg/Kg		EPA 6010		08/21 08/23	DLG
Chromium	6.7		mg/Kg		EPA 6010		08/21 08/23	DLG
Cobalt	58	U	mg/Kg		EPA 6010		08/21 08/23	DLG
Copper	6.2		mg/Kg		EPA 6010		08/21 08/23	DLG
Iron	7000		mg/Kg		EPA 6010		08/21 08/23	DLG

All chgs s.L 2/2/94

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-9
Client Sample ID :BUL-LF06-SD01 BULLEN
Matrix :SOIL

		Qualifier					
Lead	5.8	U	mg/Kg		EPA 6010	08/21 08/23	DLG
Magnesium	1600		mg/Kg		EPA 6010	08/21 08/23	DLG
Manganese	50.5		mg/Kg		EPA 6010	08/21 08/23	DLG
Molybdenum	2.9	U	mg/Kg		EPA 6010	08/21 08/23	DLG
Nickel	7.5		mg/Kg		EPA 6010	08/21 08/23	DLG
Potassium	2900	U R	mg/Kg	J.1	EPA 6010	08/21 08/23	DLG
Selenium	58	U	mg/Kg		EPA 6010	08/21 08/23	DLG
Silver	2.9	U	mg/Kg		EPA 6010	08/21 08/23	DLG
Sodium	150	U	mg/Kg		EPA 6010	08/21 08/23	DLG
Thallium	0.3	U	mg/Kg		EPA 7841	08/21 08/24	EMB
Vanadium	6.5		mg/Kg		EPA 6010	08/21 08/23	DLG
Zinc	30		mg/Kg		EPA 6010	08/21 08/23	DLG

All chgs s.c. 2/2/94

* See Special Instructions Above
** See Sample Remarks Above
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D = Secondary dilution.

UA = Unavailable
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LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-18
Client Sample ID :BUL-LF06-SD02 FBI #126 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 16:10 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. SAMPLE WAS RECEIVED BROKEN IN BAG. EPH RESULT - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	84.3		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	79.0	D	mg/Kg	3510/3550/8100M		08/21	08/25	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.500	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/22	SGM

1-25-94

COMMERCIAL TESTING & ENGINEERING CO.
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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4202-18
Client Sample ID :BUL-LF06-SD02 FBI #126 BULLEN
Matrix :SOIL

Chloroethane	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/22	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDE	0.010	U	mg/Kg	EPA 8080	08/21	08/23	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/23	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/23	[illegible]
Methoxychlor	0.004	U	mg/Kg	EPA 8080	08/21	08/23	[illegible]
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/23	NRC

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* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

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COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-3
Client Sample ID :BUL-LF06-SW01 FBI #84-87 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :08/26/93
Collected :08/15/93 @ 16:36 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C. EPH PATTERN NOT CONSISTENT WITH AN UNWEATHERED MIDDLE DISTILLATE FUEL. FINAL RESULTS.

Auditor / Approver

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	1.84		mg/L	3510/3550/8100M	(J)-K	08/21	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.020	U	mg/L	EPA 5030/8015m		08/23	08/23	KWM

Benzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Toluene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
o-Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans12Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,2 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,1 Trichoroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromodichloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans1,3Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
cis-1,3-Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Vinyl Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB

CAP
1-25-94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-3
Client Sample ID :BUL-LF06-SW01 FBI #84-87 BULLEN
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL (907) 562-2343
FAX (907) 561-5301

2-Chloroethylvinylether	0.0010	U	mg/L	EPA 8010	08/21	08/21	JL
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	JL
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	JL
Organochlorine Pest				EPA 8080			
Aldrin	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Alpha-BHC	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Beta-BHC	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Delta-BHC	0.0002	U	mg/L	EPA 8080	08/21	08/23	NR
Gamma-BHC	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Chlordane	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDD	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDE	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDT	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Dieldrin	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endosulfan I	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endosulfan II	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endosulfan Sulfate	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endrin	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endrin Aldehyde	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Heptachlor	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Heptachlor Epoxide	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Methoxychlor	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Toxaphene	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1016	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1221	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1232	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1242	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1248	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1254	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1260	0.002	U	mg/L	EPA 8080	08/21	08/23	NR

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-3
Client Sample ID :BUL-LF06-SW01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69693
Report Completed :09/01/93
Collected :08/15/93 @ 16:36 hr
Received :08/17/93 @ 12:00 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Bromoform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Bromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Chloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Chloroform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Chloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
cis-1,2-Dichloroehtene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
transl,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWI

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-3
Client Sample ID :BUL-LF06-SW01 BULLEN
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Napthalene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Styrene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Toluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	11.0-13.3		mg/L	EPA 9060			08/25	R
...TOC Concentration	12.5		mg/L	EPA 9060			08/25	R
Semivolatile Organics				EPA 8270				
Phenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroethyl)ether	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Chlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,3-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,4-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Benzyl Alcohol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,2-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroisopropyl)e	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
n-Nitroso-di-n-Propylam	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Hexachloroethane	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Nitrobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Isophorone	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Nitrophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4-Dimethylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Benzoic Acid	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroethoxy)Meth	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4-Dichlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,2,4-Trichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Naphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Chloroaniline	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Hexachlorobutadiene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Chloro-3-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Methylnaphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	T

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
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REPORT of ANALYSIS

Chemlab Ref.# :93.4122-3
Client Sample ID :BUL-LF06-SW01 BULLEN
Matrix :WATER

VALIDATION QUALIFIER
COMMENT

Hexachlorocyclopentadie	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
2,4,6-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
2,4,5-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
2-Chloronaphthalene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
2-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Dimethylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Acenaphthylene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
2,6-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
3-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Acenaphthene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
2,4-Dinitrophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
4-Nitrophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Dibenzofuran	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
2,4-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Diethylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
4-Chlorophenyl-Phenylet	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Fluorene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
4-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
4,6-Dinitro-2-Methylphe	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
n-Nitrosodiphenylamine	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
4-Bromophenyl-Phenyleth	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Hexachlorobenzene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Pentachlorophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Phenanthrene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
di-n-Butylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Pyrene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Butylbenzylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
3,3-Dichlorobenzidine	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Benzo(a)Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Chrysene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
bis(2-Ethylhexyl)Phthal	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
di-n-Octylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Benzo(b)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Benzo(k)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Benzo(a)Pyrene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Indeno(1,2,3-cd)Pyrene	0.01	UJ(D)	mg/L	EPA 8270	08/20 08/20	MT
Dibenz(a,h)Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	MT
Benzo(g,h,i)Perylene	0.01	UJ(D)	mg/L	EPA 8270	08/20 08/20	MT

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-3
Client Sample ID :BUL-LF06-SW01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69672
Report Completed :08/26/93
Collected :08/15/93 @ 16:36 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			---				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.61		mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.074		mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	50		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Iron	3.6		mg/L	EPC 6010		08/20	08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Magnesium	18		mg/L	EPA 6010		08/20	08/23	DLG
Manganese	0.13		mg/L	EPA 6010		08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20	08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Sodium	73		mg/L	EPA 6010		08/20	08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841		08/18	08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Dissolved Metals Analys	---			---				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.052		mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	47		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG

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ANCHORAGE, AK 99518
TEL: (907) 562-2343
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REPORT of ANALYSIS

Chemlab Ref.# :93.4121-3
Client Sample ID :BUL-LF06-SW01 BULLEN
Matrix :WATER

Iron	0.12		mg/L	EPC 6010		08/20 08/23	DL
Lead	0.10	U	mg/L	EPA 6010		08/20 08/23	DL
Magnesium	18		mg/L	EPA 6010		08/20 08/23	DL
Manganese	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Molybdenum	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Nickel	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Potassium	5.0	U	mg/L	EPA 6010		08/20 08/23	DL
Selenium	0.10	U	mg/L	EPA 6010		08/20 08/23	DL
Silver	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Sodium	75		mg/L	EPA 6010		08/20 08/23	DL
Thallium	0.005	U	mg/L	EPA 7841		08/18 08/25	EM
Vanadium	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Zinc	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Residue, Non-Filterable	34		mg/L	EPA 160.2		08/24 08/24	GP
Residue,Filterable(TDS)	419		mg/L	EPA 160.1	500	08/18 08/19	RJ

See Special Instructions Above
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COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREE
ANCHORAGE, AK 995
TEL. (907) 562-23
FAX (907) 561-53

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-4
Client Sample ID :BUL-LF06-SW02 FBI #88-91 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :08/26/93
Collected :08/15/93 @ 17:40 h
Received :08/19/93 @ 18:45 h
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C. EPH PATTERN NOT CONSISTENT WITH AN UNWEATHERED MIDDLE DISTILLATE FUEL. FINAL RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Hydrocarbons EPH	1.87		mg/L	3510/3550/8100M		08/21	08/22	JB
VPH & BTEX								
Hydrocarbons VPH	0.125	U	mg/L	EPA 8015M/8020 EPA 5030/8015m		08/23	08/23	KW
Benzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLI
Toluene	0.0012		mg/L	EPA 8020		08/21	08/21	JLI
Ethylbenzene	0.0076		mg/L	EPA 8020		08/21	08/21	JLI
p&m Xylene	0.011		mg/L	EPA 8020		08/21	08/21	JLI
o-Xylene	0.0082		mg/L	EPA 8020		08/21	08/21	[redacted]
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans12Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,2 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,1 Trichoroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromodichloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans1,3Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
cis-1,3-Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Vinyl Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	[redacted]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL (907) 562-2343
FAX (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-4
Client Sample ID :BUL-LF06-SW02 FBI #88-91 BULLEN
Matrix :WATER

2-Chloroethylvinylether	0.0010	U	mg/L	EPA 8010	08/21	08/21	JL
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	JL
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	JL
Organochlorine Pest				EPA 8080			
Aldrin	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Alpha-BHC	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Beta-BHC	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Delta-BHC	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Gamma-BHC	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Chlordane	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
4,4'-DDD	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
4,4'-DDE	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
4,4'-DDT	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Dieldrin	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Endosulfan I	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Endosulfan II	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Endosulfan Sulfate	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Endrin	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Endrin Aldehyde	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Heptachlor	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Heptachlor Epoxide	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Methoxychlor	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
Toxaphene	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
PCB-1016	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
PCB-1221	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
PCB-1232	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
PCB-1242	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
PCB-1248	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
PCB-1254	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL
PCB-1260	0.0010	U	mg/L	EPA 8080	08/21	08/21	JL

* See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B ST
ANCHORAGE, AK
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Lab Ref.# :93.4204-5
Client Sample ID :BUL-LF06-SW03 FBI #92-103 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :08/26/93
Collected :08/15/93 @ 16:50 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C. RECEIVED WITH VOC BROKEN. EPH PATTERN NOT CONSISTENT WITH AN UNWEATHERED MIDDLE DISTILLATE FUEL. FINAL RESULTS.

Qualifying Comment

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	1.45		mg/L	3510/3550/8100M	(J) - K.1 original 1/25/94	08/21	08/22	JBI
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.020 ---	U	mg/L	EPA 5030/8015m	CQ	08/23	08/23	KWI
Benzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLI
Toluene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLI
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLI
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	[redacted]
o-Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	[redacted]
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.0040		mg/L	EPA 8010	(LL) - F.1	08/21	08/21	JLE
1,1 Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Trichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Chlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Trans12Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
1,2 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
1,1,1 Trichoroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Bromodichloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Transi,3Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
cis-1,3-Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Bromoform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Chloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Bromoethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Vinyl Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Chloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE

CQ 3-4-94

Compiled: SMF 11/29/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREE
ANCHORAGE, AK 9951
TEL (907) 562-234
FAX (907) 561-530

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-5
Client Sample ID :BUL-LF06-SW03 FBI #92-103 BULLEN
Matrix :WATER

1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	J
2-Chloroethylvinylether	0.0010	U	mg/L	EPA 8010	08/21	08/21	J
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	J
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	J
Organochlorine Pest				EPA 8080			
Aldrin	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Alpha-BHC	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Beta-BHC	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Delta-BHC	0.0003	U	mg/L	EPA 8080	08/21	08/23	NI
Gamma-BHC	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Chlordane	0.003	U	mg/L	EPA 8080	08/21	08/23	NI
4,4'-DDD	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
4,4'-DDE	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
4,4'-DDT	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Dieldrin	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Endosulfan I	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Endosulfan II	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Endosulfan Sulfate	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Endrin	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Endrin Aldehyde	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Heptachlor	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Heptachlor Epoxide	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Methoxychlor	0.0002	U	mg/L	EPA 8080	08/21	08/23	NI
Toxaphene	0.003	U	mg/L	EPA 8080	08/21	08/23	NI
PCB-1016	0.003	U	mg/L	EPA 8080	08/21	08/23	NI
PCB-1221	0.003	U	mg/L	EPA 8080	08/21	08/23	NI
PCB-1232	0.003	U	mg/L	EPA 8080	08/21	08/23	NI
PCB-1242	0.003	U	mg/L	EPA 8080	08/21	08/23	NI
PCB-1248	0.003	U	mg/L	EPA 8080	08/21	08/23	NI
PCB-1254	0.003	U	mg/L	EPA 8080	08/21	08/23	NI
PCB-1260	0.003	U	mg/L	EPA 8080	08/21	08/23	NI

See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

emlab Ref.# :93.4122-4
ient Sample ID :BUL-LF06-SW03 BULLEN
trix :WATER

ient Name :ICF KAISER ENGINEERING
dered By :RAY MORRIS
oject Name :DEW LINE RI/FS
oject# :41096-412-01
SID :UA

WORK Order :69693
Report Completed :09/01/93
Collected :08/15/93 @ 16:50 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

mple Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloroethane	0.0016		mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
cis-1,2-Dichloroehtene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	

COMMERCIAL TESTING & ENGINEERING CO.
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SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-4
Client Sample ID :BUL-LF06-SW03 BULLEN
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
Napthalene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
Styrene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
Toluene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260		08/18 08/18	KWM
[redacted]C, Nonpurgable				EPA 9060	n/a		
[redacted].TOC Range	9.48-14.7		mg/L	EPA 9060		08/25	CMR
...TOC Concentration	13.1		mg/L	EPA 9060		08/25	CMR
Semivolatile Organics				EPA 8270			
Phenol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
bis(2-Chloroethyl)ether	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
2-Chlorophenol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
1,3-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
1,4-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
Benzyl Alcohol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
1,2-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
2-Methylphenol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
bis(2-Chloroisopropyl)e	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
4-Methylphenol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
n-Nitroso-di-n-Propylam	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
Hexachloroethane	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
Nitrobenzene	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
Isophorone	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
2-Nitrophenol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
2,4-Dimethylphenol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
Benzoic Acid	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
bis(2-Chloroethoxy)Meth	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
2,4-Dichlorophenol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
1,2,4-Trichlorobenzene	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
Naphthalene	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
4-Chloroaniline	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
Hexachlorobutadiene	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
[redacted]-Chloro-3-Methylphenol	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT
[redacted]-Methylnaphthalene	0.01	U	mg/L	EPA 8270		08/20 08/20	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 [redacted]EE
ANCHORAGE, AK 9951
TEL: (907) 562-234
FAX: (907) 561-530

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-4
Client Sample ID :BUL-LF06-SW03 BULLEN
Matrix :WATER

VALIDATION QUALIFIER (COMMENT)

Hexachlorocyclopentadie	0.01	U	mg/L	EPA 8270	08/20	08/20	M
2,4,6-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	M
2,4,5-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	M
2-Chloronaphthalene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
2-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Dimethylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Acenaphthylene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
2,6-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
3-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Acenaphthene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
2,4-Dinitrophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	M
4-Nitrophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Dibenzofuran	0.01	U	mg/L	EPA 8270	08/20	08/20	M
2,4-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Diethylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	M
4-Chlorophenyl-Phenylet	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Fluorene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
4-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	M
4,6-Dinitro-2-Methylphe	0.01	U	mg/L	EPA 8270	08/20	08/20	M
n-Nitrosodiphenylamine	0.01	U	mg/L	EPA 8270	08/20	08/20	M
4-Bromophenyl-Phenyleth	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Hexachlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Pentachlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/2[redacted]	M
Phenanthrene	0.01	U	mg/L	EPA 8270	08/20	08/2[redacted]	M
Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
di-n-Butylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Butylbenzylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	M
3,3-Dichlorobenzidine	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Benzo(a)Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Chrysene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
bis(2-Ethylhexyl)Phthal	0.01	U	mg/L	EPA 8270	08/20	08/20	M
di-n-Octylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Benzo(b)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Benzo(k)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Benzo(a)Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Indeno(1,2,3-cd)Pyrene	0.01	UJ(b)	mg/L	EPA 8270	08/20	08/20	M
Dibenz(a,h)Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	M
Benzo(g,h,i)Perylene	0.01	UJ(b)	mg/L	EPA 8270	08/20	08/20	M

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailab[redacted]
NA = Not Analy[redacted]
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-4
Client Sample ID :BUL-LF06-SW03 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69672
Report Completed :08/26/93
Collected :08/15/93 @ 16:50 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis ICP Screen, ICF	---			--- EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	**0.059**		**mg/L**	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	**48**		**mg/L**	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Iron	**2.1**		**mg/L**	EPC 6010		08/20	08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Magnesium	**18**		**mg/L**	EPA 6010		08/20	08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20	08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Sodium	**71**		**mg/L**	EPA 6010		08/20	08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841		08/18	08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Dissolved Metals Analys ICP Screen, ICF	---			--- EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	**0.052**		**mg/L**	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	**47**		**mg/L**	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG

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SINCE 908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-4
Client Sample ID :BUL-LF06-SW03 BULLEN
Matrix :WATER

Iron	0.12		mg/L	EPC 6010		08/20 08/23	DL
Lead	0.10	U	mg/L	EPA 6010		08/20 08/23	DL
Magnesium	18		mg/L	EPA 6010		08/20 08/23	DL
Manganese	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Molybdenum	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Nickel	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Potassium	5.0	U	mg/L	EPA 6010		08/20 08/23	DL
Selenium	0.10	U	mg/L	EPA 6010		08/20 08/23	DL
Silver	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Sodium	78		mg/L	EPA 6010		08/20 08/23	DL
Thallium	0.010	U	mg/L	EPA 7841		08/18 08/25	EM
Vanadium	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Zinc	0.050	U	mg/L	EPA 6010		08/20 08/23	DL
Residue, Non-Filterable	28		mg/L	EPA 160.2		08/24 08/24	GP
Residue,Filterable(TDS)	359		mg/L	EPA 160.1	500	08/18 08/19	RJ

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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ANCHORAGE, AK 99518
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FAX (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-6
Client Sample ID :BUL-LF06-SW03 BULLEN DUPLICATE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69672
Report Completed :09/15/93
Collected :08/15/93 @ 16:50 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.
CORRECTED RESULT FOR COBALT.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10		mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.060		mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	48		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.1	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Iron	2.1		mg/L	EPA 6010		08/20	08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Magnesium	18		mg/L	EPA 6010		08/20	08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20	08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Sodium	73		mg/L	EPA 6010		08/20	08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841		08/18	08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.052		mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	48		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG

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5633 B STR
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-6
Client Sample ID :BUL-LF06-SW03 BULLEN DUPLICATE
Matrix :WATER

Copper	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Iron	0.11		mg/L	EPA 6010		08/20 08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20 08/23	DLG
Magnesium	18		mg/L	EPA 6010		08/20 08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20 08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20 08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Sodium	78		mg/L	EPA 6010		08/20 08/23	DLG
Thallium	0.010	U	mg/L	EPA 7841		08/18 08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Residue, Non-Filterable	27		mg/L	EPA 160.2		08/24 08/24	GPP
Residue,Filterable(TDS)	389		mg/L	EPA 160.1	500	08/18 08/19	RJK

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyz
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Lab Ref.# :93.4122-9
Client Sample ID :BUL-LF06-SW03 BULLEN DUPLICATE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69693
Report Completed :09/01/93
Collected :08/15/93 @ 16:50 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.
DUPLICATE ANALYSIS SEE QA/QC PACKAGE FOR RPD CALCULATIONS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	9.55-14.3		mg/L	EPA 9060			08/25	CMR
...TOC Concentration	11.6		mg/L	EPA 9060			08/25	CMR

* See Special Instructions Above
** See Sample Remarks Above
J = Undetected, Reported value is the practical quantification limit.
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GT = Greater Than

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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-6
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :08/26/93
Collected :08/15/93 @ 16:50 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C. SEE QC SUMMARY FOR SPIKE RECOVERIES AND RPD VALVES. FINAL-RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	12.8		mg/L	3510/3550/8100M		08/21	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.508		mg/L	EPA 5030/8015m		08/23	08/23	KWM

Benzene	0.034		mg/L	EPA 8020		08/21	08/21	JLB
Toluene	0.039		mg/L	EPA 8020		08/21	08/21	JLB
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
o-Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.0042		mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethylene	0.048		mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichloroethylene	0.048		mg/L	EPA 8010		08/21	08/21	JLB
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chlorobenzene	0.048		mg/L	EPA 8010		08/21	08/21	JLB
Trichlorofluoromethane	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
Trans12Dichloroethylene	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
1,2 Dichloroethane	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
1,1,1 Trichoroethane	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
Bromodichloromethane	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
Trans1,3Dichloropropene	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
cis-1,3-Dichloropropene	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
Bromoform	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
1122-Tetrachloroethane	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
Chloromethane	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
Bromoethane	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
Vinyl Chloride	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
Chloroethane	0.0010		mg/L	EPA 8010		08/21	08/21	JLB
1,4 Dichlorobenzene	0.0010		mg/L	EPA 8010		08/21	08/21	JLB

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5633 B STREET
ANCHORAGE, AK 99518
TEL (907) 562-2343
FAX (907) 561-5301

REPORT of ANALYSIS #4

Chemlab Ref.# :93.4204-6
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE
Matrix :WATER

2-Chloroethylvinylether	0.0010		mg/L	EPA 8010	08/21	08/21	JL
1,3-Dichlorobenzene	0.0010		mg/L	EPA 8010	08/21	08/21	JL
1,2-Dichlorobenzene	0.0010		mg/L	EPA 8010	08/21	08/21	JL
Organochlorine Pest				EPA 8080			
Aldrin	0.023		mg/L	EPA 8080	08/21	08/23	NR
Alpha-BHC	0.022		mg/L	EPA 8080	08/21	08/23	NR
Beta-BHC	0.023		mg/L	EPA 8080	08/21	08/23	NR
Delta-BHC	0.026		mg/L	EPA 8080	08/21	08/23	NR
Gamma-BHC	0.022		mg/L	EPA 8080	08/21	08/23	NR
Chlordane	0.003	U	mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDD	0.029		mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDE	0.027		mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDT	0.031		mg/L	EPA 8080	08/21	08/23	NR
Dieldrin	0.027		mg/L	EPA 8080	08/21	08/23	NR
Endosulfan I	0.026		mg/L	EPA 8080	08/21	08/23	NR
Endosulfan II	0.029		mg/L	EPA 8080	08/21	08/23	NR
Endosulfan Sulfate	0.032		mg/L	EPA 8080	08/21	08/23	NR
Endrin	0.029		mg/L	EPA 8080	08/21	08/23	NR
Endrin Aldehyde	0.029		mg/L	EPA 8080	08/21	08/23	NR
Heptachlor	0.023		mg/L	EPA 8080	08/21	08/23	NR
Heptachlor Epoxide	0.025		mg/L	EPA 8080	08/21	08/23	NR
Methoxychlor	0.031		mg/L	EPA 8080	08/21	08/23	NR
Toxaphene	0.003	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1016	0.003	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1221	0.003	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1232	0.003	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1242	0.003	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1248	0.003	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1254	0.003	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1260	0.003	U	mg/L	EPA 8080	08/21	08/23	NR

See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
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GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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SINCE 1908
5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

hemlab Ref.# :93.4122-5
lient Sample ID :BUL-LF06-SW03 BULLEN SPIKE
atrix :WATER

lient Name :ICF KAISER ENGINEERING
rdered By :RAY MORRIS
roject Name :DEW LINE RI/FS
roject# :41096-412-01
WSID :UA

WORK Order :69693
Report Completed :09/15/93
Collected :08/15/93 @ 16:50 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

ample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C. 8270: THIS SAMPLE HAS BEEN SPIKED. PLEASE SEE QUALITY CONTROL DATA SHEETS. 8260: FOR SPIKE AND SPIKE DUPLICATE RECOVERY AND RPD, SEE QC SUMMARY. CORRECTED QC QUAL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	18.1-25.0		mg/L	EPA 9060			08/25	CMR
...TOC Concentration	20.6		mg/L	EPA 9060			08/25	CMR
Semivolatile Organics				EPA 8270				
Phenol	0.0317		mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroethyl)ether	0.1	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Chlorophenol	0.0796		mg/L	EPA 8270		08/20	08/20	MTT
1,3-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,4-Dichlorobenzene	0.0795		mg/L	EPA 8270		08/20	08/20	MTT
Benzyl Alcohol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,2-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroisopropyl)e	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
n-Nitroso-di-n-Propylam	0.0961		mg/L	EPA 8270		08/20	08/20	MTT
Hexachloroethane	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Nitrobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Isophorone	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Nitrophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4-Dimethylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Benzoic Acid	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroethoxy)Meth	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4-Dichlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,2,4-Trichlorobenzene	0.0780		mg/L	EPA 8270		08/20	08/20	MTT
Naphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Chloroaniline	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Hexachlorobutadiene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Chloro-3-Methylphenol	0.0846		mg/L	EPA 8270		08/20	08/20	MTT
2-Methylnaphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Hexachlorocyclopentadie	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4,6-Trichlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4,5-Trichlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Chloronaphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Nitroaniline	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-5
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE
Matrix :WATER

Dimethylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Acenaphthylene	0.0941		mg/L	EPA 8270	08/20	08/20	MT
2,6-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
3-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Acenaphthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
2,4-Dinitrophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
4-Nitrophenol	0.0442		mg/L	EPA 8270	08/20	08/20	MT
Dibenzofuran	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
2,4-Dinitrotoluene	0.0957		mg/L	EPA 8270	08/20	08/20	MT
Diethylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
4-Chlorophenyl-Phenylet	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Fluorene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
4-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
4,6-Dinitro-2-Methylphe	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
n-Nitrosodiphenylamine	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
4-Bromophenyl-Phenyleth	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Hexachlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Pentachlorophenol	0.0734		mg/L	EPA 8270	08/20	08/20	MT
Phenanthrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
di-n-Butylphthalate	0.0860		mg/L	EPA 8270	08/20	08/20	MT
Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Pyrene	0.0820		mg/L	EPA 8270	08/20	08/20	MT
Butylbenzylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
3,3-Dichlorobenzidine	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Benzo(a)Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Chrysene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
bis(2-Ethylhexyl)Phthal	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
di-n-Octylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Benzo(b)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Benzo(k)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Benzo(a)Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Indeno(1,2,3-cd)Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Dibenz(a,h)Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Benzo(g,h,i)Perylene	0.01	U	mg/L	EPA 8270	08/20	08/20	MT
Volatile Organics				EPA 8260			
Benzene	0.011		mg/L	EPA 8260	08/18	08/18	KW
Bromobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Bromochloromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Bromodichloromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Bromoform	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Bromomethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
n-Butylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Chlorobenzene	0.0098		mg/L	EPA 8260	08/18	08/18	KW
Chloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Chloroform	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Chloromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW

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REPORT of ANALYSIS

Chemlab Ref.# :93.4122-5
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE
Matrix :WATER

2-Chlorotoluene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Dibromochloromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Dibromomethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,2-Dichloroethane	0.0016		mg/L	EPA 8260	08/18	08/18	KW
1,1-Dichloroethene	0.0092		mg/L	EPA 8260	08/18	08/18	KW
cis-1,2-Dichloroehtene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Ethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Isopropylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Napthalene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Styrene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Toluene	0.011		mg/L	EPA 8260	08/18	08/18	KW
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Trichloroethene	0.0098		mg/L	EPA 8260	08/18	08/18	KW
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW
o-Xylene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KW

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyze
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-5
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69672
Report Completed :08/26/93
Collected :08/15/93 @ 16:50 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.
SEE DATA PKG. FOR SPIKE LEVELS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			---				
ICP Screen, ICF				EPA	n/a			
Aluminum	1.1		mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.91		mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.93		mg/L	EPA 6010		08/20	08/23	DLG
Barium	1.0		mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.38		mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.49		mg/L	EPA 6010		08/20	08/23	DLG
Calcium	57		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.98		mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.92		mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.94		mg/L	EPA 6010		08/20	08/23	DLG
Iron	3.0		mg/L	EPC 6010		08/20	08/23	DLG
Lead	0.90		mg/L	EPA 6010		08/20	08/23	DLG
Magnesium	27		mg/L	EPA 6010		08/20	08/23	DLG
Manganese	1.0		mg/L	EPA 6010		08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Nickel	0.95		mg/L	EPA 6010		08/20	08/23	DLG
Potassium	11		mg/L	EPA 6010		08/20	08/23	DLG
Selenium	0.87		mg/L	EPA 6010		08/20	08/23	DLG
Silver	0.17		mg/L	EPA 6010		08/20	08/23	DLG
Sodium	81		mg/L	EPA 6010		08/20	08/23	DLG
Thallium	0.016		mg/L	EPA 7841		08/18	08/25	EMB
Vanadium	0.97		mg/L	EPA 6010		08/20	08/23	DLG
Zinc	0.92		mg/L	EPA 6010		08/20	08/23	DLG
Dissolved Metals Analys	---			---				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.92		mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.89		mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.96		mg/L	EPA 6010		08/20	08/23	DLG
Barium	1.0		mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.38		mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.49		mg/L	EPA 6010		08/20	08/23	DLG
Calcium	58		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	1.0		mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.97		mg/L	EPA 6010		08/20	08/23	DLG

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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-5
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE
Matrix :WATER

Copper	0.93		mg/L	EPA 6010	08/20 08/23	DLC
Iron	1.1		mg/L	EPC 6010	08/20 08/23	DLC
Lead	0.91		mg/L	EPA 6010	08/20 08/23	DLC
Magnesium	27		mg/L	EPA 6010	08/20 08/23	DLC
Manganese	1.0		mg/L	EPA 6010	08/20 08/23	DLC
Molybdenum	0.050	U	mg/L	EPA 6010	08/20 08/23	DLC
Nickel	0.96		mg/L	EPA 6010	08/20 08/23	DLC
Potassium	11		mg/L	EPA 6010	08/20 08/23	DLC
Selenium	0.89		mg/L	EPA 6010	08/20 08/23	DLC
Silver	0.18		mg/L	EPA 6010	08/20 08/23	DLC
Sodium	81		mg/L	EPA 6010	08/20 08/23	DLC
Thallium	0.038		mg/L	EPA 7841	08/18 08/25	EME
Vanadium	0.98		mg/L	EPA 6010	08/20 08/23	DLC
Zinc	0.94		mg/L	EPA 6010	08/20 08/23	DLC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
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COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREE
ANCHORAGE, AK 9951
TEL. (907) 562-234
FAX (907) 561-530

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-7
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE DUPLICATE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :08/26/93
Collected :08/15/93 @ 16:50 hr
Received :08/19/93 @ 18:45 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C. SEE QC SUMMARY FOR SPIKE RECOVERIES AND RPD VALVES. FINAL RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Hydrocarbons EPH	13.3		mg/L	3510/3550/8100M		08/21	08/22	JB
VPH & BTEX								
Hydrocarbons VPH	0.476		mg/L	EPA 8015M/8020 EPA 5030/8015m		08/23	08/23	KW
Benzene	0.040		mg/L	EPA 8020		08/21	08/21	JLI
Toluene	0.041		mg/L	EPA 8020		08/21	08/21	JLI
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLI
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLI
o-Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLI
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.0042		mg/L	EPA 8010		08/21	08/21	JLE
1,1 Dichloroethylene	0.046		mg/L	EPA 8010		08/21	08/21	JLE
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLE
Trichloroethylene	0.048		mg/L	EPA 8010		08/21	08/21	JLE
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chlorobenzene	0.048		mg/L	EPA 8010		08/21	08/21	JLB
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans12Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,2 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,1 Trichoroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromodichloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans1,3Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
cis-1,3-Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Vinyl Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB

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REPORT of ANALYSIS

Chemlab Ref.# :93.4204-7
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE DUPLICATE
Matrix :WATER

2-Chloroethylvinylether	0.0010	U	mg/L	EPA 8010	08/21	08/21	JLI
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	JLI
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	JLI
Organochlorine Pest				EPA 8080			
Aldrin	0.029		mg/L	EPA 8080	08/21	08/23	NRC
Alpha-BHC	0.028		mg/L	EPA 8080	08/21	08/23	NRC
Beta-BHC	0.029		mg/L	EPA 8080	08/21	08/23	NRC
Delta-BHC	0.032		mg/L	EPA 8080	08/21	08/23	NRC
Gamma-BHC	0.028		mg/L	EPA 8080	08/21	08/23	NRC
Chlordane	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC
4,4'-DDD	0.034		mg/L	EPA 8080	08/21	08/23	NRC
4,4'-DDE	0.033		mg/L	EPA 8080	08/21	08/23	NRC
4,4'-DDT	0.037		mg/L	EPA 8080	08/21	08/23	NRC
Dieldrin	0.034		mg/L	EPA 8080	08/21	08/23	NRC
Endosulfan I	0.032		mg/L	EPA 8080	08/21	08/23	NRC
Endosulfan II	0.035		mg/L	EPA 8080	08/21	08/23	NRC
Endosulfan Sulfate	0.038		mg/L	EPA 8080	08/21	08/23	NRC
Endrin	0.035		mg/L	EPA 8080	08/21	08/23	NRC
Endrin Aldehyde	0.035		mg/L	EPA 8080	08/21	08/23	NRC
Heptachlor	0.029		mg/L	EPA 8080	08/21	08/23	NRC
Heptachlor Epoxide	0.031		mg/L	EPA 8080	08/21	08/23	NRC
Methoxychlor	0.037		mg/L	EPA 8080	08/21	08/23	NRC
Toxaphene	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC
PCB-1016	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC
PCB-1221	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC
PCB-1232	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC
PCB-1242	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC
PCB-1248	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC
PCB-1254	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC
PCB-1260	0.003	U	mg/L	EPA 8080	08/21	08/23	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-6
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE DUPLICATE
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69693
Report Completed :09/01/93
Collected :08/15/93 @ 16:50 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C. 8270: THIS SAMPLE HAS BEEN SPIKED. PLEASE SEE QUALITY CONTROL DATA SHEETS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.011		mg/L	EPA 8260		08/18	08/18	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chlorobenzene	0.0098		mg/L	EPA 8260		08/18	08/18	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloroethane	0.0012		mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethene	0.010		mg/L	EPA 8260		08/18	08/18	KWM
cis-1,2-Dichloroehtene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
transi,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM

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ENVIRONMENTAL LABORATORY SERVICES
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-6
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE DUPLICATE
Matrix :WATER

Isopropylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Styrene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Toluene	0.011		mg/L	EPA 8260	08/18	08/18	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Trichloroethene	0.0098		mg/L	EPA 8260	08/18	08/18	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.0364		mg/L	EPA 8270	08/20	08/20	MTT
bis(2-Chloroethyl)ether	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Chlorophenol	0.0844		mg/L	EPA 8270	08/20	08/20	MTT
1,3-Dichlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
1,4-Dichlorobenzene	0.0713		mg/L	EPA 8270	08/20	08/20	MTT
Benzyl Alcohol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
1,2-Dichlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Methylphenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
bis(2-Chloroisopropyl)e	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Methylphenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
n-Nitroso-di-n-Propylam	0.0940		mg/L	EPA 8270	08/20	08/20	MTT
Hexachloroethane	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Nitrobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Isophorone	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Nitrophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4-Dimethylphenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzoic Acid	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
bis(2-Chloroethoxy)Meth	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4-Dichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
1,2,4-Trichlorobenzene	0.0725		mg/L	EPA 8270	08/20	08/20	MTT
Naphthalene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Chloroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Hexachlorobutadiene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Chloro-3-Methylphenol	0.0867		mg/L	EPA 8270	08/20	08/20	MTT
2-Methylnaphthalene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Hexachlorocyclopentadie	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4,6-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
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REPORT of ANALYSIS SCE

Chemlab Ref.# :93.4122-6
Client Sample ID :BUL-LF06-SW03 BULLEN SPIKE DUPLICATE
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2,4,5-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Chloronaphthalene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Dimethylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Acenaphthylene	0.0886		mg/L	EPA 8270	08/20	08/20	MTT
2,6-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
3-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Acenaphthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4-Dinitrophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Nitrophenol	0.0491		mg/L	EPA 8270	08/20	08/20	MTT
Dibenzofuran	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4-Dinitrotoluene	0.0923		mg/L	EPA 8270	08/20	08/20	MTT
Diethylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Chlorophenyl-Phenylet	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Fluorene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4,6-Dinitro-2-Methylphe	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
n-Nitrosodiphenylamine	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Bromophenyl-Phenyleth	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Hexachlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Pentachlorophenol	0.0693		mg/L	EPA 8270	08/20	08/20	MTT
Phenanthrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
[illegible]hracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
[illegible]n-Butylphthalate	0.0869		mg/L	EPA 8270	08/20	08/20	MTT
Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Pyrene	0.0801		mg/L	EPA 8270	08/20	08/20	MTT
Butylbenzylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
3,3-Dichlorobenzidine	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(a)Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Chrysene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
bis(2-Ethylhexyl)Phthal	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
di-n-Octylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(b)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(k)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(a)Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Indeno(1,2,3-cd)Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Dibenz(a,h)Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(g,h,i)Perylene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT

* [illegible]ee Special Instructions Above
** [illegible]ee Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ANALYTICAL DATA SHEETS FOR THE FUEL STORAGE AREA (ST09)
(Formerly identified as AOC11)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1930

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4201-9
Client Sample ID :BUL-~~A0C11~~-S01 BULLEN
Matrix :SOIL STD9 WK 8697

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69794
Report Completed :08/25/93
Collected :08/16/93 @ 17:00 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN.

Qualifier Comments

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	73.2		%	SM17 2540G			08/21	NDC
Hydrocarbons EPH	3830	D	mg/Kg	3510/3550/8100M(J)-L.1		08/21	08/24	DSH
VPH & BTEX Hydrocarbons VPH	406	D	mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/21	08/24	WLS
Benzene	0.035		mg/Kg	EPA 8020		08/21	08/23	WLS
Toluene	0.533		mg/Kg	EPA 8020 (J)-L.1		08/21	08/23	WLS
Ethylbenzene	1.57		mg/Kg	EPA 8020		08/21	08/23	WLS
p&m Xylene	4.42		mg/Kg	EPA 8020		08/21	08/23	WLS
o-Xylene	2.21		mg/Kg	EPA 8020		08/21	08/23	WLS

3-4-94
5-9-94

Completed: SMF 11/29/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4177-6
Client Sample ID :BUL-~~AOC11~~-S01 BULLEN
Matrix :SOIL STD9 12695

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69708
Report Completed :09/23/93
Collected :08/16/93 @ 17:00 hr
Received :08/19/93 @ 10:50 hr
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.F. AND S.S. LOW 8260 SURROGATE FOR BROMOFLUOROBENZENE. DUE TO HIGH LEVEL OF HYDROCARBON INTERFERENCE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics	VALIDATION QUALIFIER	(COMMENT)		EPA 8260				
Benzene	0.120	UJ	(A) mg/Kg	EPA 8260		08/20	09/01	KW
Bromobenzene	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
Bromochloromethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromodichloromethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromoform	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromomethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
n-Butylbenzene	0.857	DJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
sec-Butylbenzene	0.303	DJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
tert-Butylbenzne	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
Carbon Tetrachloride	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chlorobenzene	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloroethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloroform	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloromethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
2-Chlorotoluene	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
4-Chlorotoluene	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
Dibromochloromethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
12Dibromo3Chloropropane	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
1,2-Dibromoethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Dibromomethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichlorobenzene	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
1,3-Dichlorobenzene	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
1,4-Dichlorobenzene	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
Dichlorodifluoromethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloroethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichloroethane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloroethene	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
cis-1,2-Dichloroethene	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
transi,2-Dichloroethene	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichloropropane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,3-Dichloropropane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
2,2-Dichloropropane	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloropropene	0.120	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Ethylbenzene	0.182	DJ	mg/Kg	EPA 8260		08/20	09/01	KW
Hexachlorobutadiene	0.120	UJ	mg/Kg I. /	EPA 8260		08/20	09/01	KW
Isopropylbenzene	0.170	DJ	mg/Kg	EPA 8260		08/20	09/01	KW

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REPORT of ANALYSIS QCE

Chemlab Ref.# :93.4177-6 STP1
Client Sample ID :BUL-~~AOC11~~-S01 BULLEN
Matrix :SOIL

		VALIDATION QUALIFIER					
p-Isopropyltoluene	0.581	DJ(A)	mg/Kg	EPA 8260	08/20	09/01	KH
Methylene Chloride	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Napthalene	4.37	DJ	mg/Kg	EPA 8260	08/20	09/01	KH
n-Propylbenzene	0.259	DJ	mg/Kg	EPA 8260	08/20	09/01	KH
Styrene	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1112-Tetrachloroethane	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1122-Tetrachloroethane	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Tetrachloroethene	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Toluene	0.108 ~~0.120~~	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,2,3-Trichlorobenzene	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,2,4-Trichlorobenzene	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,1,1-Trichloroethane	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,1,2-Trichloroethane	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Trichloroethene	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Trichlorofluoromethane	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,2,3-Trichloropropane	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,2,4-Trimethylbenzene	2.71	DJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,3,5-Trimethylbenzene	0.848	DJ	mg/Kg	EPA 8260	08/20	09/01	KH
Vinyl Chloride	0.120	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
p+m-Xylene	0.929	DJ	mg/Kg	EPA 8260	08/20	09/01	KH
o-Xylene	0.498	DJ	mg/Kg	EPA 8260	08/20	09/01	KH
Semivolatile Organics				EPA 8270			
Phenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
bis(2-Chloroethyl)ether	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
2-Chlorophenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
1,3-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
1,4-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
Benzyl Alcohol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
1,2-Dichlorobenzene	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
2-Methylphenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
bis(2-Chloroisopropyl)e	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
4-Methylphenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
n-Nitroso-di-n-Propylam	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
Hexachloroethane	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
Nitrobenzene	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
Isophorone	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
2-Nitrophenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
2,4-Dimethylphenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
Benzoic Acid	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
bis(2-Chloroethoxy)Meth	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
2,4-Dichlorophenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
1,2,4-Trichlorobenzene	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
Naphthalene	3.20		mg/Kg	EPA 8270	08/26	09/13	G
4-Chloroaniline	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
Hexachlorobutadiene	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
4-Chloro-3-Methylphenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
2-Methylnaphthalene	3.32		mg/Kg	EPA 8270	08/26	09/13	G
Hexachlorocyclopentadie	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
2,4,6-Trichlorophenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G
2,4,5-Trichlorophenol	0.230	U	mg/Kg	EPA 8270	08/26	09/13	G

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REPORT of ANALYSIS

5633 B STREET
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FAX: (907) 561-5301

Chemlab Ref.# :93.4177-6
Client Sample ID :BUL-~~AOC11~~-S01 BULLEN
Matrix :SOIL STD9 Feb 2005

2-Chloronaphthalene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
2-Nitroaniline	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Dimethylphthalate	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Acenaphthylene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
2,6-Dinitrotoluene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
3-Nitroaniline	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Acenaphthene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
2,4-Dinitrophenol	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
4-Nitrophenol	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Dibenzofuran	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
2,4-Dinitrotoluene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Diethylphthalate	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
4-Chlorophenyl-Phenylet	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Fluorene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
4-Nitroaniline	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
4,6-Dinitro-2-Methylphe	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
n-Nitrosodiphenylamine	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
4-Bromophenyl-Phenyleth	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Hexachlorobenzene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Pentachlorophenol	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Phenanthrene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Anthracene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
di-n-Butylphthalate	**0.534**		**mg/Kg**	EPA 8270	08/26 09/13	
Fluoranthene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	
Pyrene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Butylbenzylphthalate	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
3,3-Dichlorobenzidine	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Benzo(a)Anthracene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Chrysene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
bis(2-Ethylhexyl)Phthal	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
di-n-Octylphthalate	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Benzo(b)Fluoranthene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Benzo(k)Fluoranthene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Benzo(a)Pyrene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Indeno(1,2,3-cd)Pyrene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Dibenz(a,h)Anthracene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV
Benzo(g,h,i)Perylene	0.230	U	mg/Kg	EPA 8270	08/26 09/13	GV

* See Special Instructions Above
** See Sample Remarks Above
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D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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5633 B STREET
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TEL: (907) 562-2343
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REPORT OF ANALYSIS

Acmelab Ref.# :93-4201-10
Client Sample ID :SVE-~~MW1~~-SOIL ST09 (MW15) BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Client PO :RAY MORRIS
Contract Name :DEW LINE RI/FS
Project# :410036-412-01
PWSID :UA

PWSA Order :69791
Report Completed :08/[illegible]/93
Collected :08/16/93 @ 16:50 hrs
Received :08/19/93 @ 19:45 hrs
Technical Director:STEPHEN C. EDDY
Released By :

Sample Remarks: SAMPLE COLLECTED BY: C.N.L. AND S.F. SEPPOVEN. EPH OTHER = 10.9 MG/KG OF PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	77.0		%	EMIT 2540G			08/21	MSU
Hydrocarbons EPH	32.5		mg/Kg	3510/3550/8100M		08/21	08/23	JSH
VPH & BTEX								
Hydrocarbons VPH	7.58		mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/21	08/23	WLS
Benzene	0.030	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Toluene	0.030	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Ethylbenzene	0.039		mg/Kg	EPA 8020		08/21	08/23	WLS
p&m Xylene	0.042		mg/Kg	EPA 8020		08/21	08/23	WLS
o-Xylene	0.102		mg/Kg	EPA 8020		08/21	08/23	WLS

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REPORT of ANALYSIS

Chemlab Ref.# :93.4201-11
Client Sample ID :BUL-~~ADCIT~~-S03 BULLEN
Matrix :SOIL ST09 SAME 12697

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41006-412-01
PWSID :NA

RUSH Order :69794
Report Completed :08/23/93
Collected :08/16/93 @ 17:15 hrs
Received :08/19/93 @ 13:40 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. GLEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	84.7		%	SM17 2540G			08/21	MDJ
Hydrocarbons EPH	497		mg/Kg	3510/3650/9100M		08/21	08/24	TBH
VPH & BTEX								
Hydrocarbons VTH	106	D	mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/21	08/24	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Toluene	0.029		mg/Kg	EPA 8020		08/21	08/23	WLS
Ethylbenzene	0.608		mg/Kg	EPA 8020		08/21	08/23	WLS
p&m Xylene	1.38		mg/Kg	EPA 8020		08/21	08/23	WLS
o-Xylene	0.649		mg/Kg	EPA 8020		08/21	08/23	WLS

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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4201-12
Client Sample ID :SUL-~~A0CT1-B04~~ / SULLEN
Matrix :SOIL ST09

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
FWSID :UA

RUSH Order :69794
Report Completed :08/25/93
Collected :08/16/93 @ 17:10 hrs
Received :08/19/93 @ 13:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. HEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	93.1		%	EN17 2540G			08/21	MDU
Hydrocarbons EPH	[illegible]	D	mg/Kg	[illegible]10/3550/8100M		[illegible]8/21	08/23	JEH
VPH + BTEX								
Hydrocarbons VPH	167	D	mg/Kg	EPA 8015M/8020				
	---			EPA 5030/8015m		08/21	08/23	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/24	WLS
Toluene	0.073		mg/Kg	EPA 8020		08/21	08/24	WLS
Ethylbenzene	0.485		mg/Kg	EPA 8020		08/21	08/24	WLS
p&m Xylene	2.30		mg/Kg	EPA 8020		08/21	08/24	WLS
o-Xylene	0.665		mg/Kg	EPA 8020		08/21	08/24	WLS

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D = Secondary Dilution.

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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4201-13
Client Sample ID :BUL-~~1221~~-305 BULLEN
Matrix :SOIL STD9 SAMPLE READS

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Projects :41095-412-81
PWSID :UA

PUSH Order :69794
Report Completed :08/25/93
Collected :08/16/93 @ 17:10 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH OTHER = 11.9 MG/KG OF PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	92.4		%	SM17 2540G			08/21	MDC
Hydrocarbons EPH	23.9		mg/Kg	3510/3550/8100M		08/21	08/23	JBH
VPH & BTEX								
Hydrocarbons VPH	4.94		mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/21	08/23	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
p&m Xylene	0.021		mg/Kg	EPA 8020		08/21	08/23	WLS
o-Xylene	0.052		mg/Kg	EPA 8020		08/21	08/23	WLS

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GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4201-14
Client Sample ID :BUL-~~A001-SB01~~ BULLEN
Matrix :SOIL ST09 SAMP R695

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :CEW LINE RI/FS
Project# :41014-412-01
PWSID :UA

RUSH Order :69794
Report Completed :08/25/93
Collected :08/16/93 @ 17:15 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: E.M.L. AND S.S. SIPPOVEN. EPH OTHER = 18.7 MG/KG OF PATTERN IS NOT CONSISTENT WITH NUMBER DISTILLATE FUEL.

Parameter	Results	Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	91.9		%	SM17 2540G			08/21	MSC
Hydrocarbons EPH	48.6		mg/Kg	3510/3550/8100		08/21	08/23	JDH
PH & BTEX								
Hydrocarbons VPH	2.24		mg/Kg	EPA 8015M/8020 EPA 5030/8015M		08/21	08/23	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
p&m Xylene	0.028		mg/Kg	EPA 8020		08/21	08/23	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS

* See Special Instructions Above
\# See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4205-5
Client Sample ID :BUL-~~A0C11~~-SW01 S BULLEN
Matrix :WATER ST09

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69804
Report Completed :08/31/93
Collected :08/16/93 @ 15:30 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By : S. C. Ede

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN. EPH PATTERN NOT CONSISTANT WITH A MIDDLE DISTILLATE FUEL. CORRECTED RESULT FOR EPH.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	0.554		mg/L	3510/3550/8100M		08/21	08/22	JBH
VPH & BTEX Hydrocarbons VPH	0.020	U	mg/L	EPA 8015M/8020 EPA 5030/8015m		08/23	08/23	WLS
Benzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Toluene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
o-Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
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REPORT of ANALYSIS

Chemlab Ref.# :93.4180-7
Client Sample ID :BUL-~~AOC11~~-SW01/BULLEN
Matrix :WATER STD

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 15:30 hr
Received :08/19/93 @ 10:50 hr
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Bromoform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Bromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Chloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Chloroform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Chloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,2-Dichloroethane	0.0017		mg/L	EPA 8260		08/21	08/21	KWI
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWI

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS GCK

Chemlab Ref.# :93.4180-7
Client Sample ID :BUL-~~AOC11~~-SW01 BULLEN
Matrix :WATER STD

Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
Styrene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
Toluene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWM
Semivolatile Organics				EPA 8270		
Phenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
bis(2-Chloroethyl)ether	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2-Chlorophenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
1,3-Dichlorobenzene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
1,4-Dichlorobenzene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
Benzyl Alcohol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
1,2-Dichlorobenzene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2-Methylphenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
bis(2-Chloroisopropyl)e	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
4-Methylphenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
n-Nitroso-di-n-Propylam	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
Hexachloroethane	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
Nitrobenzene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
Isophorone	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2-Nitrophenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2,4-Dimethylphenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
Benzoic Acid	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
bis(2-Chloroethoxy)Meth	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2,4-Dichlorophenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
1,2,4-Trichlorobenzene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
Naphthalene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
4-Chloroaniline	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
Hexachlorobutadiene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
4-Chloro-3-Methylphenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2-Methylnaphthalene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
Hexachlorocyclopentadie	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2,4,6-Trichlorophenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2,4,5-Trichlorophenol	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT
2-Chloronaphthalene	0.010	U	mg/L	EPA 8270	08/22 08/24	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-7
Client Sample ID :BUL-~~AOC11~~-SW01 BULLEN
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2-Nitroaniline	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Dimethylphthalate	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Acenaphthylene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
2,6-Dinitrotoluene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
3-Nitroaniline	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Acenaphthene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
2,4-Dinitrophenol	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
4-Nitrophenol	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Dibenzofuran	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
2,4-Dinitrotoluene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Diethylphthalate	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
4-Chlorophenyl-Phenylet	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Fluorene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
4-Nitroaniline	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
4,6-Dinitro-2-Methylphe	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
n-Nitrosodiphenylamine	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
4-Bromophenyl-Phenyleth	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Hexachlorobenzene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Pentachlorophenol	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Phenanthrene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Anthracene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
di-n-Butylphthalate	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Fluoranthene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Pyrene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Butylbenzylphthalate	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
3,3-Dichlorobenzidine	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Benzo(a)Anthracene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Chrysene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
bis(2-Ethylhexyl)Phthal	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
di-n-Octylphthalate	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Benzo(b)Fluoranthene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Benzo(k)Fluoranthene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Benzo(a)Pyrene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Indeno(1,2,3-cd)Pyrene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Dibenz(a,h)Anthracene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
Benzo(g,h,i)Perylene	0.010	U	mg/L	EPA 8270		08/22	08/24	MT
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	28.8-33.1		mg/L	EPA 9060				
...TOC Concentration	31.1		mg/L	EPA 9060			08/30	CMR
							08/30	CMR
Residue, Non-Filterable	18		mg/L	EPA 160.2		08/24	08/24	GPP
Residue,Filterable(TDS)	1036		mg/L	EPA 160.1	500	08/20	08/23	RJK

See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

compiled by SAM 09/01/95

ICF ID	BUL-ST09-2S06	BUL-ST09-2S06	BUL-ST09-2S06	BUL-ST09-2S06
F&BI Number	1860	1860 dup	1860 ms	1860 msd
Sample Type	soil	soil	soil	soil
Date Received	9/3/93	9/3/93	9/3/93	9/3/93
% Dry Weight	93			
Sequence Date	#5-09/06/93			
Leaded Gas				
JP-4	<60			
Lube Oil	<120			
Diesel	<60			
Spike Level				
Unknown Semi-volat				
Pentacosane	86			
Sequence Date				
PCB 1221				
PCB 1232				
PCB 1016				
PCB 1242				
PCB 1248				
PCB 1254				
PCB 1260				
Spike Level				
Dibutyl Chlorendate				
Sequence Date				
alpha-BHC				
beta-BHC				
gamma-BHC				
delta-BHC				
Heptachlor				
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
DDE				
Dieldrin				
Endrin				
Endosulfan II				
DDD				
Endrin Aldehyde				
DDT				
Endosulfan Sulfate				
Endrin Ketone				
Methoxy Chlor				
Chlordane				
Dibutyl Chlorendate				
Spike Level				
Vol Sequence	#1&2-09/07/93	#1&2-09/07/93	#1&2-09/07/93	#1&2-09/07/93
CCl4	<0.2	<0.2	23	19
TCA	<0.2	<0.2	76	84
Benzene	<0.02	<0.02	80	82
TCE	<0.04	<0.04	96	99
Toluene	<0.02	<0.02	88	88
PCE	<0.1	<0.1	92	95
Ethylbenzene	<0.03	<0.03	96	95
Xylenes	<0.09	<0.09	88	92
Gasoline	<1 J	<1 J		
Spike level				
BFB	83	90	97	94

ANALYTICAL DATA SHEETS FOR THE DRUM STORAGE AREA (SS10)
(Formerly identified as AOC12)

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4201-4 SAMPLE 12-6-93
Client Sample ID :BUL-~~A0612~~-801 BULLEN
Matrix :SOIL SS19

REPORT of ANALYSIS

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :11096-412-01
PWSID :NA

RUSH Order :69794
Report Completed :08/30/93
Collected :08/19/93 @ 16:15 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. EPH OTHER = 119 MG/KG OF PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL. FINAL RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Time	Init
Percent Solids	92.1		%	AK17 05400			08/21	MDU
Hydrocarbons EPH	430		mg/Kg	EPA 8100/3550/8100M		08/21	10/23	JDH
VPH & BTEX								
Hydrocarbons VPH	1.72		mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
1,1,1 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/24	SGM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1958

REPORT of ANALYSIS

Chemlab Ref.# :93.4201-4
Client Sample ID :BUL-~~A3C12~~-S01 BULLEN
Matrix :SOIL SS(P

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chloroethane	0.020	U	mg/Kg	EPA 8010	08/21 08/24	SGM
1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/24	SGM
2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21 08/24	SGM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/24	SGM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/24	SGM
PCBs in Soil	0.100	U	mg/Kg	EPA 8080	08/20 08/22	ECG
------Aroclor	---					

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1958

5533 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4201-5
Client Sample ID :SUL-~~A0C12~~-SO1 BULLEN SPIKE
Matrix :SOIL SS108MT 12695

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69794
Report Completed :08/30/93
Collected :08/16/93 @ 16:15 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. FOR SPIKING CONCENTRATIONS AND PERCENT RECOVERIES, SEE QA/QC PACKAGE. FINAL RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	82.1		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	490		mg/Kg	3510/3550/8100M		08/21	08/23	JBH
VPH & BTEX Hydrocarbons VPH	12.7		mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.162		mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.877		mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.193		mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.622		mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.265		mg/Kg	EPA 8020		08/21	08/22	WLS
PCBs in Soil	0.258		mg/Kg	EPA 8080		08/20	08/22	ECG
------Aroclor 1262								

* See Special Instructions Above
See Sample Remarks Above
= Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

SINCE 1968

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT OF ANALYSIS

Chemlab Ref.# :93.4201-6
Client Sample ID :BUL-~~A3612~~-S01 BULLEN SPIKE DUPLICATE
Matrix :SOIL SS 8WF 12.695

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69794
Report Completed :08/30/93
Collected :08/16/93 @ 16:15 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. FINAL RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	92.1		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	459		mg/Kg	3510/3550/8100M		08/21	08/23	JEH
VPH & BTEX Hydrocarbons VPH	12.2		mg/Kg	EPA 8015M/8020 EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.157		mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.860		mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.187		mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.609		mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.266		mg/Kg	EPA 8020		08/21	08/22	WLS
PCBs in Soil ------Aroclor 1262	0.266		mg/Kg	EPA 8080		08/20	08/22	ECG

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4201-7
Client Sample ID :BUL-~~AOC17~~-S02 BULLEN
Matrix :SOIL SSIP SNL 12695

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69794
Report Completed :08/30/93
Collected :08/16/93 @ 16:15 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. FINAL RESULTS.

Analyses Comment

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	94.0		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	775		mg/Kg	3510/3550/8100M (J)-K,1		08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	14.3		mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Chloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM

COC 1/25/94

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FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4201-7
Client Sample ID :BUL-~~20C12~~-302 BULLEN
Matrix :SOIL SS10 8mf 12/6/93

2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21	08/25	SGM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/25	SGM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21	08/25	SGM
PCBs in Soil	0.200	U	mg/Kg	EPA 8080	08/20	08/22	SCG
------Aroclor	---						

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4177-5
Client Sample ID :BUL-~~AOC12~~-S02 BULLEN
Matrix :SOIL SS10 Gravel 12-95

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69708
Report Completed :09/23/93
Collected :08/16/93 @ 16:15 hr
Received :08/19/93 @ 10:50 hr
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: S.M.F. AND S.S. LOW 8260 SURROGATE FOR BROMOFLUOROBENZENE. DUE TO HIGH LEVEL OF HYDROCARBON INTERFERENCE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics		VALIDATION QUALIFIER →	(Comments)	EPA 8260				
Benzene	0.100	UJ	(A) mg/Kg	EPA 8260		08/20	09/01	KW
Bromobenzene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
Bromochloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromodichloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromoform	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Bromomethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
n-Butylbenzene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
sec-Butylbenzene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
tert-Butylbenzne	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
Carbon Tetrachloride	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chlorobenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloroform	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Chloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
2-Chlorotoluene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
4-Chlorotoluene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
Dibromochloromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
12Dibromo3Chloropropane	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
1,2-Dibromoethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Dibromomethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichlorobenzene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
1,3-Dichlorobenzene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
1,4-Dichlorobenzene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
Dichlorodifluoromethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichloroethane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
cis-1,2-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
trans1,2-Dichloroethene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,2-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,3-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
2,2-Dichloropropane	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
1,1-Dichloropropene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Ethylbenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW
Hexachlorobutadiene	0.100	UJ	mg/Kg, I.1	EPA 8260		08/20	09/01	KW
Isopropylbenzene	0.100	UJ	mg/Kg	EPA 8260		08/20	09/01	KW

11/24/94 JS

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FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4177-5
Client Sample ID :BUL-~~AOG12~~-S02 BULLEN
Matrix :SOIL

VALIDATION QUALIFIER → (COMMENT)

p-Isopropyltoluene	0.100	UJ	(A) mg/Kg, I.1	EPA 8260	08/20	09/01	KH
Methylene Chloride	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Napthalene	0.100	UJ	mg/Kg, I.1	EPA 8260	08/20	09/01	KH
n-Propylbenzene	0.100	UJ	mg/Kg, I.1	EPA 8260	08/20	09/01	KH
Styrene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1112-Tetrachloroethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1122-Tetrachloroethane	0.100	UJ	mg/Kg, I.1	EPA 8260	08/20	09/01	KH
Tetrachloroethene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Toluene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,2,3-Trichlorobenzene	0.100	UJ	mg/Kg I.1	EPA 8260	08/20	09/01	KH
1,2,4-Trichlorobenzene	0.100	UJ	mg/Kg I.1	EPA 8260	08/20	09/01	KH
1,1,1-Trichloroethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,1,2-Trichloroethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Trichloroethene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Trichlorofluoromethane	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
1,2,3-Trichloropropane	0.100	UJ	mg/Kg I.1	EPA 8260	08/20	09/01	KH
1,2,4-Trimethylbenzene	0.100	UJ	mg/Kg, I.1	EPA 8260	08/20	09/01	KH
1,3,5-Trimethylbenzene	0.100	UJ	mg/Kg, I.1	EPA 8260	08/20	09/01	KH
Vinyl Chloride	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
p+m-Xylene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
o-Xylene	0.100	UJ	mg/Kg	EPA 8260	08/20	09/01	KH
Semivolatile Organics				EPA 8270			
Phenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
bis(2-Chloroethyl)ether	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
2-Chlorophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
1,3-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
1,4-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
Benzyl Alcohol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
1,2-Dichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
2-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
bis(2-Chloroisopropyl)e	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
4-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
n-Nitroso-di-n-Propylam	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
Hexachloroethane	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
Nitrobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
Isophorone	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
2-Nitrophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
2,4-Dimethylphenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
Benzoic Acid	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
bis(2-Chloroethoxy)Meth	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
2,4-Dichlorophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
1,2,4-Trichlorobenzene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
Naphthalene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
4-Chloroaniline	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
Hexachlorobutadiene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
4-Chloro-3-Methylphenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
2-Methylnaphthalene	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
Hexachlorocyclopentadie	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
2,4,6-Trichlorophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G
2,4,5-Trichlorophenol	0.210	U	mg/Kg	EPA 8270	08/26	09/16	G

COMMERCIAL TESTING & ENGINEERING CO.
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REPORT of ANALYSIS

Chemlab Ref.# :93.4177-5 Sub 12/8
Client Sample ID :BUL-~~A0C12~~-S02 BULLEN
Matrix :SOIL SSIP

5633 B STREET
ANCHORAGE, AK 99518
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FAX: (907) 561-5301

		Qualifier		Comment			
2-Chloronaphthalene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
2-Nitroaniline	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Dimethylphthalate	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Acenaphthylene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
2,6-Dinitrotoluene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
3-Nitroaniline	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Acenaphthene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
2,4-Dinitrophenol	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
4-Nitrophenol	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Dibenzofuran	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
2,4-Dinitrotoluene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Diethylphthalate	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
4-Chlorophenyl-Phenylet	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Fluorene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
4-Nitroaniline	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
4,6-Dinitro-2-Methylphe	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
n-Nitrosodiphenylamine	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
4-Bromophenyl-Phenyleth	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Hexachlorobenzene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Pentachlorophenol	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Phenanthrene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Anthracene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
di-n-Butylphthalate	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Fluoranthene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Pyrene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Butylbenzylphthalate	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
3,3-Dichlorobenzidine	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Benzo(a)Anthracene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Chrysene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
bis(2-Ethylhexyl)Phthal	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
di-n-Octylphthalate	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Benzo(b)Fluoranthene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Benzo(k)Fluoranthene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Benzo(a)Pyrene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Indeno(1,2,3-cd)Pyrene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Dibenz(a,h)Anthracene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Benzo(g,h,i)Perylene	0.210	U	mg/Kg		EPA 8270	08/26 09/16	C
Sample Preparation	---				EPA 3050 Digest		
Total Metals Analysis	---				-		
ICP Screen, ICF					EPA	n/a	
Aluminum	1400		mg/Kg		EPA 6010	08/24 08/25	DF1
Antimony	51	U	mg/Kg		EPA 6010	08/24 08/25	DF1
Arsenic	5.1	U	mg/Kg		EPA 6010	08/24 08/25	DF1
Barium	19		mg/Kg		EPA 6010	08/24 08/25	DF1
Beryllium	2.6	U	mg/Kg		EPA 6010	08/24 08/25	DF1
Cadmium	2.6	U	mg/Kg		EPA 6010	08/24 08/25	DF1
Calcium	1900	J	mg/Kg	G.1	EPA 6010	08/24 08/25	DF1
Chromium	2.7		mg/Kg		EPA 6010	08/24 08/25	DF1
Cobalt	51	U	mg/Kg		EPA 6010	08/24 08/25	DF1
Copper	3.4		mg/Kg		EPA 6010	08/24 08/25	DF1

All charges n.c 2/2/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

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5633 B S[illegible]T
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4177-5
Client Sample ID :BUL-~~A0CI2~~-S02 BULLEN
Matrix :SOIL SS10

		Qualifier			Comment			
Iron	4300		mg/Kg		EPA 6010	08/24	08/25	DF
Lead	5.1	U	mg/Kg		EPA 6010	08/24	08/25	DF
Magnesium	1100		mg/Kg	G,I,J,L	EPA 6010	08/24	08/25	DF
Manganese	45		mg/Kg	I,L	EPA 6010	08/24	08/25	DF
Molybdenum	2.6	U	mg/Kg		EPA 6010	08/24	08/25	DF
Nickel	4.7		mg/Kg		EPA 6010	08/24	08/25	DF
Potassium	250	U	mg/Kg		EPA 6010	08/24	08/25	DF
Selenium	51	U	mg/Kg		EPA 6010	08/24	08/25	DF
Silver	2.6	U	mg/Kg		EPA 6010	08/24	08/25	DF
Sodium	52		mg/Kg		EPA 6010	08/24	08/25	DF
Thallium	0.25	U	mg/Kg		EPA 7841	08/24	08/26	KA
Vanadium	4.1		mg/Kg		EPA 6010	08/24	08/25	DF
Zinc	14		mg/Kg		EPA 6010	08/24	08/25	DF

All changes s.c 2/2/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyz[illegible]
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4301-8
Client Sample ID :BUL-~~93612~~-S03 BULLEN
Matrix :SOIL SS10

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69794
Report Completed :08/30/93
Collected :08/16/93 @ 16:30 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.M.L. AND S.S. SEPPOVEN. FINAL RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	91.9		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	4.00	U	mg/Kg	3510/3550/8100M		08/21	08/23	TEH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.400	U	mg/Kg	EPA 5030/8015m		08/21	08/23	WLS
Benzene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Toluene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Ethylbenzene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
p&m Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
o-Xylene	0.020	U	mg/Kg	EPA 8020		08/21	08/23	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,1 Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,1 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Chloroform	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Carbontetrachloride	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1, 2 Dichloropropane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Trichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,1,2 Trichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Dibromochloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Tetrachloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Chlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Trichlorofluoromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Trans12Dichloroethylene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,2 Dichloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,1,1 Trichoroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Bromodichloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Trans1,3Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
cis-1,3-Dichloropropene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Bromoform	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1122-Tetrachloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Chloromethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Bromoethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Vinyl Chloride	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
Chloroethane	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM
1,4 Dichlorobenzene	0.020	U	mg/Kg	EPA 8010		08/21	08/25	SGM

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REPORT OF ANALYSIS

Chemlab Ref.# :93.4201-8
Client Sample ID :BUL-~~AOS12~~ S03 BULLEN
Matrix :SOIL SS19

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ANCHORAGE, AK 99518
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FAX: (907) 561-5301

2-Chloroethylvinylether	0.020	U	mg/Kg	EPA 8010	08/21 08/25	SGM
1,3-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/25	SGM
1,2-Dichlorobenzene	0.020	U	mg/Kg	EPA 8010	08/21 08/25	SGM
PCBs in Soil	0.030	U	mg/Kg	EPA 8080	08/20 08/22	ECG
------Aroclor	---					

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

ANALYTICAL DATA SHEETS FOR BACKGROUND (BKGD)

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-1
Client Sample ID :BUL-BKGD-S01 FBI #110 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 13:45 hr
Received :08/19/93 @ 18:45 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	79.1		%	SM17 2540G			08/21	MDX
Hydrocarbons EPH	4.00	U	mg/Kg	3510/3550/8100M		08/21	08/24	JBI
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.500	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.025	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,1 Dichloroethylene	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,1 Dichloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Chloroform	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Carbontetrachloride	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1, 2 Dichloropropane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Trichloroethylene	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,1,2 Trichloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Dibromochloromethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Tetrachloroethylene	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Chlorobenzene	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Transl2Dichloroethylene	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,2 Dichloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,1,1 Trichoroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Bromodichloromethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Transl,3Dichloropropene	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
cis-1,3-Dichloropropene	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Bromoform	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Chloromethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Bromoethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Vinyl Chloride	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
Chloroethane	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI
1,4 Dichlorobenzene	0.025	U	mg/Kg	EPA 8010		08/21	08/21	SGI

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ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-1
Client Sample ID :BUL-BKGD-S01 FBI #110 BULLEN
Matrix :SOIL

2-Chloroethylvinylether	0.025	U	mg/Kg	EPA 8010	08/21	08/21	SGI
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8010	08/21	08/21	SGI
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8010	08/21	08/21	SGI
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyz
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-1
Client Sample ID :BUL-BKGD-S01 BULLEN BKGD BACKGROUND
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 13:45 hr
Received :08/17/93 @ 12:00 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Bromobenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Bromochloromethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Bromodichloromethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Bromoform	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Bromomethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
n-Butylbenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
sec-Butylbenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
tert-Butylbenzne	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Carbon Tetrachloride	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Chlorobenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Chloroethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Chloroform	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Chloromethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
2-Chlorotoluene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
4-Chlorotoluene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Dibromochloromethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
12Dibromo3Chloropropane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,2-Dibromoethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Dibromomethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,2-Dichlorobenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,3-Dichlorobenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,4-Dichlorobenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Dichlorodifluoromethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,1-Dichloroethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,2-Dichloroethane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,1-Dichloroethene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
cis-1,2-Dichloroethene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
trans1,2-Dichloroethene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,2-Dichloropropane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,3-Dichloropropane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
2,2-Dichloropropane	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
1,1-Dichloropropene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Ethylbenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Hexachlorobutadiene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
Isopropylbenzene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI
p-Isopropyltoluene	0.030	U	mg/kg	EPA 8260		08/19	08/19	KWI

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-1
Client Sample ID :BUL-BKGD-S01 BULLEN BKGD BACKGROUND
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
Napthalene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
n-Propylbenzene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
Styrene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1112-Tetrachloroethane	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1122-Tetrachloroethane	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
Tetracnloroethene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
Toluene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1,2,3-Trichlorobenzene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1,2,4-Trichlorobenzene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1,1,1-Trichloroethane	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1,1,2-Trichloroethane	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
Trichloroethene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
Trichlorofluoromethane	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1,2,3-Trichloropropane	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1,2,4-Trimethylbenzene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
1,3,5-Trimethylbenzene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
Vinyl Chloride	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
p+m-Xylene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
o-Xylene	0.030	U	mg/kg	EPA 8260	08/19 08/19	KWI
Semivolatile Organics				EPA 8270		
Phenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
bis(2-Chloroethyl)ether	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2-Chlorophenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
1,3-Dichlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
1,4-Dichlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
Benzyl Alcohol	1.00	U	mg/Kg	EPA 8270	08/26 09/05	MTT
1,2-Dichlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2-Methylphenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
bis(2-Chloroisopropyl)e	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
4-Methylphenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
n-Nitroso-di-n-Propylam	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
Hexachloroethane	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
Nitrobenzene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
Isophorone	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2-Nitrophenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2,4-Dimethylphenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
Benzoic Acid	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
bis(2-Chloroethoxy)Meth	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2,4-Dichlorophenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
1,2,4-Trichlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
Naphthalene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
4-Chloroaniline	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
Hexachlorobutadiene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
4-Chloro-3-Methylphenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2-Methylnaphthalene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
Hexachlorocyclopentadie	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2,4,6-Trichlorophenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2,4,5-Trichlorophenol	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT
2-Chloronaphthalene	0.290	U	mg/Kg	EPA 8270	08/26 09/05	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-1
Client Sample ID :BUL-BKGD-S01 BULLEN BKGD BACKGROUND
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2-Nitroaniline	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Dimethylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Acenaphthylene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
2,6-Dinitrotoluene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
3-Nitroaniline	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Acenaphthene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
2,4-Dinitrophenol	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
4-Nitrophenol	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Dibenzofuran	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
2,4-Dinitrotoluene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Diethylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
4-Chlorophenyl-Phenylet	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Fluorene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
4-Nitroaniline	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
4,6-Dinitro-2-Methylphe	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
n-Nitrosodiphenylamine	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
4-Bromophenyl-Phenyleth	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Hexachlorobenzene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Pentachlorophenol	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Phenanthrene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Anthracene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
di-n-Butylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Fluoranthene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Pyrene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Butylbenzylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
3,3-Dichlorobenzidine	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Benzo(a)Anthracene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Chrysene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
bis(2-Ethylhexyl)Phthal	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
di-n-Octylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Benzo(b)Fluoranthene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Benzo(k)Fluoranthene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Benzo(a)Pyrene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Indeno(1,2,3-cd)Pyrene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Dibenz(a,h)Anthracene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Benzo(g,h,i)Perylene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MTT
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA	n/a		
Aluminum	5030		mg/Kg	EPA 6010		08/21 08/23	DLG
Antimony	64	U J	mg/Kg J.2	EPA 6010		08/21 08/23	DLG
Arsenic	6.4	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Barium	46		mg/Kg	EPA 6010		08/21 08/23	DLG
Beryllium	3.2	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Cadmium	3.2	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Calcium	59000		mg/Kg	EPA 6010		08/21 08/23	DLG
Chromium	10		mg/Kg	EPA 6010		08/21 08/23	DLG
Cobalt	64	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Copper	7.4		mg/Kg	EPA 6010		08/21 08/23	DLG
Iron	13000		mg/Kg	EPA 6010		08/21 08/23	DLG

All dups o.k. 2/2/94

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1968

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-1
Client Sample ID :BUL-BKGD-S01 BULLEN BKGD BACKGROUND
Matrix :SOIL

Lead	6.4	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Magnesium	5100		mg/Kg		EPA 6010	08/21	08/23	DLG
Manganese	200		mg/Kg		EPA 6010	08/21	08/23	DLG
Molybdenum	3.2	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Nickel	14		mg/Kg		EPA 6010	08/21	08/23	DLG
Potassium	3200	U R	mg/Kg	J.1	EPA 6010	08/21	08/23	DLG
Selenium	64	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Silver	3.2	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Sodium	160	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Thallium	0.3	U	mg/Kg		EPA 7841	08/21	08/25	EMB
Vanadium	14		mg/Kg		EPA 6010	08/21	08/23	DLG
Zinc	35		mg/Kg		EPA 6010	08/21	08/23	DLG

All clear s.c 2/2/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-3
Client Sample ID :BUL-BKGD-S01 BULLEN DUPLICATE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 13:45 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Sample Preparation	----			EPA 3050 Digest				
Total Metals Analysis	----			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	5100		mg/Kg	EPA 6010		08/21	08/23	DLG
Antimony	63	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Arsenic	6.3	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Barium	48		mg/Kg	EPA 6010		08/21	08/23	DLG
Beryllium	3.2	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Cadmium	3.2	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Calcium	59600		mg/Kg	EPA 6010		08/21	08/23	DLG
Chromium	10		mg/Kg	EPA 6010		08/21	08/23	DLG
Cobalt	63	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Copper	7.6		mg/Kg	EPA 6010		08/21	08/23	DLG
Iron	13000		mg/Kg	EPA 6010		08/21	08/23	DLG
Lead	6.3	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Magnesium	5100		mg/Kg	EPA 6010		08/21	08/23	DLG
Manganese	200		mg/Kg	EPA 6010		08/21	08/23	DLG
Molybdenum	3.2		mg/Kg	EPA 6010		08/21	08/23	DLG
Nickel	14		mg/Kg	EPA 6010		08/21	08/23	DLG
Potassium	3200		mg/Kg	EPA 6010		08/21	08/23	DLG
Selenium	63	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Silver	3.1	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Sodium	160	U	mg/Kg	EPA 6010		08/21	08/23	DLG
Thallium	0.3	U	mg/Kg	EPA 7841		08/21	08/25	EMB
Vanadium	14		mg/Kg	EPA 6010		08/21	08/23	DLG
Zinc	36		mg/Kg	EPA 6010		08/21	08/23	DLG

* See Special Instructions Above
See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-2
Client Sample ID :BUL-BKGD-S01 BULLEN SPIKE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 13:45 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN. FOR SPIKE & SPIKE DULICATE RECOVERIES SEE QC SUMMARY.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.351		mg/Kg	EPA 8260		08/19	08/19	KWM
Bromobenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromochloromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromodichloromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromoform	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromomethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
n-Butylbenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
sec-Butylbenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
tert-Butylbenzne	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Carbon Tetrachloride	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chlorobenzene	0.327		mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroform	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2-Chlorotoluene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
4-Chlorotoluene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromochloromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
12Dibromo3Chloropropane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dibromoethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromomethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,4-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dichlorodifluoromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloroethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethene	0.056		mg/Kg	EPA 8260		08/19	08/19	KWM
cis-1,2-Dichloroethene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
trans1,2-Dichloroethene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloropropane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichloropropane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2,2-Dichloropropane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloropropene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Ethylbenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Hexachlorobutadiene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropylbenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-2
Client Sample ID :BUL-BKGD-S01 BULLEN SPIKE
Matrix :SOIL

p-Isopropyltoluene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Methylene Chloride	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Napthalene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
n-Propylbenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Styrene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1112-Tetrachloroethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Tetrachloroethene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Toluene	0.342		mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,3-Trichlorobenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,4-Trichlorobenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,1,1-Trichloroethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,1,2-Trichloroethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Trichloroethene	0.311		mg/Kg	EPA 8260	08/19	08/19	KWI
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,3-Trichloropropane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,4-Trimethylbenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,3,5-Trimethylbenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Vinyl Chloride	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
p+m-Xylene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
o-Xylene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWI
[illegible]mivolatile Organics				EPA 8270			
[illegible]henol	1.16		mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Chloroethyl)ether	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Chlorophenol	1.14		mg/Kg	EPA 8270	08/26	09/05	MTT
1,3-Dichlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,4-Dichlorobenzene	1.04		mg/Kg	EPA 8270	08/26	09/05	MTT
Benzyl Alcohol	1.00	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,2-Dichlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Methylphenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Chloroisopropyl)e	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Methylphenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
n-Nitroso-di-n-Propylam	1.23		mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachloroethane	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Nitrobenzene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Isophorone	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Nitrophenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4-Dimethylphenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzoic Acid	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Chloroethoxy)Meth	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4-Dichlorophenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,2,4-Trichlorobenzene	1.20		mg/Kg	EPA 8270	08/26	09/05	MTT
Naphthalene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Chloroaniline	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachlorobutadiene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Chloro-3-Methylphenol	1.23		mg/Kg	EPA 8270	08/26	09/05	MTT
2-Methylnaphthalene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachlorocyclopentadie	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4,6-Trichlorophenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
[illegible],4,5-Trichlorophenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-2
Client Sample ID :BUL-BKGD-S01 BULLEN SPIKE
Matrix :SOIL

2-Chloronaphthalene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
2-Nitroaniline	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Dimethylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Acenaphthylene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
2,6-Dinitrotoluene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
3-Nitroaniline	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Acenaphthene	1.33		mg/Kg	EPA 8270		08/26 09/05	MT
2,4-Dinitrophenol	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
4-Nitrophenol	1.19		mg/Kg	EPA 8270		08/26 09/05	MT
Dibenzofuran	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
2,4-Dinitrotoluene	1.20		mg/Kg	EPA 8270		08/26 09/05	MT
Diethylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
4-Chlorophenyl-Phenylet	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Fluorene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
4-Nitroaniline	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
4,6-Dinitro-2-Methylphe	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
n-Nitrosodiphenylamine	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
4-Bromophenyl-Phenyleth	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Hexachlorobenzene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Pentachlorophenol	1.29		mg/Kg	EPA 8270		08/26 09/05	MT
Phenanthrene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Anthracene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
di-n-Butylphthalate	1.42		mg/Kg	EPA 8270		08/26 09/05	
Fluoranthene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	
Pyrene	1.19		mg/Kg	EPA 8270		08/26 09/05	MT
Butylbenzylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
3,3-Dichlorobenzidine	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(a)Anthracene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Chrysene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
bis(2-Ethylhexyl)Phthal	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
di-n-Octylphthalate	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(b)Fluoranthene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(k)Fluoranthene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(a)Pyrene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Indeno(1,2,3-cd)Pyrene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Dibenz(a,h)Anthracene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(g,h,i)Perylene	0.290	U	mg/Kg	EPA 8270		08/26 09/05	MT
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICP				EPA	n/a		
Aluminum	5500		mg/Kg	EPA 6010		08/21 08/23	DLG
Antimony	88		mg/Kg	EPA 6010		08/21 08/23	DLG
Arsenic	110		mg/Kg	EPA 6010		08/21 08/23	DLG
Barium	160		mg/Kg	EPA 6010		08/21 08/23	DLG
Beryllium	46		mg/Kg	EPA 6010		08/21 08/23	DLG
Cadmium	59		mg/Kg	EPA 6010		08/21 08/23	DLG
Calcium	62000		mg/Kg	EPA 6010		08/21 08/23	DLG
Chromium	120		mg/Kg	EPA 6010		08/21 08/23	DLG
Cobalt	130		mg/Kg	EPA 6010		08/21 08/23	DLG
Copper	120		mg/Kg	EPA 6010		08/21 08/23	G

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-2
Client Sample ID :BUL-BKGD-S01 BULLEN SPIKE
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Iron	13000		mg/Kg	EPA 6010	08/21 08/23	DLG
Lead	100		mg/Kg	EPA 6010	08/21 08/23	DLG
Magnesium	6800		mg/Kg	EPA 6010	08/21 08/23	DLG
Manganese	310		mg/Kg	EPA 6010	08/21 08/23	DLG
Molybdenum	110		mg/Kg	EPA 6010	08/21 08/23	DLG
Nickel	120		mg/Kg	EPA 6010	08/21 08/23	DLG
Potassium	3200	U	mg/Kg	EPA 6010	08/21 08/23	DLG
Selenium	130		mg/Kg	EPA 6010	08/21 08/23	DLG
Silver	19		mg/Kg	EPA 6010	08/21 08/23	DLG
Sodium	1400		mg/Kg	EPA 6010	08/21 08/23	DLG
Thallium	2.6		mg/Kg	EPA 7841	08/21 08/25	EMB
Vanadium	120		mg/Kg	EPA 6010	08/21 08/23	DLG
Zinc	140		mg/Kg	EPA 6010	08/21 08/23	DLG

* See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-10
Client Sample ID :BUL-BKGD-S01 BULLEN SPIKE DUPLICATE
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 13:45 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.369		mg/Kg	EPA 8260		08/19	08/19	KWM
Bromobenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromochloromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromodichloromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromoform	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromomethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
n-Butylbenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
sec-Butylbenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	[illegible]
tert-Butylbenzne	0.030	U	mg/Kg	EPA 8260		08/19	08/19	[illegible]
Carbon Tetrachloride	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chlorobenzene	0.342		mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroform	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2-Chlorotoluene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
4-Chlorotoluene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromochloromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
12Dibromo3Chloropropane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dibromoethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromomethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,4-Dichlorobenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dichlorodifluoromethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloroethane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethene	0.056		mg/Kg	EPA 8260		08/19	08/19	KWM
cis-1,2-Dichloroethene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
trans1,2-Dichloroethene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloropropane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichloropropane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2,2-Dichloropropane	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloropropene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Ethylbenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Hexachlorobutadiene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropylbenzene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	[illegible]
p-Isopropyltoluene	0.030	U	mg/Kg	EPA 8260		08/19	08/19	[illegible]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-10
Client Sample ID :BUL-BKGD-S01 BULLEN SPIKE DUPLICATE
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Napthalene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
n-Propylbenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Styrene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1112-Tetrachloroethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Tetrachloroethene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Toluene	0.357		mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,3-Trichlorobenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,4-Trichlorobenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,1,1-Trichloroethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,1,2-Trichloroethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Trichloroethene	0.335		mg/Kg	EPA 8260	08/19	08/19	KWM
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,3-Trichloropropane	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,4-Trimethylbenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,3,5-Trimethylbenzene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Vinyl Chloride	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
p+m-Xylene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
o-Xylene	0.030	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Semivolatile Organics				EPA 8270			
Phenol	2.30		mg/Kg	EPA 8270	08/26	09/05	MTT
s(2-Chloroethyl)ether	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
-Chlorophenol	2.44		mg/Kg	EPA 8270	08/26	09/05	MTT
1,3-Dichlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,4-Dichlorobenzene	2.29		mg/Kg	EPA 8270	08/26	09/05	MTT
Benzyl Alcohol	1.00	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,2-Dichlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Methylphenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Chloroisopropyl)e	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Methylphenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
n-Nitroso-di-n-Propylam	2.51		mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachloroethane	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Nitrobenzene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Isophorone	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Nitrophenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4-Dimethylphenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzoic Acid	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Chloroethoxy)Meth	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4-Dichlorophenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,2,4-Trichlorobenzene	2.50		mg/Kg	EPA 8270	08/26	09/05	MTT
Naphthalene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Chloroaniline	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachlorobutadiene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Chloro-3-Methylphenol	2.63		mg/Kg	EPA 8270	08/26	09/05	MTT
2-Methylnaphthalene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachlorocyclopentadie	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4,6-Trichlorophenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4,5-Trichlorophenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Chloronaphthalene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT

COMMERCIAL TESTING & ENGINEERING CO.
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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-10
Client Sample ID :BUL-BKGD-S01 BULLEN SPIKE DUPLICATE
Matrix :SOIL

2-Nitroaniline	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Dimethylphthalate	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Acenaphthylene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,6-Dinitrotoluene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
3-Nitroaniline	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Acenaphthene	2.69		mg/Kg	EPA 8270	08/26	09/05	MTT
2,4-Dinitrophenol	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Nitrophenol	2.90		mg/Kg	EPA 8270	08/26	09/05	MTT
Dibenzofuran	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4-Dinitrotoluene	2.62		mg/Kg	EPA 8270	08/26	09/05	MTT
Diethylphthalate	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Chlorophenyl-Phenylet	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Fluorene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Nitroaniline	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4,6-Dinitro-2-Methylphe	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
n-Nitrosodiphenylamine	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Bromophenyl-Phenyleth	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachlorobenzene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Pentachlorophenol	2.96		mg/Kg	EPA 8270	08/26	09/05	MTT
Phenanthrene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Anthracene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
di-n-Butylphthalate	2.83		mg/Kg	EPA 8270	08/26	09/05	MTT
Fluoranthene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	[illegible]
Pyrene	2.49		mg/Kg	EPA 8270	08/26	09/05	[illegible]
Butylbenzylphthalate	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
3,3-Dichlorobenzidine	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzo(a)Anthracene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Chrysene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Ethylhexyl)Phthal	0.103		mg/Kg	EPA 8270	08/26	09/05	MTT
di-n-Octylphthalate	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzo(b)Fluoranthene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzo(k)Fluoranthene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzo(a)Pyrene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Indeno(1,2,3-cd)Pyrene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Dibenz(a,h)Anthracene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzo(g,h,i)Perylene	0.290	U	mg/Kg	EPA 8270	08/26	09/05	MTT

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected. Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-2
Client Sample ID :BUL-BKGD-S02 FBI #111 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 11:45 hr:
Received :08/19/93 @ 18:45 hr:
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH RESULT - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	76.6		%	SM17 2540G			08/21	MDI
Hydrocarbons EPH	152		mg/Kg	3510/3550/8100M		08/21	08/24	JBI
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.600	U	mg/Kg	EPA 5030/8015m		08/21	08/21	WLS

Benzene	0.030	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Toluene	0.030	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Ethylbenzene	0.030	U	mg/Kg	EPA 8020		08/21	08/21	WLS
p&m Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/21	WLS
o-Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Carbontetrachloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1, 2 Dichloropropane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,2 Trichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Dibromochloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Tetrachloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chlorobenzene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans12Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,2 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,1 Trichoroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromodichloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans1,3Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
cis-1,3-Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Vinyl Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM

COMMERCIAL TESTING & ENGINEERING CO.
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SINCE 1908

5633 B STREET
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TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS ACE

Chemlab Ref.# :93.4202-2
Client Sample ID :BUL-BKGD-S02 FBI #111 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
2-Chloroethylvinylether	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
4,4'-DDT	0.004	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Endosulfan Sulfate	0.004	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Endrin	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/22	08/22	NRC
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/22	08/22	
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/22	08/22	
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/22	08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-4
Client Sample ID :BUL-BKGD-S02 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 11:45 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN. HOLDING TIME MISSED FOR 8270.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromochloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromodichloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromoform	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromomethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
n-Butylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
sec-Butylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
tert-Butylbenzne	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Carbon Tetrachloride	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroform	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
4-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromochloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2Dibromo3Chloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dibromoethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromomethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,4-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dichlorodifluoromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
cis-1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
trans1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloropropene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Ethylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Hexachlorobutadiene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-4
Client Sample ID :BUL-BKGD-S02 BULLEN
Matrix :SOIL

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TEL: (907) 562-2343
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Methylene Chloride	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Napthalene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
n-Propylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Styrene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1112-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Tetrachloroethene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Toluene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,3-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,4-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,1,1-Trichloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,1,2-Trichloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Trichloroethene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,3-Trichloropropane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,4-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,3,5-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Vinyl Chloride	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
p+m-Xylene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
o-Xylene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Semivolatile Organics				EPA 8270			
Phenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	
bis(2-Chloroethyl)ether	0.26	U	mg/Kg	EPA 8270	08/31	09/11	
2-Chlorophenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
1,3-Dichlorobenzene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
1,4-Dichlorobenzene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
Benzyl Alcohol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
1,2-Dichlorobenzene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
2-Methylphenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
bis(2-Chloroisopropyl)e	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
4-Methylphenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
n-Nitroso-di-n-Propylam	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
Hexachloroethane	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
Nitrobenzene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
Isophorone	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
2-Nitrophenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
2,4-Dimethylphenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
Benzoic Acid	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
bis(2-Chloroethoxy)Meth	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
2,4-Dichlorophenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
1,2,4-Trichlorobenzene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
Naphthalene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
4-Chloroaniline	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
Hexachlorobutadiene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
4-Chloro-3-Methylphenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
2-Methylnaphthalene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
Hexachlorocyclopentadie	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
2,4,6-Trichlorophenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
2,4,5-Trichlorophenol	0.26	U	mg/Kg	EPA 8270	08/31	09/11	GV
2-Chloronaphthalene	0.26	U	mg/Kg	EPA 8270	08/31	09/11	

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ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-4
Client Sample ID :BUL-BKGD-S02 BULLEN
Matrix :SOIL

2-Nitroaniline	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Dimethylphthalate	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Acenaphthylene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
2,6-Dinitrotoluene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
3-Nitroaniline	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Acenaphthene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
2,4-Dinitrophenol	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
4-Nitrophenol	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Dibenzofuran	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
2,4-Dinitrotoluene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Diethylphthalate	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
4-Chlorophenyl-Phenylet	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Fluorene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
4-Nitroaniline	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
4,6-Dinitro-2-Methylphe	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
n-Nitrosodiphenylamine	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
4-Bromophenyl-Phenyleth	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Hexachlorobenzene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Pentachlorophenol	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Phenanthrene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Anthracene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
di-n-Butylphthalate	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
[illegible]oranthene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
[illegible]ene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Butylbenzylphthalate	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
3,3-Dichlorobenzidine	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(a)Anthracene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Chrysene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
bis(2-Ethylhexyl)Phthal	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
di-n-Octylphthalate	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(b)Fluoranthene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(k)Fluoranthene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(a)Pyrene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Indeno(1,2,3-cd)Pyrene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Dibenz(a,h)Anthracene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(g,h,i)Perylene	0.26	U	mg/Kg	EPA 8270		08/31 09/11	GV
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA	n/a		
Aluminum	9700		mg/Kg	EPA 6010		08/21 08/23	DLG
Antimony	61	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Arsenic	6.1	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Barium	120		mg/Kg	EPA 6010		08/21 08/25	DLG
Beryllium	3.1	U	mg/Kg	EPA 6010		08/21 08/25	DLG
Cadmium	3.1	U	mg/Kg	EPA 6010		08/21 08/25	DLG
Calcium	3100		mg/Kg	EPA 6010		08/21 08/25	DLG
Chromium	17		mg/Kg	EPA 6010		08/21 08/25	DLG
Cobalt	61	U	mg/Kg	EPA 6010		08/21 08/25	DLG
Copper	11		mg/Kg	EPA 6010		08/21 08/25	DLG
[illegible]on	12300		mg/Kg	EPA 6010		08/21 08/25	DLG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-4
Client Sample ID :BUL-BKGD-S02 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Lead	7.6		mg/Kg	EPA 6010	08/21	08/25	DLC
Magnesium	2400		mg/Kg	EPA 6010	08/21	08/25	DLC
Manganese	130		mg/Kg	EPA 6010	08/21	08/25	DLC
Molybdenum	3.1	U	mg/Kg	EPA 6010	08/21	08/25	DLC
Nickel	13		mg/Kg	EPA 6010	08/21	08/25	DLC
Potassium	3100	U	mg/Kg	EPA 6010	08/21	08/25	DLC
Selenium	61	U	mg/Kg	EPA 6010	08/21	08/25	DLC
Silver	3.1	U	mg/Kg	EPA 6010	08/21	08/25	DLC
Sodium	160	U	mg/Kg	EPA 6010	08/21	08/25	DLC
Thallium	0.3	U	mg/Kg	EPA 7841	08/21	08/25	EME
Vanadium	26		mg/Kg	EPA 6010	08/21	08/23	DLC
Zinc	33		mg/Kg	EPA 6010	08/21	08/23	DLC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
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REPORT of ANALYSIS

[redacted]mlab Ref.# :93.4202-3
Client Sample ID :BUL-BKGD-S03 FBI #112 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 10:30 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH RESULT - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	66.6		%	SM17 2540G				
Hydrocarbons EPH	157		mg/Kg	3510/3550/8100M			08/21	MDU
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	1.03		mg/Kg	EPA 5030/8015m		08/21	08/21	WLS
Benzene	0.040	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Toluene	0.040	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Ethylbenzene	0.040	U	mg/Kg	EPA 8020		08/21	08/21	WLS
[redacted]m Xylene	0.040	U	mg/Kg	EPA 8020		08/21	08/21	WLS
[redacted]Xylene	0.040	U	mg/Kg	EPA 8020		08/21	08/21	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethylene	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroform	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Carbontetrachloride	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1, 2 Dichloropropane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trichloroethylene	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,2 Trichloroethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Dibromochloromethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Tetrachloroethylene	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chlorobenzene	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trichlorofluoromethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans12Dichloroethylene	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,2 Dichloroethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,1 Trichoroethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromodichloromethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans1,3Dichloropropene	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
cis-1,3-Dichloropropene	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoform	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1122-Tetrachloroethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloromethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Vinyl Chloride	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroethane	0.040	U	mg/Kg	EPA 8010		08/21	08/21	SGM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STR
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4202-3
Client Sample ID :BUL-BKGD-S03 FBI #112 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.040	U	mg/Kg	EPA 8010	08/21	08/21	SGM
2-Chloroethylvinylether	0.040	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,3-Dichlorobenzene	0.040	U	mg/Kg	EPA 8010	08/21	08/21	SGM
1,2-Dichlorobenzene	0.040	U	mg/Kg	EPA 8010	08/21	08/21	SGM
Organochlorine Pest				EPA 8080			
Aldrin	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Alpha-BHC	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Beta-BHC	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Delta-BHC	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Gamma-BHC	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDD	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDE	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
4,4'-DDT	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Dieldrin	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan I	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan II	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endosulfan Sulfate	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Endrin Aldehyde	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Heptachlor Epoxide	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Methoxychlor	0.003	U	mg/Kg	EPA 8080	08/21	08/22	NRC
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-5
Client Sample ID :BUL-BKGD-S03 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 10:30 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN. HOLDING TIME MISSED FOR 8270.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromobenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromochloromethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromodichloromethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromoform	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromomethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
n-Butylbenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
sec-Butylbenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
tert-Butylbenzne	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Carbon Tetrachloride	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chlorobenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroform	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloromethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2-Chlorotoluene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
4-Chlorotoluene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromochloromethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dibromo-3-Chloropropane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dibromoethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromomethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichlorobenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichlorobenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,4-Dichlorobenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dichlorodifluoromethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloroethane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
cis-1,2-Dichloroethene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
trans1,2-Dichloroethene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloropropane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichloropropane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2,2-Dichloropropane	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloropropene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Ethylbenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Hexachlorobutadiene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropylbenzene	0.035	U	mg/Kg	EPA 8260		08/19	08/19	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-5
Client Sample ID :BUL-BKGD-S03 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Napthalene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
n-Propylbenzene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Styrene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1112-Tetrachloroethane	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1122-Tetrachloroethane	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Tetrachloroethene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Toluene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,3-Trichlorobenzene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,4-Trichlorobenzene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,1,1-Trichloroethane	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,1,2-Trichloroethane	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Trichloroethene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Trichlorofluoromethane	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,3-Trichloropropane	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,4-Trimethylbenzene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,3,5-Trimethylbenzene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Vinyl Chloride	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
p+m-Xylene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
o-Xylene	0.035	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Semivolatile Organics				EPA 8270			
Phenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	
bis(2-Chloroethyl)ether	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
2-Chlorophenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
1,3-Dichlorobenzene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
1,4-Dichlorobenzene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
Benzyl Alcohol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
1,2-Dichlorobenzene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
2-Methylphenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
bis(2-Chloroisopropyl)e	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
4-Methylphenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
n-Nitroso-di-n-Propylam	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
Hexachloroethane	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
Nitrobenzene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
Isophorone	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
2-Nitrophenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
2,4-Dimethylphenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
Benzoic Acid	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
bis(2-Chloroethoxy)Meth	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
2,4-Dichlorophenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
1,2,4-Trichlorobenzene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
Naphthalene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
4-Chloroaniline	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
Hexachlorobutadiene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
4-Chloro-3-Methylphenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
2-Methylnaphthalene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
Hexachlorocyclopentadie	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
2,4,6-Trichlorophenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	GV
2,4,5-Trichlorophenol	0.29	U	mg/Kg	EPA 8270	08/31	09/11	
2-Chloronaphthalene	0.29	U	mg/Kg	EPA 8270	08/31	09/11	

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-5
Client Sample ID :BUL-BKGD-S03 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

2-Nitroaniline	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Dimethylphthalate	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Acenaphthylene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
2,6-Dinitrotoluene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
3-Nitroaniline	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Acenaphthene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
2,4-Dinitrophenol	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
4-Nitrophenol	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Dibenzofuran	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
2,4-Dinitrotoluene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Diethylphthalate	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
4-Chlorophenyl-Phenylet	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Fluorene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
4-Nitroaniline	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
4,6-Dinitro-2-Methylphe	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
n-Nitrosodiphenylamine	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
4-Bromophenyl-Phenyleth	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Hexachlorobenzene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Pentachlorophenol	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Phenanthrene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Anthracene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
di-n-Butylphthalate	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Fluoranthene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Pyrene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Butylbenzylphthalate	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
3,3-Dichlorobenzidine	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(a)Anthracene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Chrysene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
bis(2-Ethylhexyl)Phthal	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
di-n-Octylphthalate	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(b)Fluoranthene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(k)Fluoranthene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(a)Pyrene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Indeno(1,2,3-cd)Pyrene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Dibenz(a,h)Anthracene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Benzo(g,h,i)Perylene	0.29	U	mg/Kg	EPA 8270		08/31 09/11	GV
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICP				EPA	n/a		
Aluminum	12000		mg/Kg	EPA 6010		08/21 08/23	DLG
Antimony	70	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Arsenic	7.0	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Barium	150		mg/Kg	EPA 6010		08/21 08/23	DLG
Beryllium	3.5	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Cadmium	3.5	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Calcium	6100		mg/Kg	EPA 6010		08/21 08/23	DLG
Chromium	20		mg/Kg	EPA 6010		08/21 08/23	DLG
Cobalt	70	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Copper	12		mg/Kg	EPA 6010		08/21 08/23	DLG
Iron	18700		mg/Kg	EPA 6010		08/21 08/23	DLG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-5
Client Sample ID :BUL-BKGD-S03 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Lead	9.7		mg/Kg	EPA 6010	08/21	08/23	DLG
Magnesium	2800		mg/Kg	EPA 6010	08/21	08/23	DLG
Manganese	65		mg/Kg	EPA 6010	08/21	08/23	DLG
Molybdenum	3.5	U	mg/Kg	EPA 6010	08/21	08/23	DLG
Nickel	17		mg/Kg	EPA 6010	08/21	08/23	DLG
Potassium	3500	U	mg/Kg	EPA 6010	08/21	08/23	DLG
Selenium	70	U	mg/Kg	EPA 6010	08/21	08/23	DLG
Silver	3.5	U	mg/Kg	EPA 6010	08/21	08/23	DLG
Sodium	170	U	mg/Kg	EPA 6010	08/21	08/23	DLG
Thallium	0.3	U	mg/Kg	EPA 7841	08/21	08/25	EME
Vanadium	32		mg/Kg	EPA 6010	08/21	08/23	DLG
Zinc	29		mg/Kg	EPA 6010	08/21	08/23	DLG

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-4
Client Sample ID :BUL-BKGD-S04 FBI #113 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 11:00 hr
Received :08/19/93 @ 18:45 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH RESULT - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Percent Solids	79.4		%	SM17 2540G			08/21	MD
Hydrocarbons EPH	33.8		mg/Kg	3510/3550/8100M		08/21	08/24	JE
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.600	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WL
Benzene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WL
Toluene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WL
Ethylbenzene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WL
p&m Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WL
o-Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WL
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
1,1 Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
1,1 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Chloroform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Carbontetrachloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
1, 2 Dichloropropane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Trichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
1,1,2 Trichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Dibromochloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Tetrachloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Chlorobenzene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Trans12Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
1,2 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
1,1,1 Trichoroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Bromodichloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Trans1,3Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
cis-1,3-Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Bromoform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Chloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Bromoethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Vinyl Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG
Chloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-4
Client Sample ID :BUL-BKGD-S04 FBI #113 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SG
2-Chloroethylvinylether	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SG
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SG
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SG
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NRC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.
UA = Unavailable
NA = Not Analyze
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
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REPORT of ANALYSIS

Chemlab Ref.# :93.4123-6
Client Sample ID :BUL-BKGD-S04 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/14/93
Collected :08/15/93 @ 11:00 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromochloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromodichloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromoform	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromomethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
n-Butylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
sec-Butylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
ert-Butylbenzne	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
arbon Tetrachloride	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroform	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
4-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromochloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
12Dibromo3Chloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dibromoethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromomethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,4-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dichlorodifluoromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
cis-1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
trans1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloropropene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Ethylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Hexachlorobutadiene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropyltoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-6
Client Sample ID :BUL-BKGD-S04 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Napthalene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
n-Propylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Styrene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1112-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Tetrachloroethene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Toluene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,3-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,4-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,1,1-Trichloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,1,2-Trichloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Trichloroethene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,3-Trichloropropane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,2,4-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
1,3,5-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Vinyl Chloride	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
p+m-Xylene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
o-Xylene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWI
Semivolatile Organics				EPA 8270			
Phenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
bis(2-Chloroethyl)ether	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2-Chlorophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
1,3-Dichlorobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
1,4-Dichlorobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
Benzyl Alcohol	1.00	U	mg/Kg	EPA 8270	08/26	09/05	MTI
1,2-Dichlorobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2-Methylphenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
bis(2-Chloroisopropyl)e	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
4-Methylphenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
n-Nitroso-di-n-Propylam	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
Hexachloroethane	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
Nitrobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
Isophorone	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2-Nitrophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2,4-Dimethylphenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
Benzoic Acid	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
bis(2-Chloroethoxy)Meth	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2,4-Dichlorophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
1,2,4-Trichlorobenzene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
Naphthalene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
4-Chloroaniline	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
Hexachlorobutadiene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
4-Chloro-3-Methylphenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2-Methylnaphthalene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
Hexachlorocyclopentadie	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2,4,6-Trichlorophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2,4,5-Trichlorophenol	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI
2-Chloronaphthalene	0.240	U	mg/Kg	EPA 8270	08/26	09/05	MTI

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-6
Client Sample ID :BUL-BKGD-S04 BULLEN
Matrix :SOIL

2-Nitroaniline	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Dimethylphthalate	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Acenaphthylene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
2,6-Dinitrotoluene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
3-Nitroaniline	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Acenaphthene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
2,4-Dinitrophenol	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
4-Nitrophenol	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Dibenzofuran	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
2,4-Dinitrotoluene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Diethylphthalate	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
4-Chlorophenyl-Phenylet	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Fluorene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
4-Nitroaniline	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
4,6-Dinitro-2-Methylphe	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
n-Nitrosodiphenylamine	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
4-Bromophenyl-Phenyleth	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Hexachlorobenzene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Pentachlorophenol	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Phenanthrene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Anthracene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
di-n-Butylphthalate	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Fluoranthene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Pyrene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Butylbenzylphthalate	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
3,3-Dichlorobenzidine	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(a)Anthracene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Chrysene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
bis(2-Ethylhexyl)Phthal	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
di-n-Octylphthalate	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(b)Fluoranthene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(k)Fluoranthene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(a)Pyrene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Indeno(1,2,3-cd)Pyrene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Dibenz(a,h)Anthracene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Benzo(g,h,i)Perylene	0.240	U	mg/Kg	EPA 8270		08/26 09/05	MT
Sample Preparation	---			EPA 3050 Digest			
Total Metals Analysis	---			-			
ICP Screen, ICP				EPA	n/a		
Aluminum	10300		mg/Kg	EPA 6010		08/21 08/23	DLG
Antimony	63	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Arsenic	6.3	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Barium	97		mg/Kg	EPA 6010		08/21 08/23	DLG
Beryllium	3.2	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Cadmium	3.2	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Calcium	43300		mg/Kg	EPA 6010		08/21 08/23	DLG
Chromium	19		mg/Kg	EPA 6010		08/21 08/23	DLG
Cobalt	63	U	mg/Kg	EPA 6010		08/21 08/23	DLG
Copper	15		mg/Kg	EPA 6010		08/21 08/23	DLG
Iron	20600		mg/Kg	EPA 6010		08/21 08/23	DLG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1968

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-6
Client Sample ID :BUL-BKGD-S04 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Lead	9.6		mg/Kg	EPA 6010	08/21 08/23	DLG
Magnesium	7400		mg/Kg	EPA 6010	08/21 08/23	DLG
Manganese	290		mg/Kg	EPA 6010	08/21 08/23	DLG
Molybdenum	3.2	U	mg/Kg	EPA 6010	08/21 08/23	DLG
Nickel	24		mg/Kg	EPA 6010	08/21 08/23	DLG
Potassium	3200	U	mg/Kg	EPA 6010	08/21 08/23	DLG
Selenium	63	U	mg/Kg	EPA 6010	08/21 08/23	DLG
Silver	3.2	U	mg/Kg	EPA 6010	08/21 08/23	DLG
Sodium	160	U	mg/Kg	EPA 6010	08/21 08/23	DLG
Thallium	0.3	U	mg/Kg	EPA 7841	08/21 08/25	EMP
Vanadium	27		mg/Kg	EPA 6010	08/21 08/23	DLG
Zinc	60		mg/Kg	EPA 6010	08/21 08/23	DLG

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4202-5
Client Sample ID :BUL-BKGD-SD01 FBI #114 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69798
Report Completed :08/26/93
Collected :08/15/93 @ 14:05 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J.P., D.N., AND S.S. SEPPOVEN. EPH RESULT - PATTERN IS NOT CONSISTENT WITH MIDDLE DISTILLATE FUEL.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Percent Solids	78.1		%	SM17 2540G			08/21	MDU
Hydrocarbons EPH	8.43		mg/Kg	3510/3550/8100M	(J)-K	08/21	08/24	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.600	U	mg/Kg	EPA 5030/8015m		08/21	08/22	WLS
Benzene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Toluene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Ethylbenzene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
p&m Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
o-Xylene	0.030	U	mg/Kg	EPA 8020		08/21	08/22	WLS
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Carbontetrachloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1, 2 Dichloropropane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,2 Trichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Dibromochloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Tetrachloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chlorobenzene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trichlorofluoromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans12Dichloroethylene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,2 Dichloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1,1,1 Trichoroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromodichloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Trans1,3Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
cis-1,3-Dichloropropene	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoform	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
1122-Tetrachloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloromethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Bromoethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Vinyl Chloride	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM
Chloroethane	0.030	U	mg/Kg	EPA 8010		08/21	08/21	SGM

CAP 1-25-94

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REPORT of ANALYSIS

Chemlab Ref.# :93.4202-5
Client Sample ID :BUL-BKGD-SD01 FBI #114 BULLEN
Matrix :SOIL

1,4 Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGI
2-Chloroethylvinylether	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGI
1,3-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGI
1,2-Dichlorobenzene	0.030	U	mg/Kg	EPA 8010	08/21	08/21	SGI
Organochlorine Pest				EPA 8080			
Aldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Alpha-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Beta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Delta-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Gamma-BHC	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Chlordane	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(
4,4'-DDD	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
4,4'-DDE	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
4,4'-DDT	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Dieldrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Endosulfan I	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Endosulfan II	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Endosulfan Sulfate	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Endrin	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Endrin Aldehyde	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Heptachlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Heptachlor Epoxide	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Methoxychlor	0.002	U	mg/Kg	EPA 8080	08/21	08/22	NR(
Toxaphene	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(
PCB-1016	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(
PCB-1221	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(
PCB-1232	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(
PCB-1242	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(
PCB-1248	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(
PCB-1254	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(
PCB-1260	0.020	U	mg/Kg	EPA 8080	08/21	08/22	NR(

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailabl
NA = Not Analyz
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-7
Client Sample ID :BUL-BKGD-SD01 BULLEN
Matrix :SOIL

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69695
Report Completed :09/24/93
Collected :08/15/93 @ 14:05 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: J PURA ICF, AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromochloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromodichloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromoform	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Bromomethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
n-Butylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
sec-Butylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
tert-Butylbenzne	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Carbon Tetrachloride	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloroform	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Chloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
4-Chlorotoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromochloromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
12Dibromo3Chloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dibromoethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dibromomethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,4-Dichlorobenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Dichlorodifluoromethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloroethane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
cis-1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
trans1,2-Dichloroethene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,3-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
2,2-Dichloropropane	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
1,1-Dichloropropene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Ethylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Hexachlorobutadiene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
Isopropylbenzene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM
p-Isopropyltoluene	0.025	U	mg/Kg	EPA 8260		08/19	08/19	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-7
Client Sample ID :BUL-BKGD-SD01 BULLEN
Matrix :SOIL

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

p-Isopropyltoluene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Methylene Chloride	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Napthalene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
n-Propylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Styrene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1112-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1122-Tetrachloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Tetrachloroethene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Toluene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,3-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,4-Trichlorobenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,1,1-Trichloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,1,2-Trichloroethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Trichloroethene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Trichlorofluoromethane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,3-Trichloropropane	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,2,4-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
1,3,5-Trimethylbenzene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Vinyl Chloride	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
p+m-Xylene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
o-Xylene	0.025	U	mg/Kg	EPA 8260	08/19	08/19	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Chloroethyl)ether	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Chlorophenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,3-Dichlorobenzene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,4-Dichlorobenzene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzyl Alcohol	1.00	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,2-Dichlorobenzene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Methylphenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Chloroisopropyl)e	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Methylphenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
n-Nitroso-di-n-Propylam	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachloroethane	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Nitrobenzene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Isophorone	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Nitrophenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4-Dimethylphenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Benzoic Acid	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
bis(2-Chloroethoxy)Meth	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4-Dichlorophenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
1,2,4-Trichlorobenzene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Naphthalene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Chloroaniline	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachlorobutadiene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
4-Chloro-3-Methylphenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2-Methylnaphthalene	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
Hexachlorocyclopentadie	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4,6-Trichlorophenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT
2,4,5-Trichlorophenol	0.250	U	mg/Kg	EPA 8270	08/26	09/05	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1958

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS SCE

Chemlab Ref.# :93.4123-7
Client Sample ID :BUL-BKGD-SD01 BULLEN
Matrix :SOIL

		Qualifier			Comment			
2-Chloronaphthalene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
2-Nitroaniline	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Dimethylphthalate	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Acenaphthylene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
2,6-Dinitrotoluene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
3-Nitroaniline	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Acenaphthene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
2,4-Dinitrophenol	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
4-Nitrophenol	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Dibenzofuran	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
2,4-Dinitrotoluene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Diethylphthalate	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
4-Chlorophenyl-Phenylet	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Fluorene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
4-Nitroaniline	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
4,6-Dinitro-2-Methylphe	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
n-Nitrosodiphenylamine	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
4-Bromophenyl-Phenyleth	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Hexachlorobenzene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Pentachlorophenol	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Phenanthrene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Anthracene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
di-n-Butylphthalate	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Fluoranthene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Pyrene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Butylbenzylphthalate	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
3,3-Dichlorobenzidine	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Benzo(a)Anthracene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Chrysene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
bis(2-Ethylhexyl)Phthal	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
di-n-Octylphthalate	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Benzo(b)Fluoranthene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Benzo(k)Fluoranthene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Benzo(a)Pyrene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Indeno(1,2,3-cd)Pyrene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Dibenz(a,h)Anthracene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Benzo(g,h,i)Perylene	0.250	U	mg/Kg		EPA 8270	08/26	09/05	MTT
Sample Preparation	---				EPA 3050 Digest			
Total Metals Analysis	---				-			
ICP Screen, ICF					EPA	n/a		
Aluminum	3800		mg/Kg		EPA 6010	08/21	08/23	DLG
Antimony	60	U J	mg/Kg	J,2	EPA 6010	08/21	08/23	DLG
Arsenic	6.0	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Barium	28		mg/Kg		EPA 6010	08/21	08/23	DLG
Beryllium	3.0	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Cadmium	3.0	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Calcium	29000		mg/Kg		EPA 6010	08/21	08/23	DLG
Chromium	7.8		mg/Kg		EPA 6010	08/21	08/23	DLG
Cobalt	60	U	mg/Kg		EPA 6010	08/21	08/23	DLG
Copper	5.8		mg/Kg		EPA 6010	08/21	08/23	DLG

All chngs S.L 2/2/94

COMMERCIAL TESTING & ENGINEERING CO.
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SINCE 1958

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4123-7
Client Sample ID :BUL-BKGD-SD01 BULLEN
Matrix :SOIL

		Qualifier					
Iron	7200		mg/Kg	EPA 6010	08/21	08/23	DL
Lead	6.0	U	mg/Kg	EPA 6010	08/21	08/23	DL
Magnesium	3100		mg/Kg	EPA 6010	08/21	08/23	DL
Manganese	70		mg/Kg	EPA 6010	08/21	08/23	DL
Molybdenum	3.0	U	mg/Kg	EPA 6010	08/21	08/23	DL
Nickel	9.9		mg/Kg	EPA 6010	08/21	08/23	DL
Potassium	3000	U R	mg/Kg J. i	EPA 6010	08/21	08/23	DL
Selenium	60	U	mg/Kg	EPA 6010	08/21	08/23	DL
Silver	3.0	U	mg/Kg	EPA 6010	08/21	08/23	DL
Sodium	260		mg/Kg	EPA 6010	08/21	08/23	DL
Thallium	0.3	U	mg/Kg	EPA 7841	08/21	08/25	EM
Vanadium	11		mg/Kg	EPA 6010	08/21	08/23	DL
Zinc	30		mg/Kg	EPA 6010	08/21	08/23	DL

All clear J.L. 2/2/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

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REPORT of ANALYSIS

Chemlab Ref.# :93.4204-1
Client Sample ID :BUL-BKGD-SW01 FBI #76-79 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :11/22/93
Collected :08/15/93 @ 14:00 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C. CORRECTED RESULT FOR 1,2 DICHLOROETHANE.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	0.200	U	mg/L	3510/3550/8100M		08/21	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.020	U	mg/L	EPA 5030/8015m		08/23	08/23	KWM
Benzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Toluene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
o-Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans12Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,2 Dichloroethane	0.0049		mg/L	EPA 8010		08/21	08/21	JLB
1,1,1 Trichoroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromodichloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans1,3Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
cis-1,3-Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Vinyl Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB

COMMERCIAL TESTING & ENGINEERING CO.
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REPORT of ANALYSIS

Chemlab Ref.# :93.4204-1
Client Sample ID :BUL-BKGD-SW01 FBI #76-79 BULLEN
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL (907) 562-2343
FAX (907) 561-5301

1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	JL
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21	08/21	JL
Organochlorine Pest				EPA 8080			
Aldrin	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Alpha-BHC	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Beta-BHC	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Delta-BHC	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Gamma-BHC	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Chlordane	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDD	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDE	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
4,4'-DDT	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Dieldrin	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endosulfan I	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endosulfan II	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endosulfan Sulfate	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endrin	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Endrin Aldehyde	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Heptachlor	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Heptachlor Epoxide	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Methoxychlor	0.0001	U	mg/L	EPA 8080	08/21	08/23	NR
Toxaphene	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1016	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1221	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1232	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1242	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1248	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1254	0.002	U	mg/L	EPA 8080	08/21	08/23	NR
PCB-1260	0.002	U	mg/L	EPA 8080	08/21	08/23	NR

* See Special Instructions Above
** See Sample Remarks Above
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LT = Less Than
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COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-1
Client Sample ID :BUL-BKGD-SW01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69693
Report Completed :09/01/93
Collected :08/15/93 @ 14:00 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloroethane	0.0045		mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
cis-1,2-Dichloroehtene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
transl,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/20	08/20	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KWM

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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-1
Client Sample ID :BUL-BKGD-SW01 BULLEN
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
Napthalene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
n-Propylbenzene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
Styrene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
Tetrachloroethene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
Toluene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
Trichloroethene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
Vinyl Chloride	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
p+m-Xylene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
o-Xylene	0.0010	U	mg/L	EPA 8260		08/20	08/20	KW
TOC, Nonpurgable				EPA 9060	n/a			
...TOC Range	24.6-34.8		mg/L	EPA 9060		08/25		CMF
...TOC Concentration	30.7		mg/L	EPA 9060		08/25		CMF
Semivolatile Organics				EPA 8270				
Phenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroethyl)ether	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Chlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,3-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,4-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Benzyl Alcohol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,2-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroisopropyl)e	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
n-Nitroso-di-n-Propylam	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Hexachloroethane	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Nitrobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Isophorone	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Nitrophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4-Dimethylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Benzoic Acid	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroethoxy)Meth	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4-Dichlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,2,4-Trichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Naphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Chloroaniline	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Hexachlorobutadiene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Chloro-3-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Methylnaphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-1
Client Sample ID :BUL-BKGD-SW01 BULLEN
Matrix :WATER

5633 B STRE
ANCHORAGE, AK 995
TEL: (907) 562-2
FAX: (907) 561-5

		VALIDATION QUALIFIER (COMMENT)				
Hexachlorocyclopentadie	0.01	U	mg/L	EPA 8270	08/20 08/20	I
2,4,6-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	I
2,4,5-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	I
2-Chloronaphthalene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
2-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Dimethylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Acenaphthylene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
2,6-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
3-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Acenaphthene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
2,4-Dinitrophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	I
4-Nitrophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Dibenzofuran	0.01	U	mg/L	EPA 8270	08/20 08/20	I
2,4-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Diethylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	I
4-Chlorophenyl-Phenylet	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Fluorene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
4-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	I
4,6-Dinitro-2-Methylphe	0.01	U	mg/L	EPA 8270	08/20 08/20	I
n-Nitrosodiphenylamine	0.01	U	mg/L	EPA 8270	08/20 08/20	I
4-Bromophenyl-Phenyleth	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Hexachlorobenzene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Pentachlorophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Phenanthrene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
di-n-Butylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Pyrene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Butylbenzylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	I
3,3-Dichlorobenzidine	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Benzo(a)Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Chrysene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
bis(2-Ethylhexyl)Phthal	0.01	U	mg/L	EPA 8270	08/20 08/20	I
di-n-Octylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Benzo(b)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Benzo(k)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Benzo(a)Pyrene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Indeno(1,2,3-cd)Pyrene	0.01	UJ(b)	mg/L	EPA 8270	08/20 08/20	I
Dibenz(a,h)Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	I
Benzo(g,h,i)Perylene	0.01	UJ(b)	mg/L	EPA 8270	08/20 08/20	I

* See Special Instructions Above
** See Sample Remarks Above
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D = Secondary dilution.

UA = Unavailable
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GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL. (907) 562-2343
FAX (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-1
Client Sample ID :BUL-BKGD-SW01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69672
Report Completed :09/15/93
Collected :08/15/93 @ 14:00 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.
CORRECTED RESULT FOR LEAD.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.20		mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.060		mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	88		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Iron	0.95		mg/L	EPA 6010		08/20	08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Magnesium	53		mg/L	EPA 6010		08/20	08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20	08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Sodium	410		mg/L	EPA 6010		08/20	08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841		08/18	08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.058		mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	86		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG

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REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4121-1
Client Sample ID :BUL-BKGD-SW01 BULLEN
Matrix :WATER

Copper	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Iron	0.19		mg/L	EPA 6010		08/20 08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20 08/23	DLG
Magnesium	54		mg/L	EPA 6010		08/20 08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20 08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20 08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Sodium	450		mg/L	EPA 6010		08/20 08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841		08/18 08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20 08/23	DLG
Residue, Non-Filterable	13		mg/L	EPA 160.2		08/24 08/24	GPP
Residue,Filterable(TDS)	1853		mg/L	EPA 160.1	500	08/18 08/19	RJK

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COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREE
ANCHORAGE, AK 9951
TEL: (907) 562-234
FAX: (907) 561-530

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-2
Client Sample ID :BUL-BKGD-SW02 FBI #80-83 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :08/26/93
Collected :08/15/93 @ 11:20 h
Received :08/19/93 @ 18:45 h
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C. 1L WAS RECEIVED BROKEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
VPH & BTEX								
Hydrocarbons VPH	0.020	U	mg/L	EPA 8015M/8020 EPA 5030/8015m		08/23	08/23	KW
Benzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JL
Toluene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JL
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JL
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JL
o-Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JL
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1,1 Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Trichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Chlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Trans12Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1,2 Dichloroethane	0.0052		mg/L	EPA 8010		08/21	08/21	JL
1,1,1 Trichoroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Bromodichloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Trans1,3Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
cis-1,3-Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Bromoform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Chloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Bromoethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Vinyl Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
Chloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
2-Chloroethylvinylether	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JL

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-2
Client Sample ID :BUL-BKGD-SW02 FBI #80-83 BULLEN
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

* See Special Instructions Above
See Sample Remarks Above
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ANCHORAGE, AK 99518
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REPORT of ANALYSIS

Chemlab Ref.# :93.4122-2
Client Sample ID :BUL-BKGD-SW02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69693
Report Completed :09/01/93
Collected :08/15/93 @ 11:20 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/18	08/18	
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloroethane	0.0019		mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
cis-1,2-Dichloroehtene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
transi,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	

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5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-2
Client Sample ID :BUL-BKGD-SW02 BULLEN
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
Napthalene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
n-Propylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
Styrene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
Tetrachloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
Toluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
Trichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
Vinyl Chloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
p+m-Xylene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
o-Xylene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KW
TOC, Nonpurgable				EPA 9060	n/a			
..TOC Range	16.1-18.2		mg/L	EPA 9060			08/31	CMF
...TOC Concentration	17.0		mg/L	EPA 9060			08/31	CMF
Semivolatile Organics				EPA 8270				
Phenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroethyl)ether	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Chlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,3-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,4-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Benzyl Alcohol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,2-Dichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroisopropyl)e	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
n-Nitroso-di-n-Propylam	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Hexachloroethane	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Nitrobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Isophorone	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Nitrophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4-Dimethylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Benzoic Acid	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
bis(2-Chloroethoxy)Meth	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2,4-Dichlorophenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
1,2,4-Trichlorobenzene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Naphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Chloroaniline	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
Hexachlorobutadiene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
4-Chloro-3-Methylphenol	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT
2-Methylnaphthalene	0.01	U	mg/L	EPA 8270		08/20	08/20	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1968

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-2
Client Sample ID :BUL-BKGD-SW02 BULLEN
Matrix :WATER

Hexachlorocyclopentadie	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4,6-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4,5-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Chloronaphthalene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Dimethylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Acenaphthylene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,6-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
3-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Acenaphthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4-Dinitrophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Nitrophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Dibenzofuran	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Diethylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Chlorophenyl-Phenylet	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Fluorene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4,6-Dinitro-2-Methylphe	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
n-Nitrosodiphenylamine	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Bromophenyl-Phenyleth	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Hexachlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	[illegible]
Pentachlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	[illegible]
Phenanthrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
di-n-Butylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Butylbenzylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
3,3-Dichlorobenzidine	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(a)Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Chrysene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
bis(2-Ethylhexyl)Phthal	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
di-n-Octylphthalate	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(b)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(k)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(a)Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Indeno(1,2,3-cd)Pyrene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Dibenz(a,h)Anthracene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzo(g,h,i)Perylene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT

* See Special Instructions Above
** See Sample Remarks Above
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D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Demlab Ref.# :93.4121-2
Client Sample ID :BUL-BKGD-SW02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69672
Report Completed :09/15/93
Collected :08/15/93 @ 11:20 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.
CORRECTED QC QUAL FOR VANADIUM AND ZINC.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	33		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Iron	0.37		mg/L	EPA 6010		08/20	08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Magnesium	10		mg/L	EPA 6010		08/20	08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20	08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Sodium	31		mg/L	EPA 6010		08/20	08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841		08/18	08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Dissolved Metals Analys	---			-				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	33		mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STR
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4121-2
Client Sample ID :BUL-BKGD-SW02 BULLEN
Matrix :WATER

Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Iron	0.18		mg/L	EPA 6010		08/20	08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Magnesium	11		mg/L	EPA 6010		08/20	08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20	08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Sodium	37		mg/L	EPA 6010		08/20	08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841		08/18	08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Residue, Non-Filterable	19		mg/L	EPA 160.2		08/24	08/24	GPP
Residue,Filterable(TDS)	241		mg/L	EPA 160.1	500	08/18	08/19	RJK

* See Special Instructions Above
** See Sample Remarks Above
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LT = Less Than
GT = Greater Than

ANALYTICAL DATA SHEETS FOR QA/QC

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-3
Client Sample ID :BUL-AB01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 11:35 hrs
Received :08/19/93 @ 10:50 hrs
Technical Director: STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Bromoform	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Bromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Chloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Chloroform	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Chloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
transl,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	LCH

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-3
Client Sample ID :BUL-AB01 BULLEN
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
Napthalene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
Styrene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
Toluene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
Trichloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC
o-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	LC

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
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LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 9951
TEL: (907) 562-234
FAX: (907) 561-530

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-4
Client Sample ID :BUL-AB01 BULLEN SPIKE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 11:35 hr
Received :08/19/93 @ 10:50 hr
Technical Director:STEPHEN C. EDE
Released By : Stephen C Ede

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN. 8260: FOR SPIKE AND SPIKE DUPLICATE RECOVERY AND RPD, SEE QC SUMMARY.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics				EPA 8260				
Benzene	0.010		mg/L	EPA 8260		08/21	08/21	KW
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromoform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Chlorobenzene	0.0096		mg/L	EPA 8260		08/21	08/21	KW
Chloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Chloroform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Chloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,1-Dichloroethene	0.0088		mg/L	EPA 8260		08/21	08/21	KW
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
transl,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-4
Client Sample ID :BUL-AB01 BULLEN SPIKE
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Napthalene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Styrene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Toluene	0.010		mg/L	EPA 8260	08/21	08/21	KW
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Trichloroethene	0.0094		mg/L	EPA 8260	08/21	08/21	KW
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
o-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-5
Client Sample ID :BUL-AB01 BULLEN SPIKE DUPLICATE
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 11:35 hrs
Received :08/19/93 @ 10:50 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN. 8260: FOR SPIKE AND SPIKE DUPLICATE RECOVERY AND RPD, SEE QC SUMMARY.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.010		mg/L	EPA 8260		08/21	08/21	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chlorobenzene	0.0096		mg/L	EPA 8260		08/21	08/21	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloroethene	0.011		mg/L	EPA 8260		08/21	08/21	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
transl,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-5
Client Sample ID :BUL-AB01 BULLEN SPIKE DUPLICATE
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
Napthalene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
Styrene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
Toluene	0.0099		mg/L	EPA 8260	08/21 08/21	KWI
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
Trichloroethene	0.0093		mg/L	EPA 8260	08/21 08/21	KWI
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI
o-Xylene	0.0010	U	mg/L	EPA 8260	08/21 08/21	KWI

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-9
Client Sample ID :BUL-EB01 FBI #106-109 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :08/26/93
Collected :08/15/93 @ 17:25 hr
Received :08/19/93 @ 18:45 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C. SAMPLE RECEIVED WITH 1L BROKEN AND 1 VOC BROKEN. AIR BUBBLES IN 2 40ML VIALS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
VPH & BTEX								
Hydrocarbons VPH	0.020	U	mg/L	EPA 8015M/8020 EPA 5030/8015m		08/23	08/23	KWM
Benzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Toluene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
o-Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Halogenated Volatile Or								
Methylene Chloride	0.0070		mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans12Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,2 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,1 Trichoroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromodichloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans1,3Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
cis-1,3-Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Vinyl Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
2-Chloroethylvinylether	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4204-9
Client Sample ID :BUL-EB01 FBI #106-109 BULLEN
Matrix :WATER

1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21 08/21	JL

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4122-7
Client Sample ID :BUL-EB01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69693
Report Completed :09/01/93
Collected :08/15/93 @ 17:25 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloroethane	0.0011		mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
cis-1,2-Dichloroehtene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
transi,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-7
Client Sample ID :BUL-EB01 BULLEN
Matrix :WATER

5633 B STR
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.0057		mg/L	EPA 8260	08/18	08/18	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Styrene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Toluene	0.0024		mg/L	EPA 8260	08/18	08/18	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Semivolatile Organics				EPA 8270			
Phenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
bis(2-Chloroethyl)ether	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Chlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
1,3-Dichlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
1,4-Dichlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzyl Alcohol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
1,2-Dichlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Methylphenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
bis(2-Chloroisopropyl)e	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Methylphenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
n-Nitroso-di-n-Propylam	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Hexachloroethane	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Nitrobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Isophorone	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Nitrophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4-Dimethylphenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Benzoic Acid	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
bis(2-Chloroethoxy)Meth	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4-Dichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
1,2,4-Trichlorobenzene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Naphthalene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Chloroaniline	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Hexachlorobutadiene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
4-Chloro-3-Methylphenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Methylnaphthalene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
Hexachlorocyclopentadie	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4,6-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2,4,5-Trichlorophenol	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT
2-Chloronaphthalene	0.01	U	mg/L	EPA 8270	08/20	08/20	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-7
Client Sample ID :BUL-EB01 BULLEN
Matrix :WATER

VALIDATION QUALIFIER (COMMENT)

5633 B STREE
ANCHORAGE, AK 995
TEL: (907) 562-23
FAX: (907) 561-53

2-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Dimethylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Acenaphthylene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
2,6-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
3-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Acenaphthene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
2,4-Dinitrophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	M
4-Nitrophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Dibenzofuran	0.01	U	mg/L	EPA 8270	08/20 08/20	M
2,4-Dinitrotoluene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Diethylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	M
4-Chlorophenyl-Phenylet	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Fluorene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
4-Nitroaniline	0.01	U	mg/L	EPA 8270	08/20 08/20	M
4,6-Dinitro-2-Methylphe	0.01	U	mg/L	EPA 8270	08/20 08/20	M
n-Nitrosodiphenylamine	0.01	U	mg/L	EPA 8270	08/20 08/20	M
4-Bromophenyl-Phenyleth	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Hexachlorobenzene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Pentachlorophenol	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Phenanthrene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
di-n-Butylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Pyrene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Butylbenzylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	M
3,3-Dichlorobenzidine	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Benzo(a)Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Chrysene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
bis(2-Ethylhexyl)Phthal	0.01	U	mg/L	EPA 8270	08/20 08/20	M
di-n-Octylphthalate	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Benzo(b)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Benzo(k)Fluoranthene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Benzo(a)Pyrene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Indeno(1,2,3-cd)Pyrene	0.01	U J(b)	mg/L	EPA 8270	08/20 08/20	M
Dibenz(a,h)Anthracene	0.01	U	mg/L	EPA 8270	08/20 08/20	M
Benzo(g,h,i)Perylene	0.01	U J(b)	mg/L	EPA 8270	08/20 08/20	M

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS

5633 B STR
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4121-7
Client Sample ID :BUL-EB01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69672
Report Completed :08/26/93
Collected :08/15/93 @ 17:25 hrs.
Received :08/17/93 @ 12:00 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Total Metals Analysis	---			---				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	0.20	U	mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Iron	0.10	U	mg/L	EPC 6010		08/20	08/23	DLG
Lead	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Magnesium	0.20	U	mg/L	EPA 6010		08/20	08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010		08/20	08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Silver	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Sodium	0.34		mg/L	EPA 6010		08/20	08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841		08/18	08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Dissolved Metals Analys	---			---				
ICP Screen, ICF				EPA	n/a			
Aluminum	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Antimony	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Arsenic	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Barium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Beryllium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cadmium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Calcium	0.20	U	mg/L	EPA 6010		08/20	08/23	DLG
Chromium	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG
Cobalt	0.10	U	mg/L	EPA 6010		08/20	08/23	DLG
Copper	0.050	U	mg/L	EPA 6010		08/20	08/23	DLG

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4121-7
Client Sample ID :BUL-EB01 BULLEN
Matrix :WATER

Iron	0.10	U	mg/L	EPC 6010	08/20	08/23	DLG
Lead	0.10	U	mg/L	EPA 6010	08/20	08/23	DLG
Magnesium	0.20	U	mg/L	EPA 6010	08/20	08/23	DLG
Manganese	0.050	U	mg/L	EPA 6010	08/20	08/23	DLG
Molybdenum	0.050	U	mg/L	EPA 6010	08/20	08/23	DLG
Nickel	0.050	U	mg/L	EPA 6010	08/20	08/23	DLG
Potassium	5.0	U	mg/L	EPA 6010	08/20	08/23	DLG
Selenium	0.10	U	mg/L	EPA 6010	08/20	08/23	DLG
Silver	0.050	U	mg/L	EPA 6010	08/20	08/23	DLG
Sodium	0.33		mg/L	EPA 6010	08/20	08/23	DLG
Thallium	0.005	U	mg/L	EPA 7841	08/18	08/25	EMB
Vanadium	0.050	U	mg/L	EPA 6010	08/20	08/23	DLG
Zinc	0.050	U	mg/L	EPA 6010	08/20	08/23	DLG

* See Special Instructions Above
* See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
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COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4205-1
Client Sample ID :BUL-EB02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69804
Report Completed :08/26/93
Collected :08/16/93 @ 10:10 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN. FINAL RESULTS.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Hydrocarbons EPH	0.200	U	mg/L	3510/3550/8100M		08/21	08/22	JBH
VPH & BTEX				EPA 8015M/8020				
Hydrocarbons VPH	0.020	U	mg/L	EPA 5030/8015m		08/23	08/23	WLS

Benzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Toluene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
p&m Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
o-Xylene	0.0010	U	mg/L	EPA 8020		08/23	08/23	WLS
Organochlorine Pest				EPA 8080				
Aldrin	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Alpha-BHC	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Beta-BHC	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Delta-BHC	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Gamma-BHC	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Chlordane	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC
4,4'-DDD	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
4,4'-DDE	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
4,4'-DDT	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Dieldrin	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Endosulfan I	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Endosulfan II	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Endosulfan Sulfate	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Endrin	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Endrin Aldehyde	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Heptachlor	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Heptachlor Epoxide	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Methoxychlor	0.0001	U	mg/L	EPA 8080		08/21	08/23	NRC
Toxaphene	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC
PCB-1016	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC
PCB-1221	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC
PCB-1232	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC
PCB-1242	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC
PCB-1248	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC
PCB-1254	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC
PCB-1260	0.002	U	mg/L	EPA 8080		08/21	08/23	NRC

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4205-1
Client Sample ID :BUL-EB02 BULLEN
Matrix :WATER

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
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NA = Not Analyzed
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GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-1
Client Sample ID :BUL-EB02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 10:10 hr
Received :08/19/93 @ 10:50 hr
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Ini
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromoform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Bromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Chloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Chloroform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Chloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KW

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE. AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-1
Client Sample ID :BUL-EB02 BULLEN
Matrix :WATER

		Qualifier					
Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Napthalene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Styrene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Toluene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Trichloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
o-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KW
Total Metals Analysis	---			-			
ICP Screen, ICF				EPA n/a			
Aluminum	0.10	U	mg/L	EPA 6010	08/23	08/24	DF
Antimony	0.10	U	mg/L	EPA 6010	08/23	08/24	DF
Arsenic	0.10	U	mg/L	EPA 6010	08/23	08/24	DF
Barium	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Beryllium	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Cadmium	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Calcium	0.29		mg/L	EPA 6010	08/23	08/24	DF
Chromium	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Cobalt	0.10	U	mg/L	EPA 6010	08/23	08/24	DF
Copper	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Iron	0.10	U	mg/L	EPA 6010	08/23	08/24	DF
Lead	0.10	U	mg/L	EPA 6010	08/23	08/24	DF
Magnesium	0.20	U	mg/L	EPA 6010	08/23	08/24	DF
Manganese	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Molybdenum	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Nickel	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Potassium	5.0	U	mg/L	EPA 6010	08/23	08/24	DF
Selenium	0.10	U	mg/L	EPA 6010	08/23	08/24	DF
Silver	0.050	U	mg/L	EPA 6010	08/23	08/24	DF
Sodium	0.54	J	mg/L J.5	EPA 6010	08/23	08/24	DF
Thallium	0.0050	U	mg/L	EPA 7841	08/23	08/26	KA
Vanadium	0.050	U	mg/L	EPA 6010	08/23	08/24	KA
Zinc	0.050	U	mg/L	EPA 6010	08/23	08/24	KA

All changes s.c. 2/2/94

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
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COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4180-2
Client Sample ID :BUL-EB02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 10:45 hrs
Received :08/19/93 @ 10:50 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Semivolatile Organics				EPA 8270				
Phenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
bis(2-Chloroethyl)ether	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2-Chlorophenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
1,3-Dichlorobenzene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
1,4-Dichlorobenzene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Benzyl Alcohol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
1,2-Dichlorobenzene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2-Methylphenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
bis(2-Chloroisopropyl)e	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
4-Methylphenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
n-Nitroso-di-n-Propylam	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Hexachloroethane	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Nitrobenzene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Isophorone	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2-Nitrophenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2,4-Dimethylphenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Benzoic Acid	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
bis(2-Chloroethoxy)Meth	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2,4-Dichlorophenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
1,2,4-Trichlorobenzene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Naphthalene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
4-Chloroaniline	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Hexachlorobutadiene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
4-Chloro-3-Methylphenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2-Methylnaphthalene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Hexachlorocyclopentadie	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2,4,6-Trichlorophenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2,4,5-Trichlorophenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2-Chloronaphthalene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2-Nitroaniline	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Dimethylphthalate	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Acenaphthylene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2,6-Dinitrotoluene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
3-Nitroaniline	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
Acenaphthene	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
2,4-Dinitrophenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT
4-Nitrophenol	0.0112	U	mg/L	EPA 8270		08/22	08/24	MTT

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

REPORT of ANALYSIS QA

Chemlab Ref.# :93.4180-2
Client Sample ID :BUL-EB02 BULLEN
Matrix :WATER

VALIDATION QUALIFIER (COMMENT)

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Dibenzofuran	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
2,4-Dinitrotoluene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Diethylphthalate	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
4-Chlorophenyl-Phenylet	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Fluorene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
4-Nitroaniline	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
4,6-Dinitro-2-Methylphe	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
n-Nitrosodiphenylamine	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
4-Bromophenyl-Phenyleth	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Hexachlorobenzene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Pentachlorophenol	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Phenanthrene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Anthracene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
di-n-Butylphthalate	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Fluoranthene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Pyrene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Butylbenzylphthalate	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
3,3-Dichlorobenzidine	0.0112	U J(D)	mg/L	EPA 8270	08/22	08/24	MT
Benzo(a)Anthracene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Chrysene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
bis(2-Ethylhexyl)Phthal	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
di-n-Octylphthalate	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Benzo(b)Fluoranthene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Benzo(k)Fluoranthene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Benzo(a)Pyrene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Indeno(1,2,3-cd)Pyrene	0.0112	U J(D)	mg/L	EPA 8270	08/22	08/24	MT
Dibenz(a,h)Anthracene	0.0112	U	mg/L	EPA 8270	08/22	08/24	MT
Benzo(g,h,i)Perylene	0.0112	U J(D)	mg/L	EPA 8270	08/22	08/24	MT

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL (907) 562-2343
FAX (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-8
Client Sample ID :BUL-TB01 FBI #104-105 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69802
Report Completed :08/26/93
Collected :08/15/93 @ 08:00 hrs
Received :08/19/93 @ 18:45 hrs
Technical Director:STEPHEN C. EDE
Released By : Stephen C. Ede

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Aromatic Volatiles				EPA 8020				
Benzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Toluene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
Chlorobenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
p & m Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
o-Xylene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
1,3 Dichlorobenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	JLB
1,2 Dichlorobenzene	0.0010	U	mg/L	EPA 8020		08/21	08/21	[redacted]
						08/21	08/21	[redacted]
Halogenated Volatile Or				EPA 8010				
Methylene Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Carbontetrachloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1, 2 Dichloropropane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,2 Trichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Dibromochloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Tetrachloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans12Dichloroethylene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,2 Dichloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,1,1 Trichoroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromodichloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Trans1,3Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
cis-1,3-Dichloropropene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoform	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloromethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Bromoethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Vinyl Chloride	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
Chloroethane	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8010		08/21	08/21	JLB
2-Chloroethylvinylether	0.0010	U	mg/L	EPA 8010		08/21	08/21	[redacted]
						08/21	08/21	[redacted]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS

Chemlab Ref.# :93.4204-8
Client Sample ID :BUL-TB01 FBI #104-105 BULLEN
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21 08/21	JI
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8010	08/21 08/21	JI

* See Special Instructions Above
See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4122-8
Client Sample ID :BUL-TB01 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69693
Report Completed :09/01/93
Collected :08/15/93 @ 08:00 hrs
Received :08/17/93 @ 12:00 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.S. SEPPOVEN OF ICF, DAN NOE, AND ROBERT C.C.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/18	08/18	[redacted]
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
cis-1,2-Dichloroehtene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
trans1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/18	08/18	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/18	08/18	[redacted]

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Lab Ref.# :93.4122-8
Client Sample ID :BUL-TB01 BULLEN
Matrix :WATER

Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Styrene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Toluene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	08/18	08/18	KWM

See Special Instructions Above
* See Sample Remarks Above
= detected, Reported value is the practical quantification limit.
= Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

REPORT of ANALYSIS

Chemlab Ref.# :93.4205-7
Client Sample ID :BUL-TB02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

RUSH Order :69804
Report Completed :08/25/93
Collected :08/16/93 @ 08:00 hrs.
Received :08/19/93 @ 18:45 hrs.
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Aromatic Volatiles				EPA 8020				
Benzene	0.0010	U	mg/L	EPA 8020		08/22	08/22	JLB
Toluene	0.0010	U	mg/L	EPA 8020		08/22	08/22	JLB
Ethylbenzene	0.0010	U	mg/L	EPA 8020		08/22	08/22	JLB
Chlorobenzene	0.0010	U	mg/L	EPA 8020		08/22	08/22	JLB
p & m Xylene	0.0010	U	mg/L	EPA 8020		08/22	08/22	JLB
o-Xylene	0.0010	U	mg/L	EPA 8020		08/22	08/22	JLB
1,4 Dichlorobenzene	0.0010	U	mg/L	EPA 8020		08/22	08/22	JLB
1,3 Dichlorobenzene	0.0010	U	mg/L	EPA 8020		08/22	08/22	JLB
1,2 Dichlorobenzene	0.0010	U	mg/L	EPA 8020		08/22	08/22	[illegible]

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.
UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1968

REPORT of ANALYSIS

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Chemlab Ref.# :93.4180-9
Client Sample ID :BUL-TB02 BULLEN
Matrix :WATER

Client Name :ICF KAISER ENGINEERING
Ordered By :RAY MORRIS
Project Name :DEW LINE RI/FS
Project# :41096-412-01
PWSID :UA

WORK Order :69714
Report Completed :09/09/93
Collected :08/16/93 @ 08:00 hrs
Received :08/19/93 @ 10:50 hrs
Technical Director:STEPHEN C. EDE
Released By :

Sample Remarks: SAMPLE COLLECTED BY: S.F. AND S.S. SEPPOVEN.

Parameter	Results	QC Qual	Units	Method	Allowable Limits	Ext. Date	Anal Date	Init
Volatile Organics				EPA 8260				
Benzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromodichloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromoform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Bromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
n-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
sec-Butylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
tert-Butylbenzne	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Carbon Tetrachloride	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloroform	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Chloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
2-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
4-Chlorotoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dibromochloromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
12Dibromo3Chloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dibromoethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dibromomethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,3-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,4-Dichlorobenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Dichlorodifluoromethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichloroethane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
cis-1,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
transi,2-Dichloroethene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,3-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
2,2-Dichloropropane	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
1,1-Dichloropropene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Ethylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Hexachlorobutadiene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
Isopropylbenzene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM
p-Isopropyltoluene	0.0010	U	mg/L	EPA 8260		08/21	08/21	KWM

COMMERCIAL TESTING & ENGINEERING CO.
ENVIRONMENTAL LABORATORY SERVICES
SINCE 1908

REPORT of ANALYSIS SEC

Chemlab Ref.# :93.4180-9
Client Sample ID :BUL-TB02 BULLEN
Matrix :WATER

5633 B STREET
ANCHORAGE, AK 99518
TEL: (907) 562-2343
FAX: (907) 561-5301

Methylene Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Napthalene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
n-Propylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Styrene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1112-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1122-Tetrachloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Tetrachloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Toluene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,2,3-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,2,4-Trichlorobenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,1,1-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,1,2-Trichloroethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Trichloroethene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Trichlorofluoromethane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,2,3-Trichloropropane	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,2,4-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
1,3,5-Trimethylbenzene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
Vinyl Chloride	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
p+m-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM
o-Xylene	0.0010	U	mg/L	EPA 8260	08/21	08/21	KWM

* See Special Instructions Above
** See Sample Remarks Above
U = Undetected, Reported value is the practical quantification limit.
D = Secondary dilution.

UA = Unavailable
NA = Not Analyzed
LT = Less Than
GT = Greater Than

compiled by SAM 09/01/95

ICF ID	BUL-2EB03	BUL-2TB03
F&BI Number	1864	1866
Sample Type	water	water
Date Received	9/5/93	9/5/93
% Dry Weight		
Sequence Date		
Leaded Gas		
JP-4		
Lube Oil		
Diesel		
Spike Level		
Unknown Semi-volat		
Pentacosane		
Sequence Date		
PCB 1221		
PCB 1232		
PCB 1016		
PCB 1242		
PCB 1248		
PCB 1254		
PCB 1260		
Spike Level		
Dibutyl Chlorendate		
Sequence Date		
alpha-BHC		
beta-BHC		
gamma-BHC		
delta-BHC		
Heptachlor		
Aldrin		
Heptachlor Epoxide		
Endosulfan I		
DDE		
Dieldrin		
Endrin		
Endosulfan II		
DDD		
Endrin Aldehyde		
DDT		
Endosulfan Sulfate		
Endrin Ketone		
Methoxy Chlor		
Chlordane		
Dibutyl Chlorendate		
Spike Level		
Vol Sequence	#1&2-09/07/93	#1&2-09/07/93
CCl4	<10	<10
TCA	<10	<10
Benzene	<1	<1
TCE	<10	<10
Toluene	<1	<1
PCE	<10	<10
Ethylbenzene	<1	<1
Xylenes	<2	<2
Gasoline	<50 J	<50 J
Spike level		
BFB	103	104

APPENDIX G

DATA VALIDATION SUMMARIES

ICF KAISER ENGINEERS

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Bullen Point (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Extractable Petroleum Hydrocarbons by USEPA Method 8100M
MATRIX: Water and Soil
DATE: February 1, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received three (3) water samples and seven (7) soil samples for extractable petroleum hydrocarbons (EPH) analyses by modified USEPA Method 8100 on August 15 and 16, 1993. The samples were extracted on August 21, 1993 and analyzed for EPH by gas chromatography with flame ionization detection (GC/FID) on August 21 through 25, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-BKGD-SW01	93.4204-01	Water
BUL-LF06-SW01	93.4204-03	Water
BUL-LF06-SW03	93.4204-05	Water
BUL-AOC12-S02	93.4201-07	Soil
BUL-AOC11-S01	93.4201-09	Soil
BUL-BKGD-S01	93.4202-01	Soil
BUL-BKGD-SD01	93.4202-05	Soil
BUL-LF06-S03	93.4202-10	Soil
BUL-LF06-SD01	93.4202-17	Soil
BUL-LF06-SD02	93.4202-18	Soil

The following QC sample designations were included in project documentation: sample numbers BUL-LF06-SW01, BUL-LF06-SW03 and BUL-LF06-SD01, BUL-LF06-SD02 were designated as "field duplicate pairs."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review." (December 1990), modified USEPA SW-846 Method 8100 and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:
B.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

C. Continuing Calibration:
C.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

D. Laboratory Blanks:
D.1 All target analytes were not detected in the method blank at concentrations above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

E. Surrogate Recoveries:
E.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

F. Field Blanks:
F.1 There was no field blank designation included in project sample analyses.

G. Laboratory Control Sample Analysis:
G.1 Laboratory control sample QC criteria were met for all "blank spike" analyses.

H. Laboratory Replicate Analysis:
H.1 No laboratory replicate control sample is included with the project documentation.

I. Field Duplicate Analysis:
I.1 A QC limit for precision of $\leq$20% for water samples and $\leq$50% for soil samples, as measured by the Relative Percent Difference (RPD) between sample values, was specified for field duplicate comparability.

Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were utilized for the field duplicate analysis for the water samples. The RPD of the water samples is 24%, exceeding the RPD limit. It is opinion of the reviewer that the quality of the data is not affected due to the above noted slight deviation.

Sample numbers BUL-LF06-SD01 and BUL-LF06-SD02 were utilized for field duplicate analysis for the soil samples. The results of the field duplicate analysis for the soil samples met all applicable QC criteria and the results are considered acceptable.

J. Matrix Spike/Matrix Spike Duplicate Analysis:

J.1 The matrix spike (MS) and matrix spike duplicate (MSD) analyses met all QC criteria and results are considered acceptable.

K. Quantitation and Identification:

K.1 The chromatographic pattern of samples BUL-LF06-SW01, BUL-AOC12-S02, BUL-AOC11-S01, BUL-BKGD-SD01, BUL-LF06-SD01, and BUL-LF06-SD02 is not consistent with the chromatographic pattern of middle distillate fuel (diesel fuel). It is the opinion of the reviewer that peaks found in the above noted samples are due to the presence of higher molecular weight hydrocarbons. Therefore, the detected results for EPH in these samples are considered as estimated (J) and are usable for limited purposes (see modified sample data sheets).

K.2 No other problems were observed with analyte quantitation and identification for all project sample analysis.

L. Conclusion:

L.1 Due to the inconsistency of the chromatographic pattern with the diesel fuel standard, select data are considered as estimates and usable for limited purposes only.

L.2 The data for all other samples are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Bullen Point (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Extractable Petroleum Hydrocarbons by USEPA Method 8100M
MATRIX: Water and Soil
DATE: January 31, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received two (2) water samples and four (4) soil samples for extractable petroleum hydrocarbons (EPH) analyses by modified USEPA Method 8100 on August 16, 1993. The samples were extracted on August 20 and 21, 1993 and analyzed for EPH by gas chromatography with flame ionization detection (GC/FID) on August 21 through 24, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-EB02	93.4205-01	Water
BUL-ST05-GW01	93.4205-02	Water
BUL-ST05-S02	93.4200-04	Soil
BUL-ST05-S06	93.4200-10	Soil
BUL-ST05-S13-1.5	93.4200-17	Soil
BUL-ST05-S22	93.4200-28	Soil

The following QC sample designations were included in project documentation: sample number BUL-EB02 was designated as an "equipment blank" and sample numbers BUL-ST05-S02 and BUL-ST05-S22 were designated as a "field duplicate pair."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review." (December 1990), USEPA SW-846 Method 8100M and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:
B.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

C. Continuing Calibration:
C.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

D. Laboratory Blanks:
D.1 All target analytes were not detected in the method blank at concentrations above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

E. Surrogate Recoveries:
E.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

F. Field Blanks:
F.1 The field blank analysis met all applicable QC criteria and the results are considered acceptable.

G. Laboratory Control Sample Analysis:
G.1 Laboratory control sample QC criteria were met for all "blank spike" analyses.

H. Laboratory Replicate Analysis:
H.1 No laboratory replicate control sample is included with the project documentation.

I. Field Duplicate Analysis:
I.1 A QC limit for precision of $\leq$50%, as measured by the Relative Percent Difference (RPD) between sample values, was specified for field duplicate comparability.

Sample numbers BUL-ST05-S02 and BUL-ST05-S22 were utilized for the field duplicate analysis. The results of the field duplicate analysis met all applicable QC criteria and the are considered acceptable.

J. Matrix Spike/Matrix Spike Duplicate Analysis:
J.1 The matrix spike (MS) and matrix spike duplicate (MSD) analyses met all QC criteria and results were considered acceptable.

K. Quantitation and Identification:

K.1 The chromatographic pattern of sample BUL-ST05-S13-1.5 is not consistent with the chromatographic pattern of middle distillate fuel (diesel fuel). It is the opinion of the reviewer that the peaks found in the above noted sample are due to the presence of higher molecular weight hydrocarbons. Therefore, the detected result for EPH in this sample are considered as estimated (J) and are usable for limited purposes (see modified sample data sheets).

K.2 No other problems were observed with analyte quantitation and identification of the project sample analysis.

L. Conclusion:

L.1 Due to the inconsistency of the chromatographic pattern with the diesel fuel standard, select data are considered as estimates and usable for limited purposes only.

L.2 The data for all other samples are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Bullen Point (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Volatile Petroleum Hydrocarbons by USEPA Method 8015
MATRIX: Water and Soil
DATE: February 1, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received two (2) water samples and four (4) soil samples for volatile petroleum hydrocarbon (VPH) analysis by USEPA Method 8015 on August 16, 1993. The samples were analyzed for VPH by gas chromatography with flame ionization detection (GC/FID) on August 22 through 24, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-EB02	93.4205-01	Water
BUL-ST05-GW01	93.4205-02	Water
BUL-ST05-S02	93.4200-04	Soil
BUL-ST05-S06	93.4200-10	Soil
BUL-ST05-S13-1.5	93.4200-17	Soil
BUL-ST05-S22	93.4200-22	Soil

The following QC sample designations were included in the project documentation: sample number BUL-EB02 was designated as an "equipment blank" and sample numbers BUL-ST05-S02 and BUL-ST05-S22 were designated as a "field duplicate pair.

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan for USEPA Method 8015 (VPH analysis). According to the laboratory, all soil samples were extracted in methanol before analysis, as required by State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review." (December 1990), USEPA SW-846 Method 8015, and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:
B.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

C. Continuing Calibration:
C.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

D. Laboratory Blanks:
D.2 The target analyte was not detected in the method blank at concentration above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

E. Surrogate Recoveries:
E.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

F. Field Blanks:
F.1 The field blank met applicable QC criteria and the results are considered acceptable.

G. Laboratory Control Sample Analysis:
G.1 No laboratory control analysis is included with the project documentation.

H. Laboratory Replicate Analysis:
H.1 No laboratory replicate analysis is included with the project documentation.

I. Field Duplicate Analysis:
I.1 A QC limit for precision of $\leq$50%, as measured by the Relative Percent Difference (RPD) between sample values, was specified for field duplicate comparability.

Sample numbers BUL-ST05-S02 and BUL-ST05-S22 were utilized for the field duplicate analysis. The RPD is reported to be 160%, exceeding the QC criteria substantially. The inconsistency of the above RPD results may be due to the soil sample non-homogeneity. Due to the significant magnitude of the above noted deviation, however, the reported sample results for the above noted field duplicate pair are considered estimates (J) and usable for limited purposes only (see modified sample data sheets).

J. Matrix Spike/Matrix Spike Duplicate Analysis:

J.1 The matrix spike (MS) and matrix spike duplicate (MSD) analysis associated with sample numbers BUL-ST05-S02, BUL-ST05-S06, BUL-ST05-S13, and BUL-ST05-S22 did not meet the QC criteria of 60-140%. The recoveries were 49% and 44%, respectively, for volatile petroleum hydrocarbons.

According to USEPA guidelines, organic data are not qualified based on low MS recoveries alone. It is the opinion of the reviewer that the above noted recoveries should not affect data quality.

K. Internal Standards:

K.1 Internal standard areas for all sample analyses were within specified QC criteria and the results are considered acceptable.

L. Quantitation and Identification:

L.1 No problems were observed with sample quantitation and identification in project sample analyses.

M. Conclusion:

M.1 Due to the above noted performance deficiency in field duplicate analyses, select data are considered estimates and usable for limited purposes only.

M.2 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Bullen Point (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Volatile Petroleum Hydrocarbons by USEPA Method 8015
MATRIX: Water and Soil
DATE: January 31, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received four (4) water samples and seven (7) soil samples for volatile petroleum hydrocarbon (VPH) analysis by USEPA Method 8015 on August 15 and 16, 1993. The samples were analyzed for VPH by gas chromatography with flame ionization detection (GC/FID) on August 21 through 23, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-BKGD-SW01	93.4204-01	Water
BUL-LF06-SW01	93.4204-03	Water
BUL-LF06-SW03	93.4204-05	Water
BUL-EB01	93.4204-09	Water
BUL-AOC12-S02	93.4201-07	Soil
BUL-AOC11-S01	93.4201-09	Soil
BUL-BKGD-S01	93.4202-01	Soil
BUL-BKGD-SD01	93.4202-05	Soil
BUL-LF06-S03	93.4202-10	Soil
BUL-LF06-SD01	93.4202-17	Soil
BUL-LF06-SD02	93.4202-18	Soil

The following QC sample designations were included in the project documentation: sample number BUL- EB01 was designated as an "equipment blank"; sample numbers BUL-LF06-SW01, BUL-LF06-SW03 and BUL-LF06-SD01, BUL-LF06-SD02 were designated as "field duplicate pairs."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

It should be noted, that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan for USEPA Method 8015 (VPH analysis). According to the laboratory, all soil samples were extracted in methanol before analysis, as required by State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review." (December 1990), USEPA SW-846 Method 8015, and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:
B.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

C. Continuing Calibration:
C.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

D. Laboratory Blanks:
D.2 The target analyte was not detected in the method blank at concentration above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

E. Surrogate Recoveries:
E.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

F. Field Blanks:
F.1 All QC criteria for the field blank analyses were met and the results are considered acceptable.

G. Laboratory Control Sample Analysis:
G.1 No laboratory control analysis is included with the project documentation.

H. Laboratory Replicate Analysis:
H.1 No laboratory replicate analysis is included with the project documentation.

I. Field Duplicate Analysis:

I.1 A QC limit for precision of $\leq$20% for water samples and $\leq$50% for soil samples, as measured by the Relative Percent Difference (RPD) between sample values, was specified for field duplicate comparability.

Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were utilized for the field duplicate analysis for the water samples. Sample numbers BUL-LF06-SD01 and BUL-LF06-SD02 were utilized for the field duplicate analysis for the soil samples. The results of the field duplicate analysis met all applicable QC criteria and the results are considered acceptable.

J. Matrix Spike/Matrix Spike Duplicate Analysis:

J.1 Sample number BUL-LF06-SW03 was utilized for matrix spike (MS) and matrix spike duplicate (MSD) analysis. All QC criteria were met and results were considered acceptable.

K. Internal Standards:

K.1 Internal standard areas for all sample analyses were within specified QC criteria and the results are considered acceptable.

L. Quantitation and Identification:

L.1 No problems were observed with sample quantitation and identification in project sample analyses.

M. Conclusion:

M.1 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Bullen Point RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Keith Strout
ANALYSIS: Volatile Organic Compounds by USEPA Method 8260
MATRIX: Water & Soil
DATE: December 13, 1993 (revised May 9, 1994)

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received eight (8) water samples and nine (9) soil samples for Volatile Organic Compound (VOC) analysis by USEPA Method 8260 on August 17, 1993 through August 19,1993. The samples were analyzed for VOCs on August 18, 1993, through September 1, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-LF06-SW01	93.4122-03	Water
BUL-LF06-SW03	93.4122-04	Water
BUL-BKGD-SW01	93.4122-01	Water
BUL-TB01	93.4122-08	Water
BUL-EB01	93.4122-07	Water
BUL-ST05-GW01	93.4180-06	Water
BUL-TB02	93.4180-09	Water
BUL-EB02	93.4180-01	Water
BUL-LF06-SD01	93.4123-09	Soil
BUL-LF06-S02	93.4123-08	Soil
BUL-BKGD-SD01	93.4123-07	Soil
BUL-BKGD-S01	93.4123-01	Soil
BUL-ST05-S02	93.4177-01	Soil
BUL-ST05-S06	93.4177-02	Soil
BUL-ST05-S13	93.4177-03	Soil
BUL-A0C11-S01	93.4177-06	Soil
BUL-A0C12-S02	93.4177-05	Soil

The following QC sample designations were included in project documentation: sample numbers BUL-EB01 and BUL-EB02 were designated as "equipment blanks;" sample numbers BUL-TB01 and BUL-TB02 were designated as "trip blanks;" and sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were designated as a "field duplicate pair."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

It should be noted, that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan for USEPA 8260. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document "National Functional Guidelines for Organic Data Review", December, 1990 and USEPA Method 8260 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 Samples BUL-ST05-S02, BUL-ST05-S06, BUL-ST05-S13, BUL-AC011-S01, and BUL-A0C12-S02 were collected on August 16, 1993. Samples BUL-ST05-S02 and BUL-ST05-S13 were analyzed on August 31, 1993, exceeding the technical holding time QC criteria by 1 day. Samples BUL-ST05-S06, BUL-A0C11-S01, and BUL-A0C12-S02 were analyzed on September 1, 1993, exceeding the technical holding time QC criteria by 2 days. Therefore, the detected results and the practical quantitation limits for the samples noted above are qualified as estimated (J) and are considered usable for limited purposes.

A.2 The technical holding time QC criteria were met for all other project samples.

B. Instrument Tuning:

B.1 The GC/MS instrument tuning criteria were met for all project sample analyses.

C. Initial Calibration:

C.1 Initial calibration QC criteria were met for all project sample analyses.

D. Continuing Calibration:

D.1 Continuing calibration QC criteria were met for all project sample analyses.

E. Laboratory Blanks:

E.1 Volatile organic compounds were not detected in the method blanks at a concentration above the practical quantitation limit (PQL) and the results of the method blank analyses are considered acceptable.

F. Field Blanks:

F.1 Methylene chloride was detected in equipment blank BUL-EB01 at a concentration of 0.0057 mg/L. Methylene chloride was not detected in the laboratory blanks, the travel blanks, or any of the associated field samples. Therefore, qualification of the results is not necessary.

G. Laboratory Control Sample Analyses:

G.1 Laboratory control sample (LCS) analyses submitted with project data met all applicable QC criteria for accuracy.

H. Field Duplicate Analysis:

H.1 Samples BUL-LF06-SW01 and BUL-LF06-SW03 are identified as field duplicates in the project documentation. The results of the analyses met all of the QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

I. Surrogate Recoveries:

I.1 The surrogate recovery of bromofluorobenzene in samples BUL-A0C12-S02 and BUL-A0C11-S01 was 77% and 78%, respectively, which is slightly lower than the project QC criteria of 80-120 %. These samples were not re-analyzed by the laboratory. This is probably due to the high levels of hydrocarbons detected in the samples and is not expected to have an adverse effect on the data.

I.2 All other surrogate QC criteria were met for project VOC analyses.

J. Matrix Spike/Matrix Spike Duplicate Analyses:

J.1 The recovery of 1,1-dichloroethane in the matrix spike and matrix spike duplicate analyses associated with samples BUL-ST05-S02, BUL-ST05-S06, BUL-ST05-S13, BUL-A0C11-S01, BUL-A0C12-S02, BUL-LF06-SD01, BUL-LF06-S02, BUL-BKGD-SD01, and BUL-BKGD-S01 exceeded the QC criteria. This is probably due to a matrix effect and is not expected to have an adverse effect on the detected amount of 1,1-dichloroethane in the project samples.

J.2 The matrix spike and matrix spike duplicate analyses associated with all other samples met all applicable QC criteria and are considered acceptable.

K. System Performance:

K.1 No problems with system performance were observed for project VOC analyses.

L. Quantitation & Identification:

L.1 Sample number BUL-AOC11-S01 was analyzed for volatile organic compounds by USEPA methods 8260 and 8020. Toluene was detected in both the 8260 and 8020 analyses at 0.108 mg/Kg and 0.533 mg/Kg, respectively. Due to the large RPD of 136% between the above noted toluene results, toluene is considered estimated (J) and usable for limited purposes only (see modified sample data sheets). It is the opinion of the reviewer that the differences between the detected toluene results may be due to coeluting interferences from other organic compounds or sample non-homogeneity.

L.2 Toluene was not reported by the laboratory in sample number BUL-AOC11-S01 when analyzed by USEPA method 8260 because the detected result was below the PQL. Although the toluene detected by method 8260 confirms the toluene result analyzed by method 8020, it is considered estimated (J) (see modified sample data sheets). Results below the PQL are considered to be qualitatively acceptable, but quantitatively unreliable to the uncertainty in analytical precision near the limit of detection.

M. Conclusion:

M.1 Due to a large RPD between sample results and sample quantitation and deficiencies in technical holding time, select data are qualified as estimated and are considered usable for limited purposes.

M.2 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Bullen Point(ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEW: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Aromatic Volatile Organic Compounds USEPA Method 8020
MATRIX: Water and Soil
DATE: February 1, 1994 (revised March 4,1994)

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received two (2) water samples and four (4) soil samples for aromatic volatile organic compound analyses by USEPA Method 8020 on August 16, 1993. The samples were analyzed for aromatic volatile organics by gas chromatography with photo-ionization detection (GC/PID) on August 22 through 24, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-EB02	93.4205-01	Water
BUL-ST05-GW01	93.4205-02	Water
BUL-ST05-S02	93.4200-04	Soil
BUL-ST05-S06	93.4200-10	Soil
BUL-ST05-S13-1.5	93.4200-17	Soil
BUL-ST05-S22	93.4200-28	Soil

The following QC sample designations were included in project sample documentation: sample number BUL-EB02 was designated as an "equipment blank" and sample numbers BUL-ST05-S02 and BUL-ST05-S22 were designated as a "field duplicate pair."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan for USEPA Method 8020. According to the laboratory, all soil samples were extracted in methanol before analysis as required by State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA SW-846 Method 8020. and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:
B.1 All QC criteria for the initial calibration were met and the results were considered acceptable.

C. Continuing Calibration:
C.1 All QC criteria for the continuing calibration were met and the results were considered acceptable.

D. Laboratory Blanks:
D.1 No target analytes were detected in the method blank at concentration above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

E. Surrogate Recoveries:
E.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

F. Field Blanks:
F.1 The field blank analysis met all applicable QC criteria and the results are considered acceptable.

G. Laboratory Control Sample Analysis:
G.1 The laboratory control sample QC criteria were met for all "blank spike" analyses.

H. Laboratory Replicate Analysis:
H.1 No laboratory replicate analysis was included with the project documentation.

I. Field Duplicate Analysis:

I.1 A QC limit for precision of ≤50%, as measured by the Relative Percent Difference (RPD) between sample values, was specified for field duplicate comparability.

Sample numbers BUL-ST05-S02 and BUL-ST05-S22 were utilized for field duplicate analysis. The results of the field duplicate analysis did not meet all applicable QC criteria. as noted below.

Compound	BUL-ST05-S02 Sample Result	BUL-ST05-S22 Sample Result	RPD
Toluene	0.026	below detection	100%
Ethylbenzene	0.356	0.096	115%
P&M Xylene	0.511	0.139	114%
O Xylene	1.10	0.264	132%

The reported RPD exceeds the QC criteria substantially. The inconsistency of the above RPD result may be due to the soil sample non-homogeneity. Due to the significant magnitude of the above noted deviation. the reported sample results for the above noted field duplicate pair are considered estimates (J) and usable for limited purposes only.

J. Matrix Spike/Matrix Spike Duplicate Analysis:

J.1 The matrix spike (MS) and matrix spike duplicate (MSD) analysis associated with sample numbers BUL-ST05-S02, BUL-ST05-S06. BUL-ST05-S13-1.5, and BUL-ST05-S22 did not meet all applicable QC criteria. as noted below.

Compound	MS recovery	MSD recovery	QC Limits
Ethylbenzene	4%	0%	80-120%
O Xylene	0%	0%	80-120%

According the USEPA guidelines. organic data are not qualified based on low MS and MSD recoveries alone. It is the opinion of the reviewer that the low recoveries are due to matrix interference and the affect on the quality of the data is not known.

J.2 All other MS and MSD analysis met all QC criteria and results are considered acceptable.

K. Internal Standards:

K.1 Internal standard areas for all sample analyses were within specified QC criteria and the results are considered acceptable.

L. Quantitation and Identification:

L.1 Due to analyte identification problems, the following analytes are considered to be presumptively present (N) and the detected results are usable for limited purposes only (see modified sample data sheets):

- benzene in sample number BUL-ST05-S13-1.5
- toluene in sample numbers BUL-ST05-S06, BUL-ST05-S13-1.5, and BUL-ST05-GW01
- ethylbenzene in sample numbers BUL-ST05-S13-1.5, BUL-ST05-S22, and BUL-ST05-GW01
- p&m-xylene in sample numbers BUL-ST05-S06, BUL-ST05-S13-1.5, BUL-ST05-S22, and BUL-ST05-GW01
- o-xyleme in sample numbers BUL-ST05-S06, BUL-ST05-S13-1.5, BUL-ST05-S22, and BUL-ST05-GW01

L.2 No other problems were observed with analyte quantitation and identification in project sample analyses.

M. Conclusion:

M.1 Due to the lack of confirmation, select data are considered to be tentatively identified and qualitatively questionable.

M.2 Due to the above noted performance deficiency in field duplicate analyses, select data are considered estimates and usable for limited purposes only.

M.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Bullen Point (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEW: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Aromatic Volatile Organic Compounds USEPA Method 8020
MATRIX: Water and Soil
DATE: February 1, 1994 (revised May 9, 1994)

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received five (5) water samples and seven (7) soil samples for aromatic volatile organic compound analyses by USEPA Method 8020 on August 15 and 16, 1993. The samples were analyzed for aromatic volatile organics by gas chromatography with photo-ionization detection (GC/PID) on August 21 through 23, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-BKGD-SW01	93.4204-01	Water
BUL-LF06-SW01	93.4204-03	Water
BUL-LF06-SW03	93.4204-05	Water
BUL-TB01	93.4204-08	Water
BUL-EB01	93.4204-09	Water
BUL-AOC12-S02	93.4201-07	Soil
BUL-AOC11-S01	93.4201-09	Soil
BUL-BKGD-S01	93.4202-01	Soil
BUL-BKGD-SD01	93.4202-05	Soil
BUL-LF06-S03	93.4202-10	Soil
BUL-LF06-SD01	93.4202-17	Soil
BUL-LF06-SD02	93.4202-18	Soil

The following QC sample designations were included in project sample documentation: sample number BUL-EB01 was designated as an "equipment blank"; sample number BUL-TB01 was included in the project documentation as a "trip blank"; sample numbers BUL-LF06-SW01, BUL-LF06-SW03, and BUL-LF06-SD01, BUL-LF06-SD02 were designated as "field duplicate pairs."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

It should be noted, that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan for USEPA Method 8020. According to the laboratory, all soil samples were extracted in methanol before analysis. as required by State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA SW-846 Method 8020 and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:
B.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

C. Continuing Calibration:
C.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

D. Laboratory Blanks:
D.1 No target analytes were detected in the method blank at concentration above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

E. Surrogate Recoveries:
E.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

F. Field Blanks:
F.1 Target analyte toluene was detected in the equipment blank BTR-EB01 at a concentration of 0.0020 mg/L. This compound was not detected in the laboratory blank or in the associated samples, therefore no data are qualified due to field blank contamination.

F.2 All other QC criteria were met for field blank analyses and the results are considered acceptable.

G. Laboratory Control Sample Analysis:
G.1 The laboratory control sample QC criteria were met for all "blank spike" analyses and the results are considered acceptable.

H. Laboratory Replicate Analysis:
H.1 No laboratory replicate analysis was included with the project documentation.

I. Field Duplicate Analysis:

I.1 A QC limit for precision of $\leq$20% for water samples and $\leq$50% for soil samples, as measured by the Relative Percent Difference (RPD) between sample values, was specified for field duplicate comparability.

Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were utilized for field duplicate analysis for the water samples. Sample numbers BUL-LF06-SD01 and BUL-LF06-SD02 were utilized for field duplicate analysis for the soil samples. The results of the field duplicate analysis met all applicable QC criteria and the results are considered acceptable.

J. Matrix Spike/Matrix Spike Duplicate Analysis:

J.1 The matrix spike (MS) and matrix spike duplicate (MSD) analysis met all QC criteria and results are considered acceptable.

K. Internal Standards:

K.1 Internal standard areas for all sample analyses were within specified QC criteria and the results are considered acceptable.

L. Quantitation and Identification:

L.1 Sample number BUL-AOC11-S01 was analyzed for volatile organic compounds by USEPA methods 8020 and 8260. Toluene was detected in both the 8020 and 8260 analyses at 0.533 mg/Kg and 0.108 mg/Kg, respectively. Due to the large RPD of 136% between the above noted toluene results. toluene is considered to be estimated (J) and the detected results are usable for limited purposes only (see modified sample data sheets). It is the opinion of the reviewer that the differences between the detected toluene results may be due to coeluting interferences from other organic compounds or sample non-homogeneity.

L.2 No problems were observed with analyte quantitation and identification for all other project sample analyses.

M. Conclusion:

M.1 Due to a large RPD between sample results, select data are considered estimated and usable for limited purposes only.

M.2 All other sample results are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Bullen Point (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Halogenated Volatile Organic Compounds by USEPA Method 8010
MATRIX: Water and Soil
DATE: February 1, 1994 (revised May 5, 1994)

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received five (5) water samples and six (6) soil samples for halogenated volatile organic compounds analyses by USEPA Method 8010 on August 15 and 16, 1993. The samples were analyzed for halogenated volatile organic compounds by gas chromatography with halogenic-specific detection (GC/HSD) on August 21, 22, and 25, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-BKGD-SW01	93.4204-01	Water
BUL-LF06-SW01	93.4204-03	Water
BUL-LF06-SW03	93.4204-05	Water
BUL-TB01	93.4204-08	Water
BUL-EB01	93.4204-09	Water
BUL-AOC12-S02	93.4201-07	Soil
BUL-BKGD-S01	93.4202-01	Soil
BUL-BKGD-SD01	93.4202-05	Soil
BUL-LF06-S03	93.4202-10	Soil
BUL-LF06-SD01	93.4202-17	Soil
BUL-LF06-SD02	93.4202-18	Soil

The following QC sample designations were included in the project documentation: sample number BUL-EB01 was designated as an "equipment blank"; sample number BUL-TB01 was designated as a "trip blank"; and sample numbers BUL-LF06-SW01, BUL-LF06-SW03, and BUL-LF06-SD01, BUL-LF06-SD02 were designated as "field duplicate pairs."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

It should be noted, that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan for USEPA Method 8010. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA SW-846 Method 8010, and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 No target analytes were detected in the method blank at concentration above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

E. Surrogate Recoveries:

E.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

F. Field Blanks:

F.1 Methylene chloride was detected in the equipment blank BUL-EB01 at 0.0070 mg/L. Due to the field blank contamination, the result reported for methylene chloride in sample number BUL-LF06-SW03 is considered non-detected (U) (see sample data sheets).

F.2 All QC criteria for the trip blank analyses were met and the results are considered acceptable.

G. Laboratory Control Sample Analysis:

G.1 The laboratory control sample QC criteria were met for all "blank spike" analyses and the results are considered acceptable.

H. Laboratory Replicate Analysis:

H.1 No laboratory replicate analysis was included with the project documentation.

I. Field Duplicate Analysis:

I.1 A QC limit for precision of ≤20% for water samples and ≤50% for soil samples, as measured by the Relative Percent Difference (RPD) between sample values, was specified for field duplicate comparability.

Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were utilized for the field duplicate analysis for the water samples. Sample numbers BUL-LF06-SD01 and BUL-LF06-SD02 were utilized for the field duplicate analysis for the soil samples. All applicable QC criteria for the field duplicate analyses were met and the results are considered acceptable.

J. Matrix Spike/Matrix Spike Duplicate Analysis:

J.1 The recoveries of 1,1-dichloroethene and trichloroethene in the matrix (MS) and matrix spike duplicate (MSD) analyses associated with sample numbers BUL-BKGD-S01, BUL-BKGD-SD01, BUL-LF06-S03, and BUL-LF06-SD01 did not meet the laboratory established QC limits as noted below.

Sample No.	Compound	%Recovery	QC Limits
BUL-LF06-S01 MS	1,1-Dichloroethene	10%	80-120%
BUL-LF06-S01 MSD	1,1-Dichloroethene	11%	80-120%
BUL-LF06-S01 MS	Trichloroethene	46%	80-120%
BUL-LF06-S01 MSD	Trichloroethene	44%	80-120%

The laboratory control sample analysis met all QC criteria while the above noted low MS and MSD recoveries did not, therefore, it is the reviewer's opinion that the above noted low MS and MSD recoveries were due to matrix interferences and the affect on the quality of the data is not known.

J.2 All other MS and MSD analysis met all QC criteria and results were considered acceptable.

K. Internal Standards:

K.1 Internal standard areas for all sample analyses were within specified QC criteria and the results are considered acceptable.

L. Quantitation and Identification:

L.2 No problems were observed with analyte quantitation and identification for all project sample analyses.

M. Conclusion:

M.1 Due to field blank contamination, select data are considered non-detected.

M.2 All other sample results are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Bullen Point RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Keith Strout
ANALYSIS: Semi-Volatile Organic Compounds by USEPA Method 8270
MATRIX: Water & Soil
DATE: January 24, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received six (6) water samples and nine (9) soil samples for Semi-Volatile Organic Compound (SVOC) analysis by USEPA Method 8270 on August 17 and 19, 1993. The samples were extracted on August 20 through 31, 1993 and analyzed for SVOCs by gas chromatography/mass spectrometry (GC/MS) on August 20, 1993, through September 16, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-LF06-SW01	93.4122-03	Water
BUL-LF06-SW03	93.4122-04	Water
BUL-BKGD-SW01	93.4222-01	Water
BUL-EB01	93.4222-07	Water
BUL-ST05-GW01	93.4180-06	Water
BUL-EB02	93.4180-02	Water
BUL-LF06-SD01	93.4123-09	Soil
BUL-LF06-S02	93.4123-08	Soil
BUL-BKGD-SD01	93.4123-07	Soil
BUL-BKGD-S01	93.4123-01	Soil
BUL-ST05-S02	93.4177-01	Soil
BUL-ST05-S06	93.4177-02	Soil
BUL-ST05-S13	93.4177-03	Soil
BUL-A0C11-S01	93.4177-06	Soil
BUL-A0C12-S02	93.4177-05	Soil

The following QC sample designations were included in project documentation: sample numbers BUL-EB01 and BUL-EB02 were designated as "equipment blanks."

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8270 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 Sample BUL-LF06-SD01 was collected on August 15, 1993 and extracted on August 31, 1993, exceeding the technical holding time QC criteria by 2 days. It is the opinion of the reviewer that this will not have an adverse effect on the quality of the data.

A.2 The technical holding time QC criteria were met for all other project sample analyses.

B. GC/MS Instrument Performance Check:

B.1 All QC criteria for the decafluorotriphenylphosphine (DFTPP) tunes were met and the results are considered acceptable.

C. Initial Calibration:

C.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

D. Continuing Calibration:

D.1 The percent differences (%Ds) in the continuing calibrations exceeded the $\leq \pm$ 25% QC validation criteria. The detected results and quantitation limits for the analytes listed on Table A are considered estimated (J) and usable for limited purposes only (see modified sample data sheets and Table A).

%Ds exceeding the $\leq \pm$ 25% QC validation criteria were observed for several analytes in the continuing calibrations performed on August 20 and 24, 1993. These deviations are not expected to affect the quality of the results, except for those listed on Table A.

E. Laboratory Blanks:

E.1 No target analytes were detected in the method blanks at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

F. Field Blanks:

F.1 No target analytes were detected in the equipment blanks at a concentration above the PQL and the results are considered acceptable.

G. Laboratory Control Sample Analysis:

G.1 Laboratory control sample QC criteria were met for all "blank spike" analyses and the results are considered acceptable.

H. Laboratory Replicate Analysis:

H.1 No laboratory replicate analysis in included in the project documentation.

I. Field Duplicate Analysis:

I.1 A QC limit for precision of $\leq$ 20%, as measured by the Relative Percent Difference (RPD) between sample values, was specified for field duplicate comparability.

Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were utilized for the field duplicate analysis. The results of the field duplicate analysis met all applicable QC criteria and the results are considered acceptable.

J. Surrogate Recoveries:

J.1 The surrogate recoveries for 2-fluorophenol and phenol-d5 in sample number BUL-A0C11-S01 were 286% and 138%, respectively, which exceeds the acceptable QC criteria. The sample was not re-extracted by the laboratory. These high surrogate recoveries are probably due to a matrix effect since there was a high level of hydrocarbons in the sample. This is not expected to have an adverse effect on the data since there were no acid target analytes detected in the sample.

J.2 The surrogate recovery in sample BUL-ST05-GW01 could not be determined because the sample required dilution due to the high level of hydrocarbons in the sample. The detected results and the PQLs for this sample are qualified as estimated (J) and are considered usable for limited purposes.

J.3 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

K. Matrix Spike/Matrix Spike Duplicate Analyses:

K.1 The Relative Percent Differences (RPD) in the matrix spike and matrix spike duplicate analyses associated with samples BUL-ST05-S02, BUL-ST05-S06, BUL-ST05-S13, BUL-A0C11-S01, BUL-A0C12-S02, BUL-LF06-S03, BUL-BKGD-SD01, and BUL-BKGD-S01 exceeded the acceptable QC criteria as noted below.

Compound	RPD	QC Criteria
phenol	66%	35%
2-chlorophenol	72%	50%
1,4-dichlorobenzene	75%	27%
n-nitroso-di-n-propylamine	68%	38%
1,2,4-trichlorobenzene	70%	23%
4-chloro-3-methylphenol	72%	33%
acenaphthene	67%	19%
4-nitrophenol	83%	50%
2,4-dinitrotoluene	74%	47%
pentachlorophenol	78%	47%
pyrene	70%	36%

According to USEPA guidelines, organic data are not qualified based on high RPD results alone. It is the opinion of the reviewer that the affect on the quality of the data is not known.

L. Internal Standards:

L.1 Internal Standard areas for all analyses met applicable QC criteria and the results are considered acceptable.

M. Quantitation & Identification:

M.1 No problems were observed with analyte quantitation and identification in project sample analyses.

N. Conclusion:

N.1 Due to the above noted deficiencies in continuing calibration performance, select data are considered as estimates and usable for limited purposes only.

N.2 Due to the fact that the surrogate recoveries could not be determined in sample BUL-ST05-GW01 because of dilution, the detected results and the PQLs for this sample are considered as estimates and usable for limited purposes.

N.3 All other data are considered valid and usable for all purposes.

TABLE A
CALIBRATIONS OUTSIDE %D CRITERIA

Date	Compound	%D	Samples
Continuing Calibration - August 20, 1993	benzo(g,h,i)perylene indeno(1,2,3-cd)pyrene	60.2 50.0	BUL-BKGD-SW01 BUL-LF06-SW01 BUL-LF06-SW03 BUL-EB01
Continuing Calibration - August 24, 1993	3,3'-dichlorobenzidine benzo(g,h,i)perylene indeno(1,2,3-cd)pyrene	35.8 46.0 49.1	BUL-EB02 BUL-ST05-GW01

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS/Bullen Point (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Pesticides and Polychlorinated Biphenyls (PCB) by USEPA Method 8080
MATRIX: Water and Soil
DATE: February 1, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received four (4) water samples and six (6) soil samples for pesticide and PCB analyses by USEPA Method 8080 on August 15 and 16, 1993. The samples were extracted on August 21, 1993 and analyzed for pesticides and PCBs by gas chromatography with electron capture detection (GC/ECD) on August 22 through 25, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-BKGD-SW01	93.4204-01	Water
BUL-LF06-SW01	93.4204-03	Water
BUL-LF06-SW03	93.4204-05	Water
BUL-EB01	93.4204-09	Water
BUL-BKGD-S01	93.4204-01	Soil
BUL-BKGD-SD01	93.4204-05	Soil
BUL-LF06-S03	93.4204-10	Soil
BUL-LF06-SD01	93.4204-17	Soil
BUL-LF06-SD02	93.4204-18	Soil
BUL-ST05-S13-1.5	93.4200-17	Soil

The following QC sample designation was not included in project documentation: sample number BUL-EB01 was designated as an "equipment blank"; and sample numbers BUL-LF06-SW01, BUL-LF06-SW03, BUL-LF06-SD01, and BUL-LF06-SD02 were designated as "field duplicate pairs." Sample number BUL-EB01 was not analyzed by the laboratory due to insufficient sample. According to the chain-of-custody documentation, the sample containers arrived to the laboratory broken. Therefore, this sample was not validated.

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared in accordance with USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), the standard operating procedure, "Guidelines for Validation of Pesticide/PCB Data Packages", December 1992, USEPA SW-846 Method 8080 and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project sample analysis.

B. GC Instrument Performance Check:

B.1 All QC criteria were met and the results are considered acceptable.

C. Initial Calibration:

C.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

D. Continuing Calibration:

D.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

E. Laboratory Blanks:

E.1 No target analytes were detected in the method blank at concentrations above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

F. Surrogate Recoveries:

F.1 The following surrogate recoveries did not meet the advisory QC limits:

Sample Number	Surrogate Compound	% Recovery	QC Limits
BUL-BKGD-SW01	Tetrachloro-m-xylene	61%	70-130%
BUL-LF06-SW01	Tetrachloro-m-xylene	54%	70-130%
BUL-LF06-SW03	Tetrachloro-m-xylene	65%	70-130%

Since the surrogate recoveries for the above noted samples marginally fell below established QC limits, data were not qualified and the results are considered acceptable.

F.2 All other surrogate recoveries met applicable QC criteria and the results are considered acceptable.

G. Field Blanks:

G.1 Although, sample number BUL-EB01 is designated as an "equipment blank", it was not analyzed due to insufficient sample.

H. Laboratory Control Sample Analysis:

H.1 Laboratory control sample QC criteria were met for all "blank spike" analyses.

I. Laboratory Replicate Analysis:

I.1 Laboratory replicate control sample QC criteria were met for all "blank spike duplicate" analysis.

J. Field Duplicate Analysis:

J.1 A QC limit of $\leq$20% for water samples and $\leq$50% for soil samples, as measured by the Relative Percent Difference (RPD) between values, was specified for field duplicate comparability.

Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were utilized for the field duplicate analysis for the water samples. Samples numbers BUL-LF06-SD01 and BUL-LF06-SD02 were utilized for the field duplicate analysis for the soil samples. The results of the field duplicate analysis met all applicable QC criteria and are considered acceptable.

K. Matrix Spike/Matrix Spike Duplicate Analysis:

K.1 The matrix spike (MS) and matrix spike duplicate (MSD) analyses associated with sample BUL-ST05-S13 did not meet the QC criteria as noted below.

Compound	MS Recovery	MSD Recovery	QC Limits
Alpha BHC	59%	58%	70-130%
Gamma BHC	24%	24%	70-130%
Beta BHC	35%	35%	70-130%
Heptachlor	11%	11%	70-130%
Endrin	33%	34%	70-130%
DDD	66%	70%	70-130%
DDT	7%	34%	70-130%
Endosulfan sulfate	53%	55%	70-130%
Methoxychlor	0%	0%	70-130%

According to USEPA guidelines, organic data are not qualified based on low MS and MSD recoveries alone. It is opinion of the reviewer that the low MS/MSD recoveries are due to matrix interferences and the affect on the quality of the data is not known.

K.2 All other matrix spike (MS) and matrix spike duplicate (MSD) analyses met all QC criteria and results were considered acceptable.

L. Quantitation and Identification:

L.1 No problems were observed with analyte quantitation and identification in sample analysis.

M. Conclusion:

M.1 The data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Cynthia Schlag, ICF Kaiser Engineers
ANALYSIS: Polychlorinated Biphenyls (PCB) by USEPA Method 8080
MATRIX: Soil
DATE: January 25, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (Anchorage, AK) received one (1) soil sample for PCB analyses by USEPA Method 8080 on August 16, 1993. The sample was extracted on August 20, 1993 and analyzed for PCBs by gas chromatography with electron capture detection (GC/ECD) on August 22, 1993.

The ICF site identification numbers and corresponding Commercial Testing & Engineering Co. sample identification numbers are listed below.

ICF Site No.	Lab Sample No.
BUL-AOC12-S02	93.4201-07

No QC sample designation was included in project documentation.

Soil sample results and quantitation limits were reported by the laboratory with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets included in the report appendix. Definitions of data qualifiers are provided in Table 1B. This report was prepared according to the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA SW-846 Method 8080 and the Project Sampling and Analysis Plan.

II. VALIDITY and COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project sample analysis.

B. GC Instrument Performance Check:
B.1 All QC criteria were met and the results are considered acceptable.

C. Initial Calibration:
C.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

D. Continuing Calibration:
D.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

E. Laboratory Blanks:
E.1 No target analytes were detected in the method blank at concentrations above the Practical Quantitation Limits (PQL) and the results are considered acceptable.

F. Surrogate Recoveries:
F.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

G. Field Blanks:
G.1 No field blank analysis is included in project documentation.

H. Laboratory Control Sample Analysis:
H.1 Laboratory control sample QC criteria were met for all "blank spike" analyses.

I. Laboratory Replicate Analysis:
I.1 Laboratory replicate control sample QC criteria were met for all "blank spike duplicate" analysis.

J. Field Duplicate Analysis:
J.1 No field duplicate analysis is included in project documentation.

K. Matrix Spike/Matrix Spike Duplicate Analysis:
K.1 All matrix spike (MS) and matrix spike duplicate (MSD) analyses met all QC criteria and results were considered acceptable.

L. Quantitation and Identification:
L.1 No problems were observed with analyte quantitation and identification in sample analysis.

M. Conclusion:
M.1 The data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Bullen Point RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Keith Strout, ICF Kaiser Engineers
ANALYSIS: Total Organic Carbon by USEPA Method 9060
MATRIX: Water
DATE: January 25, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received four (4) water samples for Total Organic Carbon (TOC) analysis by EPA Method 9060 on August 17 and 19, 1993. The samples were analyzed for TOC on August 25 and 30, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.
BUL-LF06-SW01	93.4122-03
BUL-LF06-SW03	93.4122-04
BUL-BKGD-SW01	93.4122-01
BUL-ST05-GW01	93.4180-06

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 9060 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project samples.

B. Initial Calibrations:

B.1 All QC criteria for the initial calibration were met and the results are considered acceptable.

C. Continuing Calibrations:

C.1 All QC criteria for the continuing calibration were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 The target analyte was not detected in the method blanks at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

E. Field Blanks:

E.1 No field blank analyses were included in the project documentation.

F. Laboratory Control Sample Analysis:

F.1 The laboratory control sample QC criteria were met for all "blank spike" analyses and the results are considered acceptable.

G. Laboratory Replicate Analysis:

G.1 A QC limit for precision of $\leq$ 20%, as measured by the Relative Percent Difference (RPD) between sample values, was specified for laboratory replicate comparability. The results of the laboratory replicate analysis met all applicable QC criteria and the results are considered acceptable.

H. Field Duplicate Analysis:

H.1 A QC limit for precision of $\leq$ 20%, as measured by the RPD between values, was specified for field duplicate comparability.

Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were utilized for the field duplicate analysis. The results of the field duplicate analysis met all applicable QC criteria and the results are considered acceptable.

I. Matrix Spike:

I.1 The matrix spike (MS) recovery met all applicable QC criteria and the results are considered acceptable.

J. Quantitation:

J.1 No problems were observed with analyte quantitation in project sample analysis.

K. Conclusion:

K.1 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Bullen Point RI/FS (ICF Project No.41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Keith Strout, ICF Kaiser Engineers
ANALYSIS: Total Dissolved Solids by USEPA Method 160.1
MATRIX: Water
DATE: January 19, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co.(CT&E) (Anchorage, AK) received five (5) water samples for total dissolved solids (TDS) analysis by USEPA Method 160.1 on August 17 and 19, 1993. The samples were analyzed for TDS on August 19 and 23, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.
BUL-LF06-SW01	4121-03
BUL-LF06-SW03	4121-04
BUL-BKGD-SW01	4121-01
BUL-BKGD-SW02	4121-02
BUL-ST05-GW01	4180-06

Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were designated as a field duplicate pair.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses", October 1989, and the analytical guidelines in USEPA Method 160.1 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:
A.1 Technical holding time QC criteria were met for all project samples.

B. Calibration:
B.1 The calibration QC criteria were met for all project sample analyses.

C. Laboratory Blanks:
C.1 TDS was detected in the method blank associated with sample number BUL-ST05-GW01 at a concentration of 12 mg/L, exceeding the QC criteria of 10 mg/L. This is not expected to have an effect on the above noted sample because the detected TDS result in the sample is greater than ten (10) times the amount detected in the above noted blank.

C.2 All other QC criteria were met for the TDS analyses in the laboratory blank analyses and the results are considered acceptable.

D. Field Blanks:
D.1 There were no field blanks associated with the project samples.

E. Laboratory Replicate Analyses:
E.1 The laboratory replicate analyses associated with these samples met all of the QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

F. Field Duplicate Analysis:
F.1 Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 are identified as a field duplicate pair in the project documentation. The results of the analyses met all of the QC criteria for precision as measured by RPD and the results are considered acceptable.

G. Quantitation:
G.1 No problems were encountered with sample quantitation.

H. Conclusion:
H.1 All data are considered valid and usable for all purposes.

TABLE 1B
DATA QUALIFIERS

NO QUALIFIERS indicates that the data are acceptable both qualitatively and quantitatively.

U Indicates that the compound is not present above the concentration listed.

L Indicates results which fall between the Instrument Detection Limit for waters or the Method Detection Limit for soils and the Practical Quantitation Limit. Results are considered estimates and are usable for limited purposes.

J Results are considered estimates and are usable for limited purposes.

R Results are rejected and data are unusable for any purpose.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Bullen Point RI/FS (ICF Project No. 41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Keith Strout, ICF Kaiser Engineers
ANALYSIS: Total Suspended Solids by USEPA Method 160.2
MATRIX: Water
DATE: January 24, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received five (5) water samples for Total Suspended Solids (TSS) analysis by USEPA Method 160.2 on August 17, 1993 and 19, 1993. The samples were analyzed for TSS on August 24, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.
BUL-LF06-SW01	4121-03
BUL-LF06-SW03	4121-04
BUL-BKGD-SW01	4121-01
BUL-BKGD-SW02	4121-02
BUL-ST05-GW01	4180-06

The following QC sample designations were included in project documentation: sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were designated as a field duplciate pair.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses", October 1989, the analytical guidelines in USEPA Method 160.2 and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project samples.

B. Calibration:

B.1 Method calibration is not a requirement of USEPA Method 160.2.

C. Laboratory Blanks:

C.1 TSS was not detected in any method blanks associated with the samples at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

D. Field Blanks:

D.1 There were no field blanks associated with these samples.

E. Laboratory Replicate Analyses:

E.1 The laboratory replicate analyses associated with these samples met all of the QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

F. Field Duplicate Analyses:

F.1 Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 are identified as a field duplicate pair in the project documentation. The results of the analyses met all of the QC criteria for precision as measured by RPD and the results are considered acceptable.

G. Quantitation:

G.1 No problems were encountered with sample quantitation.

H. Conclusion:

H.1 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Bullen Point RI/FS (ICF Project No.41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Keith Strout, ICF Kaiser Engineers
ANALYSIS: Total Metals by USEPA Method 6010 and USEPA Method 7841 (Thallium)
MATRIX: Water & Soil
DATE: January 24, 1994

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received six (6) water samples and seven (7) soil samples for total metals analyses by USEPA Method 6010 and thallium analysis by USEPA Method 7841 on August 17 and 19, 1993. The samples were digested on August 19 through 27, 1993, and analyzed for total metals by inductively coupled plasma atomic emission spectroscopy (ICP) and for thallium by atomic absorption furnace technique (GFAA) on August 18 through 28, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab. Sample No.	Matrix
BUL-BKGD-SW01	4121-01	Water
BUL-BKGD-SW02	4121-02	Water
BUL-LF06-SW01	4121-03	Water
BUL-LF06-SW03	4121-04	Water
BUL-EB01	4121-07	Water
BUL-EB02	4180-01	Water
BUL-BKGD-S01	4123-01	Soil
BUL-BKGD-SD01	4123-07	Soil
BUL-LF06-S02	4123-08	Soil
BUL-LF06-SD01	4123-09	Soil
BUL-ST05-S02	4177-01	Soil
BUL-ST05-S13	4177-03	Soil
BUL-A0C12-S02	4177-05	Soil

The following QC sample designations were included in project documentation: sample numbers BUL-EB01 and BUL-EB02 were designated as equipment blanks.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B.

This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," October 1989, USEPA Method 6010, USEPA Method 7841, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 Initial calibration QC criteria were met for all project sample analyses.

C. Continuing Calibration:

C.1 A percent recovery (%R) of 111% was obtained for thallium analyte in the continuing calibration verification analyses performed on August 24, 1993, slightly exceeding the advisory QC limits of 90-110%. Thallium analyte was not detected above the Practical Quantitation Limit (PQL) in any associated sample, therefore data were not qualified based on the above noted deficiency in continuing calibration.

C.2 Continuing calibration QC criteria were met for all other project sample analyses.

D. Laboratory Blanks:

D.1 The target analytes were not detected in the calibration blanks or the method blanks at a concentration above the PQL and the results are considered acceptable.

E. Field Blanks:

E.1 Sodium was detected in equipment blanks BUL-EB01 and BUL-EB02 at concentrations of 0.340 mg/L and 0.540 mg/L, respectively. Calcium was detected in equipment blank BUL-EB02 at a concentration of 0.290 mg/L. However, since the above noted analytes were detected in the associated samples at concentrations greater than ten (10) times that of the PQLs, data were not qualified.

E.2 No other target analytes were detected in the equipment blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Duplicate Analysis:

F.1 Samples BUL-LF06-SW01 and BUL-LF06-SW03 were identified as a field duplicate pair in the project documentation. The results of the analyses met all of the QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

G. Laboratory Replicate Analysis:

G.1 The sample duplicate analyses associated with sample numbers BUL-ST05-S02, BUL-ST05-S13 and BUL-AOC12-S02 exceeded the advisory QC criteria of $\leq$50% for precision as measured by RPD for the following analytes:

Analytes	RPD
Ca	63.0%
Mg	74.0%

The detected results for the above analytes in samples associated with these two duplicate sample analyses are qualified as estimated (J) and are usable for limited purposes (see modified sample data sheets).

G.2 All other analytes in the above duplicate analyses, and all other duplicate analyses associated with project samples met all QC criteria and the results are considered acceptable.

H. ICP Interference Check Sample (ICS) Analysis:

H.1 The ICS analyses met all applicable QC criteria.

I. Laboratory Control Sample Analysis:

I.1 The laboratory control sample (LCS) analyses submitted with project data met all QC criteria for accuracy and the results are considered acceptable.

J. Matrix Spike Analysis:

J.1 The matrix spike (MS) recovery for potassium in samples BUL-LF06-SD01, BUL-BKGD-SD01 and BUL-BKGD-S01 was 0%, falling outside the established QC limits of 75-125%. Therefore, all non-detected results for potassium in the above noted samples are considered rejected (R) and unusable for any purpose (see modified sample data sheets).

J.2 The MS recovery for antimony in sample numbers BUL-LF06-SD01, BUL-BKGD-SD01 and BUL-BKGD-S01 was 70%, falling outside the QC limits of 75-125%. Therefore, all non-detected results for antimony in the above noted samples are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

J.3 The MS recoveries for antimony and calcium in sample number BUL-LF06-S02 were 65% and 179%, respectively, falling outside the

established QC limits of 75-125%. Therefore, the detected and non-detected results for antimony and calcium in the above noted sample are considered as estimates (J) and usable for limited purposes only (see modified sample data sheet).

J.4 The MS recoveries for magnesium and manganese in sample numbers BUL-ST05-S02, BUL-ST05-S13 and BUL-AOC12-S02 were 143% and 60%, respectively, falling outside the established QC limits of 75-125%. Therefore, all detected results for magnesium and manganese in the above noted samples are considered as estimates (J) and usable for limited purposes only (see modified sample data sheets).

J.5 The MS recovery for sodium in sample number BUL-EB02 was 30%, falling outside the established QC limits of 75-125%. Therefore, the detected result for sodium in the above noted equipment blank is considered as an estimate (J) and usable for limited purposes only (see modified sample data sheets).

J.6 The MS recoveries for some other target analytes fell outside the advisory QC criteria. However, the sample concentration exceeds the spike concentration by a factor of four or more for these analytes. Therefore, data are not qualified on the basis of these deviations in MS recoveries.

J.7 Due to above noted low recoveries in matrix spike recoveries (see comment J1-J6), post-digestion spike recoveries analyses were performed on August 23 through 29, 1993. The recovery results for the post-digestion spike analyses met all applicable QC criteria.

J.8 All remaining analytes in the above matrix spike analysis, and all other matrix spike analyses associated with project samples met all QC criteria and the results are considered acceptable.

K. Quantitation:

K.1 No problems were encountered with sample quantitation in project sample analyses.

L. Conclusion:

L.1 Due to the above noted deficiencies in matrix spike recovery analyses, select data are considered rejected and unusable for any purposes.

L.2 Due to the above noted deficiencies in laboratory replicate and matrix spike recovery analyses, select data are considered estimated and usable for limited purposes only.

L.3 All other data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: Elmendorf AFB/Bullen Point RI/FS (ICF Project No.41096-412-02)
LABORATORY: Commercial Testing & Engineering Co. (Anchorage, AK)
REVIEWER: Keith Strout, ICF Kaiser Engineers
ANALYSIS: Dissolved Metals by USEPA Method 6010 and USEPA Method 7841 (Thallium)
MATRIX: Water
DATE: January 24, 1993

I. INTRODUCTION:

Commercial Testing & Engineering Co. (CT&E) (Anchorage, AK) received five (5) water samples for dissolved metals analysis by USEPA Method 6010 and USEPA Method 7841 on August 17, 1993. The samples were digested on August 18 and 20, 1993, and analyzed for dissolved metals by inductively coupled plasma atomic emission spectrometry (ICP) and for thallium by atomic absorption furnace technique (GFAA) on August 23 and 25, 1993.

The ICF site identification numbers and corresponding CT&E laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.
BUL-LF06-SW01	4121-03
BUL-LF06-SW03	4121-04
BUL-BKGD-SW01	4121-01
BUL-EB01	4121-07
BUL-BKGD-SW02	4121-02

All the above listed samples are field-filtered samples.

The following QC sample designations were included in project documentation: sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were designated as a field duplicate pair and sample number BUL-EB01 was designated as an equipment blank.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B.

This report was prepared in accordance with the USEPA draft document "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," October 1989, and USEPA SW-846 Method 6010 and Method 7841, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 Technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 Initial calibration QC criteria were met for all project sample analyses.

C. Continuing Calibration:

C.1 Continuing calibration QC criteria were met for all project sample analyses.

D. Laboratory Blanks:

D.1 The target analytes were not detected in the calibration blanks or the method blank at a concentration above the Practical Quantitation Limits (PQLs) and the results are considered acceptable.

E. Field Blanks:

E.1 Sodium was detected in equipment blank BUL-EB01 at a concentration of 0.330 mg/L, exceeding the QC criteria of 0.250 mg/L. This is not expected to have an effect on the associated samples because all detected sodium results in the samples are greater than ten (10) times the amount detected in the above noted equipment blank.

E.2 No other target analytes were detected in the above noted equipment blank and the results are considered acceptable.

F. Field Duplicate Analysis:

F.1 Sample numbers BUL-LF06-SW01 and BUL-LF06-SW03 were identified as field duplicates in the project documentation. The results of the analyses met all of the QC criteria for precision as measured by Relative Percent Difference (RPD) and the results are considered acceptable.

G. Laboratory Replicate Analysis:

G.1 The sample duplicate analyses associated with these samples met all QC criteria for precision as measured by RPD and the results are considered acceptable.

H. ICP Interference Check Sample (ICS):

H.1 The ICS analyses met all applicable QC criteria.

I. Laboratory Control Sample Analysis:

I.1 The laboratory control sample (LCS) analyses submitted with project data met all QC criteria for accuracy and the results are considered acceptable.

J. Matrix Spike Analysis:

J.1 The matrix spike (MS) recovery for sodium in all samples was found to be 23%, falling below the QC limits of 75-125%. However, the sample concentration exceeds the spike concentration by a factor of four or more for the above noted target analyte. Therefore, data are not qualified on the basis of the low MS recovery.

J.2 All other MS recovery analyses associated with project samples met applicable QC criteria and the results are considered acceptable.

K. Quantitation:

K.1 No problems were encountered with sample quantitation in project sample analyses.

L. Conclusion:

L.1 All data are considered valid and usable for all purposes.

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DATA VALIDATION REPORT

PROGRAM: BULLEN POINT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Keith Strout
ANALYSIS: Gasoline by USEPA Method 8015M
MATRIX: Water and Soil
DATE: April 26, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (FBI) (Seattle, WA) received 13 soil and 2 water samples from the Bullen Point site on September 3, 1993 (referenced chain of custody record No. 576). Twelve of the soil samples required gasoline analysis by the volatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for gasoline by USEPA Method 8015M (modified) (GC/FID) on September 8, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-ST05-2S27	1850	Soil
BUL-ST05-2S28	1851	Soil
BUL-ST05-2S29	1852	Soil
BUL-ST05-2S30	1853	Soil
BUL-ST05-2S31	1854	Soil
BUL-ST05-2S32	1855	Soil
BUL-ST05-2S33	1856	Soil
BUL-ST05-2S34	1857	Soil
BUL-ST05-2S35	1858	Soil
BUL-ST05-2S36	1859	Soil
BUL-AOC11-2S06	1860	Soil
BUL-ST05-2S37	1868	Soil

The laboratory did not submit any raw data or data summary sheets for the gasoline fraction for sample numbers BUL-ST05-2S27, BUL-ST05-2S28, BUL-ST05-2S29, BUL-ST05-2S30, BUL-ST05-2S31, BUL-ST05-2S32, BUL-ST05-2S33, BUL-ST05-2S34, BUL-ST05-2S35, BUL-ST05-2S36, and BUL-ST05-2S37. The laboratory submitted gasoline data for sample numbers BUL-AOC11-2S06, BUL-2EB-03, and BUL-2TB-03, therefore, validation was performed on these three samples.

The following QC sample designations were included in project documentation: sample number BUL-2EB-03 was designated as an equipment blank and sample number BUL-2TB-03 was designated as a travel blank.

The analytical results for soils were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared using the guidelines in the USEPA draft document "National Functional Guidelines for Organic Data Review" (December 1990), USEPA Method 8015M, and the Project Sampling and Analysis Plan.

It should be noted that all quantitation limits reported by the laboratory for project soil samples were higher than those specified in the Project Sampling and Analysis Plan. According to the laboratory, all soil samples were extracted in methanol before analysis, as required by the State of Alaska guidelines. It is the opinion of the reviewer that the quality of the data was not affected.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory analyzed a four point initial calibration on system 1-2 on August 19, 1993. The range of the initial calibration was from 50 ppb to 5000 ppb. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 31.8 was calculated using calibration factors determined from the initial calibration. The 31.8% RSD exceeds the recommended 20.0% RSD, therefore, the detected results for gasoline in all of the samples are qualified "J" as estimated and are usable for limited purposes.

C. Continuing Calibrations:

C.1 The laboratory did not perform any continuing calibrations for the gasoline fraction. The laboratory indicated that since the same injection was used to analyze for gasoline and the BTEX compounds, the continuing calibration response on the FID for the BTEX compounds and the surrogate were used to determine linearity for the gasoline fraction. It is the opinion of the reviewer that the laboratory should have run continuing calibrations for the gasoline fraction, however, the response for

the BTEX compounds and the surrogate compound can be used to determine if the instrument has maintained linearity for the gasoline fraction. Because the laboratory did not perform any continuing calibrations specifically for the gasoline fraction, the detected results and the practical quantitation limits (PQLs) are qualified "J" as estimated and are usable for limited purposes.

C.2 All QC criteria for the BTEX continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Gasoline was not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Gasoline was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 Sample numbers BUL-2EB-03 was designated as an equipment blank and sample number BUL-2TB-03 was designated as a travel blank.

F.2 Gasoline was not detected in the equipment blank at a concentration above the PQL and the results are considered acceptable.

F.3 Gasoline was not detected in the travel blank at a concentration above the PQL and the results are considered acceptable.

G. Field Replicate Analysis:

G.1 There were no field replicate samples associated with this project sample set.

H. Surrogate Recoveries:

H.1 All of the surrogate QC recovery criteria were met for all project samples and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate Analyses:

I.1 The laboratory did not perform any matrix spike/matrix spike duplicate analyses for the gasoline fraction.

J. System Performance:

J.1 No problems with system performance were observed for the project samples.

K. Quantitation and Identification:

K.1 The laboratory did not submit any raw data or data summary sheets for the gasoline fraction for sample numbers BUL-ST05-2S27, BUL-ST05-2S28, BUL-ST05-2S29, BUL-ST05-2S30, BUL-ST05-2S31, BUL-ST05-2S32, BUL-ST05-2S33, BUL-ST05-2S34, BUL-ST05-2S35, BUL-ST05-2S36, and BUL-ST05-2S37. The laboratory submitted gasoline data for sample numbers BUL-AOC11-2S06, BUL-2EB-03, and

BUL-2TB-03, therefore, validation was performed on these three samples.

K.2 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Gasoline was not detected at a concentration above the PQL in any of the three project samples.

L.2 Due to a large %RSD in the initial calibration and the lack of continuing calibrations for gasoline, all detected results and the PQL for all project samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: BULLEN POINT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Pesticides by USEPA Method 8080
MATRIX: Soil
DATE: April 28, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 5 soil samples from the Bullen Point site on August 17, 1993 (referenced chain of custody record No. 510). The five soil samples were requested for pesticide analysis by the pesticide organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for pesticides by USEPA Method 8080 on August 20 and 21, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-OT04-S01	127	Soil
BUL-OT04-S02	128	Soil
BUL-OT04-S03	129	Soil
BUL-OT04-S04	130	Soil
BUL-OT04-S05	131	Soil

The following set of QC sample designations were included in project documentation: sample numbers BUL-OT04-S04 and BUL-OT04-S05 were designated as field replicate samples.

The analytical results were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional

Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF5 on August 21,1993. The range of the initial calibration was from 0.01 ppm to 1.0 ppm. All samples were quantitated using a linear regression curve calculated from the initial calibration. The percent relative standard deviations (%RSDs) were calculated for all compounds using calibration factors determined from the initial calibration using the ECD detector. The %RSD for the following target analyte exceeded the recommended QC criteria of 20.0%

Compound	%RSD
beta-BHC	22%

Due to the large percent RSD, the detected result for beta-BHC is qualified "J" as estimated and is usable for limited purposes.

B.2 Methoxychlor was spiked in at concentrations too low to be detected by the ECD detector until the 0.5 ppm initial calibration standard. All detected results for this analyte is qualified "R" as rejected and unusable, and the PQL is adjusted accordingly.

C. Continuing Calibration:

C.1 Two continuing calibration standards (0.5 ppm) were analyzed by the laboratory during this sequence. All target analytes met applicable QC criteria with the exception of chlordane and methoxychlor. The PQL for these two analytes in the method blank and samples are qualified "J" as estimated and usable for limited purposes.

D. Laboratory Blanks:

D.1 Target analytes were not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Target analytes were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analyses with the project sample set.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤50 percent as measured by Relative Percent

Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples BUL-OT04-S04 and BUL-OT04-S05 were utilized for field replicate analyses. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number OLI-ST03-S02 was used for the soil matrix spike/matrix spike duplicate analyses.

I.2 The laboratory did not report approximately one half of the matrix spike analytes for the matrix spike and matrix spike duplicate QC samples. The target analytes have been calculated and reported on the summary results page by the reviewer.

I.3 All matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 The laboratory set up the GC analytical run time on the primary GC column to elute all pesticide analytes within 9 minutes, causing co-elution of numerous pesticides, and making identification difficult. A slower temperature program and/or slower carrier gas flow rate would increase resolution for many of the pesticide analytes.

J.2 The Endrin and 4,4'-DDT breakdown met QC criteria and the results are considered acceptable.

J.3 No other problems with system performance were observed for all other project sample analyses.

K. Quantitation and Identification:

K.1 The laboratory analyzed the samples prior to analyzing the initial calibration. The laboratory did analyze an initial calibration prior to sample analyses, but they inadvertently used a different instrument method. Therefore, the PQL for all target analytes in the method blank and samples are qualified "J" as estimated and usable for limited purposes.

K.2 Sample BUL-OT04-S01 was analyzed using a different instrument method. Therefore the PQL for the target analytes in this sample are qualified "R" as rejected and unusable.

K.3 The laboratory failed to report approximately one-half of the matrix spike analytes. The corrected results have been reported on the summary results page by the reviewer.

K.4 No other problems with compound quantitation and identification were observed.

L. Conclusion:

L.1 No target analytes were detected in the method blank or the samples at a concentration above the PQL.

L.2 Since the initial calibration was analyzed subsequent to the method blank and samples, the PQL for all target analytes in the method blank and samples are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: BULLEN POINT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX: Soil
DATE: April 28, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 13 soil and 2 water samples from the Bullen Point site on September 3, 1993 (referenced chain of custody record No. 576). One soil samples was requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The sample was analyzed for PCBs by USEPA Method 8080 (GC/ECD) on September 8, 1993.

The ICF site identification number and corresponding FBI laboratory sample identification number is listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-OT04-2S06	1862	Soil

The analytical results were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC instrument ICF6 on August 21, 1994. The range of the initial calibration was from 0.1 ppm to 10 ppm. All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 30.3% was calculated using calibration factors determined from the initial calibration. The %RSD of 30.3 exceeds the recommended method criteria of 20.0%, therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blank at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 There were no field replicate samples submitted for analysis with this project sample set.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number BUL-OT04-2S06 was used for the soil matrix spike/matrix spike duplicate analyses.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 Sample BUL-OT04-2S06 was analyzed outside the 12 hour continuing calibration analysis run time. Therefore, the PQL for this sample is qualified "J" as estimated and usable for limited purposes.

K.2 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were not detected in sample BUL-OT04-2S06 at a concentration above the PQL.

L.2 Due to previously mentioned problems with the continuing calibration standard associated with sample BUL-OT04-2S06, the PQL is qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: BULLEN POINT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Diesel by EPA Method 8015M
MATRIX: Soil
DATE: April 29, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 13 soil and 2 water samples from the Bullen Point site on September 3, 1993 (referenced chain of custody record No. 576). Twelve soil samples were requested for diesel analyses by the semivolatile organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for diesel by USEPA Method 8015M (modified) (GC/FID) on September 8, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-ST05-2S27	1850	Soil
BUL-ST05-2S28	1851	Soil
BUL-ST05-2S29	1852	Soil
BUL-ST05-2S30	1853	Soil
BUL-ST05-2S31	1854	Soil
BUL-ST05-2S32	1855	Soil
BUL-ST05-2S33	1856	Soil
BUL-ST05-2S34	1857	Soil
BUL-ST05-2S35	1858	Soil
BUL-ST05-2S36	1859	Soil
BUL-AOC11-2S06	1860	Soil
BUL-ST05-2S37	1868	Soil

The analytical results for the soil samples were reported with an adjustment for moisture content.

The following QC sample designations were included in project documentation: sample numbers BUL-ST05-2S31 and BUL-ST05-S236 were designated as field replicates.

It should be noted that all quantitation limits reported by the laboratory for diesel soil project samples were higher than those specified in the Project Sampling and Analysis Plan. It is the opinion of the reviewer that the quality of the data was not affected.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in USEPA Method 8015M, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a 3 point initial calibration on GC instrument ICF6 on August 29, 1993. The range of the initial calibration was from 100 ppm to 10,000 ppm. Due to the sensitivity present at the 100 ppm initial calibration standard, the practical quantitation limit (PQL) of 50 ppm does not need to be raised to the low point of this initial calibration (100 ppm). All samples were quantitated using a linear regression curve calculated from the initial calibration. A percent relative standard deviation (%RSD) of 9.04 was calculated using calibration factors determined from the initial calibration, and is within the recommended QC limit of 20.0%. However, since this is only a three point initial calibration curve, all detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 Diesel was not detected in the method blank at a concentration above the PQL and the results are considered acceptable.

E. Instrument Blanks:

E.1 Diesel was not detected in the instrument blanks at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤ 50%, as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples BUL-ST05-2S31 and BUL-ST05-2S36 were utilized for field replicate analysis. The results of the field replicate analyses met all applicable QC criteria and the results are considered acceptable.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number BUL-OT04-2S06 was used for the soil matrix spike/matrix spike duplicate analyses. This sample was not included on chain of custody record No. 576.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 No problems with system performance were observed for all project samples.

K. Quantitation and Identification:

K.1 Samples BUL-ST05-2S32 and BUL-ST05-2S34 were incorrectly quantitated by the laboratory. Both samples displayed baselines that were not properly set. Therefore the detected results for these two samples are qualified "J" as estimated and usable for limited purposes.

K.2 No other problems were observed with compound quantitation and identification.

L. Conclusion:

L.1 Diesel was detected in 7 of the samples at concentrations ranging between 220-3400 ppm.

L.2 Samples BUL-ST05-2S32 and BUL-ST05-2S34 were incorrectly quantitated by the laboratory. Therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

L.3 Since the initial calibration was only a 3 point curve (10000 ppm, 1000 ppm & 100 ppm), all detected results are qualified "J" as estimated and usable for limited purposes.

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DATA VALIDATION REPORT

PROGRAM: BULLEN POINT / DEW Line RI/FS (ICF Project No. 41096-512-02)
LABORATORY: Friedman & Bruya, Inc. (Seattle, WA)
REVIEWER: Timothy Vonnahme
ANALYSIS: Polychlorinated Biphenyls (PCBs) by USEPA Method 8080.
MATRIX: Soil
DATE: April 28, 1994

I. INTRODUCTION:

Friedman & Bruya, Inc. (Seattle, WA) received 5 soil samples from the Bullen Point site on August 17, 1993 (referenced chain of custody record No. 510). The five soil samples were requested for polychlorinated biphenyls (PCBs) analysis by the PCB organics extraction method described in Section 8 of the Project Sampling and Analysis Plan. The samples were analyzed for PCBs by USEPA Method 8080 (GC/ECD) on August 20, 1993.

The ICF site identification numbers and corresponding FBI laboratory sample identification numbers are listed below.

ICF Site No.	Lab Sample No.	Matrix
BUL-OT04-S01	127	Soil
BUL-OT04-S02	128	Soil
BUL-OT04-S03	129	Soil
BUL-OT04-S04	130	Soil
BUL-OT04-S05	131	Soil

The following set of QC sample designations were included in project documentation: sample numbers BUL-OT04-S04 and BUL-OT04-S05 were designated as field replicate samples.

The analytical results were reported with an adjustment for moisture content.

The analytical results with qualifications are presented on modified sample data sheets submitted by the laboratory. Definitions of the data qualifiers are listed in Table 1B. This report was prepared in accordance with the USEPA draft document " National Functional Guidelines for Organic Data Review", December 1990, and the analytical guidelines in

USEPA Method 8080, and the Project Sampling and Analysis Plan.

II. VALIDITY & COMMENTS:

A. Technical Holding Times:

A.1 The technical holding time QC criteria were met for all project sample analyses.

B. Initial Calibration:

B.1 The laboratory performed a five point initial calibration on GC Instrument ICF5 on August 21, 1993. All samples were quantitated using a linear regression curve calculated from the initial calibration. The range of the initial calibration was from 0.1 ppm to 10 ppm. A percent relative standard deviation (%RSD) of 37.2% was calculated using calibration factors determined from the initial calibration. The %RSD of 37.2 exceeds the recommended method criteria of 20.0%, therefore, the detected results are qualified "J" as estimated and usable for limited purposes.

C. Continuing Calibration:

C.1 All QC criteria for the continuing calibrations were met and the results are considered acceptable.

D. Laboratory Blanks:

D.1 PCBs were not detected in the method blank at a concentration above the practical quantitation limit (PQL) and the results are considered acceptable.

E. Instrument Blanks:

E.1 PCBs were not detected in the instrument blank at a concentration above the PQL and the results are considered acceptable.

F. Field Blanks:

F.1 There were no field blanks submitted for analysis with this project sample set.

G. Field Replicate Analyses:

G.1 A QC limit for precision of ≤50 percent as measured by Relative Percent Difference (RPD) between soil sample values, was specified for field replicate comparability.

G.2 Samples BUL-OT04-S04 and BUL-OT04-S05 were utilized for field replicate analyses. Sample BUL-OT04-S04 contained Aroclor 1254 at a concentration of 0.31 ppb. Sample BUL-OT04-S05 contained Aroclor 1254 at a concentration of 0.63 ppb. The RPD is 68%, which exceeds the QC criteria of ≤50%. It is not known what affect this will have on the quality of the data.

H. Surrogate Recoveries:

H.1 All surrogate recoveries met applicable QC criteria and the results are considered acceptable.

I. Matrix Spike/Matrix Spike Duplicate:

I.1 Sample number BUL-OT04-S04 was used for the soil matrix spike/matrix

spike duplicate analyses.

I.2 All of the matrix spike/matrix spike duplicate QC criteria were met and the results are considered acceptable.

J. System Performance:

J.1 A different instrument method (OIL.MTH) was used for sample BUL-OT04-S01.

J.2 No other problems with system performance were observed for the project sample analyses.

K. Quantitation and Identification:

K.1 A discrepancy exists between the detected results reported by the laboratory and the results regenerated by the reviewer for two samples as indicated below. Results are reported in parts per million (ppb).

ICF Site No.	Laboratory Results	Validation Results
BUL-OT04-S04	0.10	0.31
BUL-OT04-S05	0.70	0.63

The laboratory indicated that the discrepancies are probably due to inconsistent quantitation procedures. The corrected results have been adjusted on the summary results page by the reviewer.

K.2 Since the above two samples are field replicate samples, the difference in detected results between the two samples may be due to possible biogenic interference in the two samples.

K.3 Sample BUL-OT04-S01 was analyzed using a different instrument method. Therefore the PQL for the PCBs in this sample are qualified "R" as rejected and unusable.

K.4 The laboratory analyzed the samples prior to analyzing the initial calibration. The laboratory did analyze an initial calibration prior to sample analyses, but they inadvertently used a different instrument method. Therefore, the PQL for the PCBs in the method blank and samples is qualified "J" as estimated and usable.

K.5 No other problems with compound quantitation and identification were observed for this project sample set.

L. Conclusion:

L.1 PCBs were detected in sample BUL-OT04-S02 at 0.90 ppb, sample BUL-OT04-S04 at 0.31 ppb, and sample BUL-OT04-S05 at 0.63 ppb.

L.2 Sample BUL-OT04-S01 was analyzed using a different instrument method. Therefore the PQL for the PCBs in this sample are qualified "R" as rejected and unusable.

L.3 Since the initial calibration was analyzed subsequent to the method blank

and samples, the PQL for the PCBs in the method blank and samples is qualified "J" as estimated and usable for limited purposes.

L.4 Due to previously mentioned problems with the initial calibration, all detected results for all project samples are qualified "J" as estimated and usable for limited purposes.