FINAL REPORT

PRELIMINARY ASSESSMENT/SITE INSPECTION

DRIFTWOOD BAY RRS, ALASKA

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December 2005

FINAL REPORT
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Driftwood Bay RRS, Alaska

Prepared for:
611th Air Support Group Civil Engineer Squadron,
Civil Environmental Restoration Element

and

Air Force Center for Environmental Excellence

December 2005

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LIST OF ACRONYMS

°F	degrees Fahrenheit
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AFCEE	Air Force Center for Environmental Excellence
ASTs	aboveground fuel storage tanks
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Civil Engineer Squadron
CES/CEVR	611th Civil Engineer Squadron Civil Environmental Restoration Element
DEW	Distant Early Warning
DoD	Department of Defense
DRO	Diesel range organics
GPS	Global Positioning System
GRO	gasoline range organics
HRS	Hazard Ranking System
IRP	Installation Restoration Program
mg/Kg	milligrams per kilogram
MOGAS	motor gasoline
msl	mean sea level
NCP	National Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
ORNL	Oak Ridge National Laboratory
PAHs	Polyaromatic Hydrocarbons
PA/SI	Preliminary Assessment and Site Inspection
PCBs	polychlorinated biphenyls
PID	photo-ionization detector
POL	petroleum, oil, and lubricants
ppm	parts per million
ppmv	parts per million by volume
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation

LIST OF ACRONYMS *(continued)*

RRO	residual range organics
RRS	Radio Relay Station
SARA	Superfund Amendments and Reauthorization Act
SVOCs	semi-volatile organic compounds
TPH	Total petroleum hydrocarbons
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
USAF	United States Air Force
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOCs	volatile organic compounds
WACS	White Alice Communications Systems

1.0 INTRODUCTION

This report outlines Installation Restoration Program (IRP) activities that were performed in support of a Preliminary Assessment and Site Inspection (PA/SI) in 2005 at the former Driftwood Bay Radio Relay Station (RRS), Alaska. This work was conducted for the 611th Civil Engineer Squadron (CES) under Contract Number F41624-03-D-8622, Task Order Number 0056, with the Air Force Center for Environmental Excellence (AFCEE).

The overall goal of this portion of the IRP at this installation is to determine if contaminants are present at the former RRS that may pose the potential for adverse effects to human health or the environment so that a determination can be made regarding whether additional work is required. The goal of this portion of the work is not to fully define the nature and extent of contaminated areas. This report describes the known source areas at the facility, summarizes previous work completed at each source area, presents the type of data that were collected during the 2005 PA/SI efforts, and presents results and conclusions.

As an additional task conducted under this project, incidental repairs were made to the access road between the runway and former composite building at the Driftwood Bay RRS. These repairs were being conducted to improve site access for conducting the site investigation in the area around the former composite building. While not specifically a part of the site investigation, the results of the road repair are provided in this report.

The following subsections give an overview of the United States Air Force IRP process, a brief history of the Driftwood Bay RRS, and the specific data collection objectives of the 2005 PA/SI projects.

1.1 IRP OVERVIEW

The objective of the IRP is to assess past hazardous waste disposal and spill sites at Air Force installations and to develop remedial actions consistent with the National Contingency Plan (NCP) for sites that pose a threat to human health and welfare or the environment. This section presents information on the program origins, objectives, and organization.

The 1976 Resource Conservation and Recovery Act (RCRA) is one of the primary federal laws governing the disposal of hazardous wastes. Sections 6001 and 6003 of RCRA require federal agencies to comply with local and state environmental regulations and provide information to the U.S. Environmental Protection Agency (USEPA) concerning past disposal practices at federal sites. RCRA Section 3012 requires state agencies to inventory past hazardous waste disposal sites and provide information to USEPA concerning those sites.

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (i.e., Superfund). CERCLA outlines the responsibility for identifying and remediating contaminated sites in the United States and its possessions. The CERCLA legislation identifies USEPA as the primary policy and enforcement agency regarding contaminated sites.

The 1986 Superfund Amendments and Reauthorization Act (SARA) extends the requirements of CERCLA and modifies CERCLA with respect to goals for remediation and the steps that lead to the selection of a remedial process. Under SARA, technologies that provide permanent removal or destruction of a contaminant are preferable to action that only contains or isolates the contaminant. SARA also provides for greater interaction with public and state agencies and extends USEPA's role in evaluating health risks associated with contamination. SARA is the primary legislation governing remedial action at past hazardous waste disposal sites.

Executive Order 12580, adopted in 1987, gave various federal agencies, including the Department of Defense (DoD), the responsibility to act as lead agencies for conducting investigations and implementing remediation efforts when they are the sole or co-contributor to contamination on or off their properties.

To ensure compliance with CERCLA, its regulations, and Executive Order 12580, the DoD developed the IRP, under the Defense Environmental Restoration Program, to identify potentially contaminated sites, investigate these sites, and evaluate and select remedial actions for potentially contaminated facilities. The DoD issued the Defense Environmental Quality Program Policy Memorandum 80-6 regarding the IRP in June 1980, and implemented the policies outlined in this memorandum in December 1980. The NCP was issued by USEPA in 1980 to provide guidance on a process by which: (1) contaminant release could be reported, (2) contamination could be identified and quantified, and (3) remedial actions could be selected. The NCP describes the responsibility of federal and state governments and those responsible for contaminant releases.

The DoD formally revised and expanded the existing IRP directives and amplified all previous directives and memoranda concerning the IRP through Defense Environmental Quality Program Policy Memorandum 81-5, dated 11 December 1981. The memorandum was implemented by an Air Force message dated 21 January 1982.

The IRP is DoD's primary mechanism for response actions on Air Force installations affected by the provisions of SARA. Over the years, requirements of the IRP have been developed and modified to ensure DoD compliance with federal laws, such as RCRA, NCP, CERCLA, and SARA, can be met.

The Driftwood Bay RRS is not included on the National Priorities List (NPL) and is not a Superfund site. Under SARA, however, all federal facilities must comply with state cleanup requirements and standards when not listed on the NPL. The 2005 PA/SI efforts were conducted with all guidance under RCRA, NCP, CERCLA, and SARA. The Air Force acted as the lead agency for all investigation activities and worked in close coordination with the Alaska Department of Environmental Conservation (ADEC) throughout the process.

1.2 DRIFTWOOD BAY RRS INSTALLATION HISTORY

Driftwood Bay RRS was initially one of 18 Distant Early Warning (DEW) Line stations constructed in Alaska between 1950 and 1959. Driftwood Bay RRS was made operational in 1961 to provide reliable communications for the DEW-Line station. Originally known as White

Alice Communications Systems (WACS) facilities, the Alaska Air Command re-designated WACS facilities as RRSs in 1969. Driftwood Bay RRS was deactivated in 1977 and all facility buildings and structures were demolished or removed in 1991 (United States Air Force [USAF], 1998).

1.3 OBJECTIVES OF THE 2005 PA/SI EFFORTS

The primary objective of the 2005 PA/SI efforts at Driftwood Bay RRS is to determine if media contain contaminants in excess of published cleanup standards, (hereinafter referred to as screening criteria - see Section 4.0) and determine the next appropriate step for study or remedial work. In order to accomplish this, data were collected to help in the reconstruction of the layout of important features of the facilities and help establish the locations of former facility waste handling areas. These data were used to guide the field investigation to the areas most likely to be contaminated.

1.4 DOCUMENT ORGANIZATION

This document is organized as follows:

- Section 1 provides an introduction to the project, a brief overview of the IRP process, a brief history of the facility, and the objectives of the investigation.
- Section 2 provides a summary of the environmental setting and previous work conducted at each facility, along with a list of data gaps and uncertainties.
- Section 3 presents the field methods that were used during this project.
- Section 4 presents the screening criteria that analytical data were compared to.
- Section 5 provides a site-by-site summary of investigation activities and findings.
- Section 6 presents a summary of road repair work during this project.
- Section 7 provides a summary of conclusions and recommendations made based on the results of this investigation.
- Section 8 provides the references used in writing this report.
- Appendix A includes all laboratory analytical results from samples collected during this project. A compact disk is attached to the front cover of this document containing all analytical data along with all laboratory quality control information (such as case narratives, sample data sheets, quality control data sheets, and signed copies of the chains of custody).
- Appendix B presents the Hazard Ranking System Scoring.
- Appendix C is the Analytical QA/QC Report.
- Appendix D contains Global Positioning System (GPS) coordinates for several drums encountered during the project.

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2.0 SUMMARY OF EXISTING INFORMATION

The following sections describe information currently known about the Driftwood Bay RRS. This includes a description of the environmental setting and a summary of previous investigations and removal actions at each site.

2.1 DRIFTWOOD BAY RRS ENVIRONMENTAL SETTING

Driftwood Bay RRS is located on the north side of Unalaska Island approximately 13.5 miles northwest of Dutch Harbor (Figure 2-1). The runway and lower portion of the facility are located just south of Driftwood Bay at an elevation of between five and 100 feet above mean sea level (msl) (Figure 2-2). The former composite building is located approximately three miles west of Driftwood Bay, on a plateau approximately 1,300 feet msl. The following subsections describe known physical characteristics of the Driftwood Bay RRS relevant to this investigation.

2.1.1 Demographics

Dutch Harbor, the closest community to Driftwood Bay RRS, is located approximately 13.5 miles to the southeast. There are no residents within four miles of the former facility. The Air Force currently owns the land under a Public Land Order. However, the land occupied by the former RRS is overfilled by both the Aleut Corporation and the Ounalashka Corporation and will be transferred to one of these corporations once the Air Force is completed with work at the facility. The land surrounding the facility is part of the Alaska Maritime National Wildlife Refuge.

2.1.2 Land Use

Interviews indicate that there is no local use of the area.

2.1.3 Cultural and Archeological Resources

An archaeological survey of Driftwood Bay conducted in 1986 found evidence of potential archaeological sites along coast. There were no potential archaeological sites identified inland from the beach (Holmes, 1986 and University of Alaska Anchorage, 2003).

2.1.4 Climate

Driftwood Bay RRS is located within a cold maritime climate with annual temperatures ranging from minus eight degrees Fahrenheit (°F) to 80°F. The average summer temperature between June and August is 50°F and the average winter temperature between November and February is 34°F. Average precipitation is 58 inches; snowfall can reach up to 50 inches in the winter months (USAF, 2002).

2.1.5 Geology

Unalaska Island is composed mainly of volcanic rocks associated with the Makushin Volcano, located approximately 6.5 miles southwest of Driftwood Bay RRS. Bedrock is predominantly

Figure 2-1 Driftwood Bay Site Location

Figure 2-2 Driftwood Bay General Facility Features

basalt and andesitic lava overlain by volcanic till and ash layers. Till is estimated to be at least 20 feet deep in the vicinity of the RRS based on road cut outcrops. Site-wide depth to groundwater and groundwater characteristics are currently unknown, however, depth to water in the vicinity of the runway was reported a few inches below ground surface (bgs) during the 1995 PA/SI (USAF, 1996) and during the 2005 investigation. Bedrock was encountered at approximately three feet bgs in two test pits excavated near the former composite building during the 2005 investigation. Further discussion is provided in Section 5.

2.1.6 Hydrology

The Driftwood Bay Valley is drained by intermittent streams that empty into Driftwood Bay. These include Humpy Creek, which runs along the east side of the Driftwood Bay Valley and Snoffy Creek, which runs through culverts underneath the runway before emptying into Driftwood Bay. Several additional small unnamed drainages extend from the mountainous regions of the facility to the Driftwood Bay Valley and into the Bering Sea. Several seeps were noted along the coast to the east of the facility discharging the cliff face several hundred feet above sea level. There were no seeps noted within the vicinity of the facility.

2.1.7 Biology

Several species of small mammal are indigenous to Unalaska Island. Indigenous mammals include: the tundra vole, the shrew, the Collard Lemming, and the red fox. Introduced species include: the arctic ground squirrel, the blue phased arctic fox, and the Norwegian Rat (USAF, 1996).

Aquatic environments in the Driftwood Bay area include marine coastal water of the Bering Sea and freshwater drainages of Humpy and Snoffy creeks. Wildlife in and around the Bering Sea in the vicinity of Driftwood Bay include: several salmon species, halibut, rockfish, Pacific Herring, sea lions, sea otters, geese, ducks, and several other sea bird populations, as well as bald eagles. Pink salmon are known to spawn in Humpy Creek (USAF, 1996).

Four known endangered species have ranges that span the vicinity of Unalaska Island. Species include: Short-tailed Albatross; Humpback, Right, and Blue Whales (Alaska Department of Fish and Game [ADF&G], 2005b).

2.1.8 Potential Receptors (Target Populations)

Target populations are those species, including humans, which might be exposed to site contaminants by virtue of the activities they are conducting. The likelihood for exposure of a target population is dependent on its distance from the site, which varies by the environmental media (or "pathway") to which the population could be exposed. The USEPA refers to this distance as the "target distance limit". Groundwater and air pathways are defined as a four mile radius around the site. The surface water pathway is 15 miles downstream from the probable point of entry to surface water. Soil exposure is 200 feet for a resident population and one mile for a nearby population from areas of known or suspected contamination (USEPA, 1991). The goal for this project is to evaluate media that could pose a potential threat to a target population.

Recreational fishing within the target distance limit is only known to occur at Driftwood Bay. Therefore, human consumers of fish caught near the site represent a potential target population.

Other potential targets include several ecological receptors such as: resident birds and mammals within a four mile radius due to the air pathway; freshwater and marine fisheries within 15 miles downstream of the site due to the surface water pathway; resident birds and mammals within a 200 foot radius of the site due to the soil pathway; and nearby populations of birds and mammals within a one mile radius of the site due to the soil pathway.

2.2 PAST INVESTIGATION AND REMOVAL ACTIONS AT DRIFTWOOD BAY RRS

The following sections provide a summary of previous investigations and removal actions at Driftwood Bay RRS.

2.2.1 OT001: Former Composite Building and Antenna Arrays

The former composite building is located approximately two miles west of Driftwood Bay and is connected to the bay by a winding four mile long road. The site includes: the former composite building foundation, the antenna pads, and two former 20,000-gallon underground storage tanks (USTs) and a 110-gallon aboveground fuel storage tank (AST) to the northwest of the former composite building. A diesel fill stand and tank are also depicted along the west wall of the building. The site location is depicted on Figure 2-3. Foundations of the composite building and antenna arrays are currently in place.

Work was conducted at this site during three events. In 1985, the U.S. Army Corps or Engineers conducted a site inspection. During the inspection, several composite surface soil and surface water samples were collected from the vicinity of the former composite building. In 1991, all structures were demolished and buried in a landfill adjacent to the southeastern margin of the former composite building foundation. Two 20,000-gallon USTs were shown on as-builts located northwest of the former composite building. In 1991, only one was reportedly located and removed. No analytical samples were reported from this work. The Air Force conducted a PA/SI, in 1995. Several surface soil samples were collected. The following paragraphs describe analytical findings from 1985 and 1995:

The report from the 1985 investigation is not available for review, but is summarized in the 1995 PA/SI Report (USAF, 1996). According to the 1995 PA/SI Report, seven analytical composite samples of surface soil were collected from the perimeter of the former composite building in 1985. Polychlorinated biphenyls (PCBs) were detected as high as 6.7 milligrams per kilogram (mg/Kg) at the northwest corner of the former composite building. Diesel range organics (DRO) were reportedly detected as high as 1,100 mg/Kg in one sample; however the sample location is not reported in the PA/SI Report. Several samples also contained detectable concentrations of volatile organic compounds (VOCs) in surface soil, including: benzene, toluene, ethylbenzene, xylenes (BTEX), and chlorinated solvents (USAF, 1996).

Figure 2-3 Driftwood Bay IRP Sites

During the 1995 PA/SI, eight surface soil samples were collected in the vicinity of the former composite building and antenna arrays. PCBs were not detected in any sample. However, 1995 sample locations do not appear to coincide well with 1985 sample locations, with PCB detections.

DRO was detected at 1,300 mg/Kg in a surface soil sample collected from the vicinity of a reported former 110-gallon fuel tank. The laboratory, however, reported the chromatogram did not resemble diesel (USAF, 1996).

2.2.2 SS002: Landfill No. 1 at the Former Composite Building

SS002 is located adjacent to the southeast side of the former composite building and encompasses approximately 40,000 square feet (Figure 2-3). The landfill was reportedly operated under permit 88921-BA009 and was used for disposal of building debris and asbestos, during the 1991 demolition of the facility (USAF, 2001a).

One surface soil sample was collected from an area of seepage in the northeast portion of the landfill, in 1995. Total petroleum hydrocarbons (TPH) were detected in the sample at a concentration of 16,000 mg/Kg and DRO was detected at 550 mg/Kg (USAF, 1996).

In 2000, the Air Force conducted an inspection of the landfill and found several areas of subsidence and exposed metal and debris (USAF, 2001a).

2.2.3 WP003: POL Waste Pit at the Former Composite Building

WP003 is a floor drain outfall located approximately 250 feet northeast of the former composite building. The general location of WP003 is depicted on Figure 2-3. The outfall is located at the end of a six-inch diameter drain line that originates within the building and is visible on as-builts of the facility.

Limited investigation was performed at this site in 1985 and 1995. In 1985, one composite surface soil sample was collected from the end of the drain line within the outfall. Traces of BTEX, chlorinated solvents, and PCBs were detected in the sample. In 1995, one surface soil sample was collected from approximately 60 feet downslope from the end drain line, within the outfall. In this sample, TPH was detected at 120,000 mg/Kg with DRO and gasoline range organics (GRO) detected at 75,000 mg/Kg and 609 mg/Kg, respectively. Traces of BTEX and pesticides were also detected in the sample (USAF, 1996).

2.2.4 SS004: Spill/Leak No. 4 at the Drum Storage Area

SS04 is a former drum storage area located approximately 1,000 feet west of the south end of the Driftwood Bay runway (Figure 2-3). The source area was composed of a formal drum storage area, a wooden storage building, and a trench parallel to the former composite building access road. A 500-gallon gasoline was also suspected of existing to the northeast of the wooden storage building.

According to the Draft Landfill Closure Report (USAF, 1995), "the wooden Airport Storage Building was burned after removal of debris and hardware to lessen the volume in the landfill; the area was then cleaned and graded."

Limited investigation of the wooden storage building area was conducted in 1985 and all three sub-sites associated with SS04 were investigated in 1995. In 1985, one composite surface soil sample was collected from the east side of the former location of the wooden storage building. It is not clear from the 1996 report what analyses were performed on the sample, but a trace of methylene chloride, a common laboratory contaminant, was detected in the sample. Seven drums were apparently located in 1985 and two composite samples of the contents were sent for laboratory analysis. Although it is not clear from the 1996 report what analyses were performed on the two samples, both contained BTEX. One sample also contained dichloroethene (USAF, 1996).

One surface soil sample was collected from each of the three sub-sites associated with SS04, in 1995. Samples were analyzed for TPH, DRO, GRO, and VOCs. The surface soil sample collected from the west side of the former wooden storage building contained DRO at a concentration of 1,640 mg/Kg and a detectable concentration of GRO. At the formal drum storage area, TPH, DRO, and GRO were detected in a surface soil sample at 1,330 mg/Kg, 1,210 mg/Kg, and 248 mg/Kg respectively. A surface soil sample collected within the trench contained detectable concentrations of TPH and DRO (USAF, 1996).

2.2.5 SS005: Spill/Leak No. 5 at the MOGAS Tank at the Runway

A motor gasoline (MOGAS) storage tank was reportedly located in an off-loading area on the south end of the runway during facility operation. The tank was reportedly a 2,500-gallon steel-welded AST. The former location of the tank is depicted on Figure 2-3.

In 1985, one composite surface soil sample was collected from the southeast side of the tank and analyzed for PCBs, metals, VOCs, and hydrocarbon distribution (the method for hydrocarbon distribution is not reported in the 1996 report). Hydrocarbons identified as oil were detected at 6,500 mg/Kg in this sample.

In 1995, one surface soil sample was collected from the location of the former tank and analyzed for BTEX, GRO, and lead. BTEX and GRO in this sample were not detected and lead was detected at 3 mg/Kg. A sheen was noted on nearby surface water during the investigation; however, the location of the surface water body was not recorded and no samples of the surface water were collected.

2.2.6 LF006: Old Disposal Area

A disposal area or landfill is located approximately one mile south of the south end, of the runway, as depicted on Figure 2-3. The 1996 PA/SI Report indicates that the extent of debris and wastes disposed of are unknown (USAF, 1996). Anecdotal evidence collected in 1995 indicated that some heavy equipment was drained of fluids and buried in LF006 in 1991 (USAF, 1996).

In 1995, an inspection of the source area was conducted. A soil stockpile and debris including several 55-gallon drums, were noted within the disposal area. One surface soil sample and one surface water sample were collected east of the old disposal area, where a road intersects Humpy Creek. It is unclear from the report how far east of the disposal area the samples were collected. Samples were analyzed for TPH, DRO, GRO, VOCs, pesticides, and metals. TPH and DRO were detected below screening criteria (see Section 3 for definition of screening criteria) concentrations in the soil sample and not detected in the water sample (USAF, 1996).

2.2.7 SS007: Spill/Leak No. 7 at the POL Tank Area

The petroleum, oil and lubricants (POL) tank area was located on the beach approximately 3,000 feet east of the north end of the runway as depicted on Figure 2-3. The POL tank area consisted of two 250,000-gallon ASTs, a fuel pumphouse, and a 25,000-gallon MOGAS AST. Fuel from the 250,000-gallon ASTs was pumped west through a two-inch diameter fuel line, to the former composite building.

In 1985, two surface soil samples were collected from the vicinity of the 250,000-gallon ASTs and analyzed for PCBs, metals, and VOCs. PCBs were not detected in either surface soil sample, but traces of metals and methylene chloride were detected. One surface water sample was also collected from Humpy Creek in the vicinity of the ASTs and was analyzed for metals; no metals were detected in this sample (USAF, 1996).

In 1991, oiled sand was excavated from the foundations of the two 250,000-gallon ASTs during demolition of the site and placed in the landfill, at the former composite building (SS002). One sample of the sand was collected and analyzed for TPH and DRO. TPH and DRO were detected at 27,000 mg/Kg and 1,930 mg/Kg respectively in the sample (USAF, 1996).

In 1995, one surface soil sample was collected from the foundations of each of the 250,000-gallon ASTs. One surface soil sample was collected from the north side, of the former pump-house and one surface water sample was collected from Humpy Creek in the vicinity of the 250,000-gallon ASTs. All three surface soil samples were analyzed for DRO, one surface soil sample was analyzed for TPH, and the surface water sample was analyzed for DRO and BTEX. DRO was detected as high as 9,700 mg/Kg in samples collected from the samples collected from the foundations of the ASTs; TPH was detected at 27,000 mg/Kg in a sample collected from the foundation of one of the ASTs; DRO was detected at 13,300 mg/Kg in the surface soil sample collected from the north side of the former pumphouse; and DRO and BTEX were not detected in the surface water sample (USAF, 1996).

No samples were collected from the former location of the 25,000-gallon MOGAS tank during any investigation.

2.2.8 SS008: Spill/Leak No. 8 at the POL Pipeline

The fuel supply lines serving the former composite building consisted of two pipelines. A four-inch diameter fill line originated at a fill stand on the beach to the northwest of the north end of the runway. This four-inch line extended along the beach through the pumphouse to the 250,000-gallon ASTs located on the beach to the east of the north end of the runway. A two-

inch diameter pipeline then transported fuel from the ASTs approximately three miles to two 20,000-gallon USTs at the former composite building. The location of the pipeline corridor from the ASTs to the former composite building is depicted on Figure 2-3.

Following removal of the facility, all above ground portions of the pipeline were dismantled and placed in Landfill No. 1 at the former composite building. According to the landfill closure report, "all POL products were removed from the POL systems and contained in 55-gallon drums to be used by the contractor. All the aboveground piping was placed in the landfill: 6,100 feet of 2-inch steel pipe, 800 feet of 4-inch steel pipe, and 160 feet of 6-inch steel pipe" (USAF, 1995).

In 1995, three surface soil samples were collected along the fuel pipeline corridor in a small area just north of the north end of the runway. Samples were analyzed for DRO only. Two of the three surface soil samples contained low but detectable concentrations of DRO. The third sample contained a DRO concentration of 5,360 mg/Kg (USAF, 1996). No other investigation has been reported for this source area.

2.2.9 FL009: Spill/Leak No. 1 at the Septic Tank

The septic system is composed of a six-inch diameter drain line, which extends approximately 160 feet from the former composite building to a septic tank. From the septic tank, the drain line extends approximately 400 feet further to an outfall area. It is unknown if the septic tank and drain line were abandoned during demolition of the site in 1991. No investigation work has been reported for this source area.

2.2.10 SS010: Spill/Leak No. 2 at the Former Water Supply Pump House

A pipeline transported water from Snoffy Creek to a pumphouse located approximately one mile west, of the south end of the runway, along the access road to the former composite building. The location of the former pumphouse is depicted on Figure 2-3. Water was piped from the pumphouse to a 24,000-gallon storage tank located approximately 100 feet south of the former composite building. The pumphouse was presumably powered by a generator that was supplied by a 550-gallon UST. During previous investigations in 1985, 1991, 1995, and 2001, attempts were made to locate the UST, but were not successful. In 1985 and 1991, investigation reportedly focused on the west side of the pumphouse, while as-built drawings of the facility show the UST on the east site of the pumphouse. In 1995 and 2001, attempts to locate the UST were unsuccessful due to a landslide that covered the pumphouse area.

2.2.11 SS011: Spill/Leak No. 3 at the Former Lighting Vault at the Runway

The former lighting vault was located approximately 650 feet southwest, of the south end of the runway, along the access road to the former composite building (Figure 2-3). A 10-foot by 15-foot concrete foundation is reportedly still in place (USAF, 1996). Historical photos show what appears to be a small AST against the west outside wall of the building.

In 1995, one surface soil sample was collected from the north side of the former lighting vault foundation and analyzed for PCBs and pesticides. Neither analyte was detected in the sample (USAF, 1996).

In 2000, five surface soil samples were collected from the perimeter of the former lighting vault foundation and analyzed for BTEX, GRO, DRO, residual range organics (RRO), VOCs, semi-volatile organic compounds (SVOCs), PCBs, and pesticides. BTEX, GRO, VOCs, PCBs, and pesticides were not detected in any of these samples. Traces of DRO, RRO, and several SVOCs were detected several of the samples. However, one SVOC benzo(a)pyrene, was detected at 1.67 mg/Kg, which is above current screening criteria outlined in Section 3, in a sample collected approximately five feet north, of the former lighting vault (USAF, 2000a).

2.2.12 TU012: Spill/Leak No. 9 at the Former USTs

As-built drawings of the Driftwood Bay RRS indicate the location of a fuel tank northeast of the former lighting vault. The location is depicted on Figure 2-3. The type of product contained in the tank and the purpose of the tank is not discernable from as-built drawings. However, the tank may have supplied fuel to a generator at the former lighting vault which supplied power to all runway lights.

In 1991, a contractor reportedly located and removed three USTs from this area. These included: a 1,000-gallon diesel UST, a 750-gallon MOGAS UST, and a 250-gallon MOGAS UST. The contractor reportedly collected several soil samples during the removal of these tanks; however, sample locations were apparently not reported. Following UST removal, the contractor reportedly used a thermal remediation unit to treat an estimated 30 cubic yards of contaminated soil associated with the tanks. Analytical results indicate the soil was treated and sampled several times and a final analytical result of 253 mg/Kg was reported for the treated soil (USAF, 1996). No additional investigation of this source area has been reported.

2.3 SUMMARY OF DATA GAPS AND UNCERTAINTIES

In order to narrow on-site field testing and sampling activities to areas with a high potential for contamination, it is important to compile a detailed history of former waste handling procedures and determine locations of certain facility features. A review of historical documents from the Driftwood Bay RRS has led to generation of a list of uncertainties about operations at several of the sites. These site-specific lists of uncertainties are provided below. During the 2005 PA/SI, information was compiled to address these uncertainties to help optimize sampling locations in areas most likely to contain contaminants.

2.3.1 Driftwood Bay RRS Data Gaps and Uncertainties

Several uncertainties were identified for the 12 separate IRP sites at Driftwood Bay RRS. These include information that, if identified, might significantly benefit the 2005 PA/SI efforts. While it is out of the scope of this project to answer all of these questions, resources were utilized to gather as much information as possible. The list includes non-analytical uncertainties that pertain to previous waste handling procedures and facility layout. Several of these pertain to specific IRP sites, which are appropriately referenced.

- OT001: Is one 20,000-gallon UST still in place to the northwest of the former composite building?
- SS002: What was the exact burial location(s) of the asbestos-containing materials within this landfill? Is there more than one burial location?
- WP003: Where is the exact location of the former composite building floor drain outfall and POL waste pit?
- SS005: Was the former MOGAS tank at the runway an AST or UST and if it was a UST, was it removed?
- LF006: Where is the exact location of the Old Disposal Area?
- SS007: Was there a beach landing area near the POL Tank Farm?
- SS008: Was the former fuel pipeline above ground or buried, and was it removed as described in the landfill closure report? Was there a beach landing area near the termination of the termination of the 4-inch diameter fuel pipeline?
- FL009: Were the septic tank and septic lines abandoned or removed?
- SS010: Was the water supply pumphouse UST removed?
- General: Are there any waste handling procedures, such as disposal trenches or burial areas, not previously identified? Was debris dumped onto surface water drainages? Are there existing groundwater seeps day-lighting into surface water drainages in the mountainous areas of the facility?

In addition to the IRP sites previously defined at the Driftwood Bay RRS, several other points of interest have also been identified. They are listed in Table 2-1.

Table 2-1 Additional Points of Interest at the Driftwood Bay RRS

Point of Interest	General Location
Ammunition Storage Shed	East of the Former Composite Building
Red Cinder Dome Rock Quarry	Between the Runway and Former Composite Building
500-Gallon Gasoline Tank	Northeast of the Drum Storage Area
Fish Pond	North of the Drum Storage Area
Drums along the road to Wide Bay	Several miles south of the Runway
Heavy Equipment Storage Building	South of the Runway
1958 Construction Camp	Near the Drum Storage Area
Water Storage Tank	South of the Former Composite Building
Drainage Ditch	Bordering the Runway
Suspected Beach Hardstand	Near the POL Tank Area

3.0 FIELD ACTIVITIES AND ANALYTICAL PROTOCOL

The following sections describe the field methods used during the 2005 PA/SI at the Driftwood Bay RRS. All laboratory analyses were performed in accordance with the project Quality Assurance Project Plan, which is included as Appendix A of the Final Quality Program Plans (USAF, 2005a).

3.1 FIELD TESTING

Field testing of samples was collected to determine areas of likely contamination. The following subsections describe how the field testing data was collected and utilized.

3.1.1 Surface Soil Field Testing

Field testing of surface soil was conducted at several locations. Field testing results were used to optimize placement of laboratory samples. In most cases, field testing sample locations were selected based on field observations, proximity to suspected sources, or proximity to sensitive or downgradient receptors. Ultimately, field testing sample results afforded the field crews the opportunity to bias the collection of samples for laboratory samples in areas of the most prevalent contamination so the results were the most conservative findings possible.

Surface soil field testing samples were collected from zero to two feet bgs in native soil. Overburden was removed to within a few inches of the desired sample depth using hand digging with a shovel or mechanical techniques, such as a hand auger or backhoe. A decontaminated stainless steel trowel or sterilized disposable Teflon® trowel was used to remove the last few inches of overburden and to collect the sample.

In general, soil was field tested using either a photo-ionization detector (PID) or an immunoassay kit (or both) to provide a qualitative estimate of VOCs and/or chloride present. Visual and olfactory observations were also noted and heavily relied upon. The general procedures for using a PID are described below. All other field testing methods were conducted per manufacturer's instructions.

Field Testing Using A PID

The following field testing procedure used to obtain and analyze soil samples was adhered to when using a PID:

1. At locations where a strong fuel odor was noted during hand digging of surface soil field testing holes, down-hole vapors were sampled with the PID to determine areas with the highest concentrations of contaminants in order to facilitate collection of laboratory analytical samples representative of the worst-case location. At locations where no obvious contamination was present, the following procedure was followed.
2. Partially fill (one-third to one-half) a clean jar or clean self-sealing plastic bag with the sample to be analyzed; total capacity of the jar or bag may not be less than eight ounces (app. 250 milliliters), but the container should not be so large as to allow vapor diffusion and stratification effects to significantly affect the sample;

3. If the sample was collected from an excavation or soil pile, it was collected from freshly uncovered soil;
4. A self-sealing plastic bag was used, and was quickly sealed shut following sample collection;
5. Headspace vapors were allowed to develop in the container for at least 10 minutes but no longer than one hour; containers were shaken or agitated for 15 seconds at the beginning and end of the headspace development period to assist volatilization; temperatures of the headspace were warmed to at least 40° F (approximately 5° C), with instruments calibrated for the temperature used;
6. After headspace development, the instrument sampling probe was inserted to a point about one-half the headspace depth; the container opening was minimized and care was taken to avoid uptake of water droplets and soil particulates;
7. After probe insertion, the highest meter reading was recorded, which normally occurred between two and five seconds after probe insertion; if erratic meter response occurred at high organic vapor concentrations or conditions of elevated headspace moisture, a note to that effect accompanied headspace data;
8. Calibration of PID was conducted following manufacturer's instructions; and
9. All field screening results were documented in the field record or log book.

Surface soil field testing samples were collected at various source areas. All surface soil field testing locations were determined in the field based on observations. Some locations required surface soil field testing within grids that overlayed a source area, while other locations were linear. Additional surface soil field testing samples were collected in areas of visible staining or stressed vegetation.

Surface soil field testing within grids was performed to determine the most likely locations of contamination. The grids were centered on suspected source areas and extended to the boundaries of potentially impacted area. The initial spacing between field testing samples was determined in the field based on site conditions and ranged from 20-foot by 20-foot squares to as small as 10-foot by 10-foot squares. The sampling interval was chosen to allow for enough samples to be collected such that an area of surface contamination was initially identified, without unnecessary data being collected via a tighter grid. The grid was established and adjusted for "fit" as needed in the field based upon the observed limits of the impacted area.

Surface soil samples from some locations were also field tested for chlorinated compounds using Dexsil L2000DX Chloride in soil test kits. The L2000DX uses an ion-specific electrode to quantify the concentration of chloride in the sample. Chemical-specific chlorinated compounds were determined through laboratory analysis. The L2000DX was chosen over other methods mainly due to the ability to detect all types of chlorinated compounds. Other kits are chemical-specific and the field crew would be required to perform up to three tests on a single sample for chlorinated compounds. Other field data was also used to determine the type of chlorinated chemical present if detected with the L2000DX. This included use of the PID to determine if the

chemical was volatile (indicating the presence of a chlorinated solvent). Contaminant location information was also used to judge the type of chlorinated chemical present. For example, if a chlorinated compound is detected in the top few feet of soil only, it is more likely to be PCBs, pesticides, or herbicides rather than a chlorinated solvent.

3.2 ANALYTICAL SAMPLING

Analytical samples were collected of several different media types during the preliminary assessment and site inspection. Samples were collected to determine whether contamination was present at the site, and to a lesser extent, the nature and extent of any contamination identified. Samples were also collected to characterize waste. The following subsections describe how each media was sampled.

3.2.1 Surface Soil Sampling

All surface soil analytical samples were collected between zero and two feet bgs in native soil. All samples collected in areas where fill material might have been recently placed was advanced to a depth sufficient to sample what would have been surface soils at the time the sites were operational. Surface soil analytical samples were collected using several different methods to remove overburden. These methods included hand digging using picks or shovels, hand augers, or a backhoes.

Once overburden was removed, a decontaminated stainless-steel hand trowel and mixing bowl was used to collect surface soil samples. Sterile disposable sampling spoons were also used to collect analytical samples. The decontaminated or disposable equipment was used to hand dig a few inches below the bottom of the excavation in order to prevent cross-contamination from equipment used to remove overburden. The soil was containerized as soon as the sample was retrieved from the sampling device. Surface soil samples were collected as follows:

1. Check all equipment and sample containers to ensure that the equipment is clean and that the containers are new and have been properly prepared.
2. Label container and initiate chain-of-custody and task/sample-specific data sheet, as applicable.
3. Excavate to a few inches above the desired sampling depth.
4. Hand dig the last few inches to the desired sampling depth with decontaminated sampling device, collect the sample aliquot for VOC and/or GRO analysis first and transfer into appropriate sample jar; collect additional soil and immediately fill jars with soil needed for analysis completely to the top to minimize headspace and seal.
5. Note in field notebook the interval from which the soil was collected and the soil type encountered.

3.2.2 Subsurface Soil Sampling Procedures

Subsurface soil samples were collected from source areas based on site conditions. Subsurface soil samples were collected using a hand auger or a backhoe if soil appeared to be greater than

three feet to bedrock and if surface soil field testing indicated the presence of contamination. Procedures for sample collection were the same as those used for collection of surface soil samples except that soil were sampled directly from the hand auger or the backhoe bucket (for test pits greater than four feet deep). All tools were decontaminated prior to sampling.

3.2.3 Water Sampling

Water samples were collected from standing water that may have received run-off from a source area (surface water) or from water that accumulated in a hand dug hole (groundwater). With the exception of preserved sample bottles, shallow standing water, or down-hole water, surface water samples were collected by submerging each sample unpreserved container (with the open end upstream), allowing the container to fill slowly and continuously using the cap to regulate the speed of water entering the bottle. Care was taken to minimize disturbance of the surface water body. For preserved sample containers and shallow standing water, a decontaminated glass beaker was submerged in water and used to transfer the sample into the sample bottle.

The sample bottles for VOCs were filled slowly to prevent the entrapment of air bubbles, splashing, or agitation of the water. Care was taken to avoid touching the top of the sample bottle, the inside of the cap, or the Teflon® septa. If a septum fell out of the cap onto the ground it could not be used. Each bottle was filled slowly and completely such that a meniscus was formed. The cap was secured and the bottle inverted, tapped firmly, and checked for the presence of air bubbles as analytical results for VOCs are potentially compromised if there is any free air trapped in the sample container.

4.0 SCREENING CRITERIA

The identification of regulations and guidelines that were considered in the development of the project work plan followed the process for Superfund sites. For the purposes of this investigation, these are based primarily on ADEC cleanup levels for chemicals in various media. Since final determination of cleanup levels for this facility will not be determined during this investigation, cleanup levels are referred to as "screening criteria" in this document. Screening criteria are used as benchmarks in this document to determine whether contamination is present at a site. The following sections discuss the basis for screening criteria to be used during this investigation.

4.1 SOIL SCREENING CRITERIA

Soil samples collected during the 2005 field investigation are compared to the soil cleanup levels presented in 18 Alaska Administrative Code (AAC) Chapter 75, Article 3, entitled *Oil and Hazardous Substances Pollution Control Regulations - Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances*. These regulations provide four methods of establishing cleanup levels for soils: two methods (Methods One and Two) that derive cleanup levels from standard tables, and two methods (Methods Three and Four) that derive site-specific alternative cleanup levels. Any method applied is used for screening purposes only in the 2005 PA/SI efforts.

Prior to applying any of the four methods for soil screening purposes, any inorganic contaminants (i.e., metals) that did not exceed their background concentration were considered to be within naturally occurring limits and were not evaluated against the regulatory soil cleanup levels. Sufficient background samples were not collected during the 2005 PA/SI effort to calculate inorganic background concentrations in accordance with the ADEC guidance provided in *Determining Background Concentrations in Soil* dated 13 June 2003. However, as allowed in Section II of the ADEC guidance document, background data from a similar and nearby site was used. The background data was from previous field efforts conducted on Amaknak and Unalaska Islands in support of risk assessments and to calculate site specific cleanup standards for the Islands. The background data was documented in the *Comprehensive Remedial Investigation (RI) Report, Amaknak and Unalaska Islands, Alaska* dated May 2000. For this PA/SI effort, the only inorganic constituent that exceeded regulatory soil cleanup levels but was considered to be within naturally occurring limits was arsenic. The background concentration for arsenic contained in the May 2000 RI Report was 9.85 mg/Kg.

Method One soil cleanup levels 18 AAC 75.341(a) –Method One soil cleanup levels are not expected to be used as screening criteria at this site.

Method Two soil cleanup levels [18 AAC 75.341(c) and (d) – Tables B1 and B2] apply to soils contaminated with petroleum hydrocarbons or other chemicals. Tabulated soil cleanup levels for many organic and inorganic chemicals as well as GRO, DRO, and RRO are compared to site-specific analytical data. All sites will first be compared to Method Two cleanup levels. For each chemical, different cleanup standards apply depending on whether the site is in an Arctic zone, a

non-Arctic zone with annual precipitation of less than 40 inches, or a non-Arctic zone with annual precipitation of greater than or equal to 40 inches. Driftwood Bay is located in a non-Arctic zone with annual precipitation greater than 40 inches. Therefore, the soil cleanup values under this category are used to evaluate data from the PA/SI. In addition, different cleanup levels can apply depending on whether human exposure can occur directly by ingestion or inhalation, or indirectly via migration from contaminated soil to groundwater. All three exposure pathways may exist at this facility; therefore, the most stringent of the three pathway-specific cleanup levels will likely apply. If a site does not meet Method Two cleanup levels, Method Three may be applied.

Method Three allows for modification of the default soil cleanup levels to account for site-specific soil and aquifer data. The applicable cleanup level is the most stringent of the site-specific calculated cleanup level for a particular pathway or pathways and the Method Two level for the remaining exposure pathways. Site-specific alternative cleanup levels can be modified as follows:

- The inhalation or migration to groundwater cleanup levels can be modified using site-specific soil data plugged into standard equations referenced in ADEC *Guidance of Cleanup Standards Equations and Input Parameters* (ADEC, 1999a).
- The migration to groundwater or inhalation cleanup level can be modified using site-specific data and a fate and transport model prepared in accordance with ADEC *Guidance on Fate and Transport Modeling* (ADEC, 1998).
- The ingestion or inhalation levels can be modified using acceptable commercial/industrial exposure parameters and standard equations referenced in ADEC *Guidance of Cleanup Standards Equations and Input Parameters* (ADEC, 1999a), if ADEC has determined that a commercial/industrial use of the site is appropriate.

Method Four provides for establishing site-specific alternative cleanup levels based on the results of a risk assessment. A risk assessment will not be performed during this investigation and Method Four will not be considered.

Because soil containing PCBs was encountered during planned field activities, 40 CFR 761 was also considered screening criteria. This regulation provides standards for the storage, treatment, disposal, and management of wastes containing PCBs. All PCB data are compared to applicable standards in 40 CFR 761.

4.2 GROUNDWATER SCREENING CRITERIA

Groundwater samples collected during the 2005 field investigation are compared to the groundwater cleanup levels presented in 18 AAC 75.345 – Table C as screening criteria. These regulations incorporate the ADEC Drinking Water Regulations (18 AAC 80). Data collected during the PA/SI will be used to determine the next appropriate step for study or remedial work.

In situations where groundwater is closely connected hydrologically to nearby surface water, ADEC Water Quality Standards (18 AAC 70) are also applied, as specified in 18 AAC 75.345. These water quality standards are dependent on the type of water (i.e., fresh water or marine water) and the use classification of the water body (i.e., water supply, water recreation, growth and propagation of fish, shellfish, other aquatic life, wildlife; and harvesting for consumption of raw mollusks, or other raw aquatic life).

Because groundwater containing PCBs may be encountered during planned field activities, 40 CFR 761 is also considered as screening criteria in addition to 18 AAC 75. This regulation provides standards for the storage, treatment, disposal, and management of wastes containing PCBs. All PCB data are compared to applicable standards in 40 CFR 761.

4.3 SURFACE WATER SCREENING CRITERIA

Surface water samples collected during the 2005 field investigation will be compared to the ADEC Water Quality Standards (18 AAC 70) as screening criteria. As mentioned above, these water quality standards are dependent on the type of water and the use classification of the water body. For parameters that are not addressed in 18 AAC 70 (e.g., GRO, DRO, and RRO), cleanup levels from 18 AAC 75.345 will be utilized.

4.4 SEDIMENT SCREENING CRITERIA

Regulatory criteria for sediment quality are addressed in several standard references such as chemical-specific *Sediment Quality Criteria for the Protection for Benthic Organisms: Phenanthrene* (USEPA, 1993a) and *Technical Basis for Deriving Sediment Quality Criteria for Nonionic Organic Contaminants for the Protection of Benthic Organisms by Using Equilibrium Partitioning* (USEPA, 1993b). However, some of these references are based primarily on marine studies and none specifically address State of Alaska cleanup levels for sediment. In 1999, the National Oceanic and Atmospheric Administration (NOAA) developed the *Screening Quick Reference Tables* (NOAA, 1999), which includes benchmarks for freshwater sediment. These Screening Quick Reference Tables, are considered more appropriate for use as screening criteria for this investigation. In addition to these, sediment screening criteria developed by the Oak Ridge National Laboratory (ORNL) are also used (ORNL, 1997).

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5.0 SUMMARY OF FINDINGS

The objective of the 2005 PA/SI efforts at Driftwood Bay RRS is to determine if contamination is present at the former facility and document locations of contaminated media. The intent of this investigation is not to fully delineate the nature and extent of each contaminated area, but to collect data necessary to determine the next appropriate step for study or remedial work.

Analytical results and associated flags for the collected data are presented in the site-specific tables in Section 5. Note that more detail on analytical data flagging procedures and definitions are presented in the Quality Assurance/Quality Control Report (Appendix C). All analytical data are provided in Appendix A and all sample and laboratory QC information is provided in the CD attached to this document.

During the 2005 work, 12 IRP sites and 10 additional points of interest were investigated. All Driftwood Bay RRS IRP sites and additional points of interest studied are listed in Table 5-1. Each of these IRP sites and points of interest are depicted on Figure 5-1.

Table 5-1 Driftwood Bay IRP Sites and Additional Points of Interest

Site Name	Description
FL009	Spill/Leak No. 1 at the Septic Tank
LF006	Old Disposal Area
OT001	Former Composite Building and Antenna Arrays
SS002	Landfill No. 1 at the Former Composite Building
SS004	Spill/Leak No. 4 at the Drum Storage Area
SS005	Spill/Leak No. 5 at the MOGAS Tank at the Runway
SS007	Spill/Leak No. 7 at the POL Tank Area
SS008	Spill/Leak No. 8 at the POL Pipeline
SS010	Spill/Leak No. 2 at the Former Water Supply Pump House
SS011	Spill/Leak No. 3 at the Former Lighting Vault at the Runway
TU012	Spill/Leak No. 9 at the Former USTs
WP003	POL Waste Pit at the Former Composite Building
Additional Points of Interest	Ammunition Storage Shed
	Red Cinder Dome Rock Quarry
	500-Gallon Gasoline Tank northeast of the Drum Storage Area
	Fish Pond northeast of the Drum Storage Area
	Drums along the road to Wide Bay
	Heavy Equipment Storage Building near the Runway
	1958 Construction Camp
	Water Storage Tank
	Drainage Ditch bordering Runway
	Beach Hardstand near the POL Tank Area

Figure 5-1 Driftwood Bay IRP Sites and Points of Interest

5.1 INORGANIC ANALYTICAL RESULTS

As discussed in Section 4.1 arsenic concentrations were compared against calculated background concentrations documented in the Comprehensive Remedial Investigation (RI) Report, Amaknak and Unalaska Islands, Alaska dated May 2000. Arsenic was the only inorganic constituent that consistently exceeded regulatory soil cleanup levels (1.8 mg/Kg) but was considered to be within naturally occurring limits (9.85 mg/Kg).

Although using background data from a similar and nearby site is allowed according to the ADEC guidance provided in Determining Background Concentrations in Soil dated 13 June 2003, the statistical methods detailed in the ADEC 2003 guidance document have changed since the Amaknak and Unalaska Islands background concentrations were calculated in 2000. Previous guidance from ADEC, used to calculate the Amaknak and Unalaska Islands background concentrations, recommended calculating an upper confidence limit (UCL) on the mean concentration in a background data set. However, the UCL statistical method is not included in the revised guidance document because that method generally performs poorly with environmental data sets. Recent guidance from USEPA which is cited in the ADEC 2003 guidance document recommends using one of three methods to determine background concentrations:

- Method 1 - Compute the background upper tolerance limit;
- Method 2 - Compute the interquartile range of the sample set to estimate a 95% confidence limit on the median of the background data set; or
- Method 3 - For background data sets with three or fewer data points, the maximum value for each hazardous substance should be selected as the background concentration unless it is suspected that the maximum represents an anomaly within the background population.

Therefore, it is recommended that a sampling program for inorganic analytes be incorporated into any future, more comprehensive, investigations at Driftwood Bay to determine background concentrations. The procedures for sample collection and statistical analysis provided in the ADEC 2003 guidance document should be followed when determining the background concentrations.

In the following sections, arsenic concentrations are discussed for individual sites only if they exceed the 9.85 mg/Kg naturally occurring background concentrations.

5.2 OT001: FORMER COMPOSITE BUILDING AND ANTENNA ARRAYS

The former composite building is located approximately two miles southwest of Driftwood Bay and is accessed from the bay by a winding four mile long road. The area covers approximately six acres and includes the former composite building foundation, the antenna pads, two former 20,000-gallon USTs, and a 110-gallon AST to the

northwest of the former composite building. The site location is depicted on Figure 5-2. Foundations of the composite building and antenna

arrays are currently in place. Previous work included removal of structures and USTs and collection of surface soil samples. Both PCBs and DRO were detected in surface soil above current screening criteria during an investigation in 1985. A later study did not detect PCBs above screening criteria but did detect DRO above screening criteria. A summary of these investigations is provided in Section 2.3 of this report.

5.2.1 Investigation Approach

During the 2005 PA/SI, the former composite building and antenna arrays were investigated to achieve the following objectives:

1. Determine if contamination is present in surface soil in association with this source area;
2. Determine depth to bedrock at OT001;
3. Determine if surface water is present at OT001;
4. Determine if a 20,000-gallon UST is still in place near the former composite building; and
5. Determine if subsurface soil contamination is present in association with the former 20,000-gallon USTs.

The investigation of this area included site reconnaissance, surface soil field testing, test pit excavation, and surface soil and subsurface soil analytical sampling.

5.2.2 Reconnaissance and Field Testing

Investigation of the former composite building and antenna arrays began with reconnaissance to determine the layout of the site and to look for any areas of stressed vegetation or stained soil. Drawings from previous reports and as-built drawings were used to determine appropriate starting points for the investigation. Foundations of the building were found to be in-place and above grade. Foundations of all four antenna pads appeared to be in-place, but were partially or entirely buried. Only bare soil with sparse vegetation was found surrounding the building foundation and antenna pads and no stained soil was located during reconnaissance. There was no evidence of surface water at OT001. The location of the former USTs was determined by measuring from the corners of the building foundation based on the UST locations shown on as-built drawings.

Surface soil field testing samples were collected from the perimeter of the building foundation and from around each of the four antenna pads. PID readings were taken from 21 locations surrounding the building foundation and from 14 locations around the antenna pads. PID readings were taken by hand digging a hole 0.5 to 1.0 feet deep and

Figure 5-2 OT001 Site Location

measuring the air within the hole. All PID locations are shown on Figure 5-3. Elevated PID readings (up to 34.4 ppmv [parts per million by volume]) and a strong odor were noted in a small area along the western perimeter of the building foundation. PID readings greater than one ppmv are depicted on Figure 5-3. All other PID readings were 0.1 ppmv or less and no other indication of contamination was detected around the building foundation or the antenna pads.

Soil from these locations was combined into five surface soil composite samples from around the building foundation and one composite sample from around each of the antenna pads for soil field testing purposes as shown on Figure 5-3. Each of these surface soil composite samples was tested in the field for chlorides using a Dexsil L2000DX Chloride in Soil Immunoassay Test Kit. Previous use indicates that chloride results from this particular test kit are typically on the order of 100 times greater than the PCB concentration in the soil tested (USAF, 2005b). For the purposes of this investigation, a result of 25 parts per million (ppm) of chloride was conservatively considered an elevated result. Surface soil field test results for chlorides in surface soil at OT001 are provided in Table 5-2. Elevated chlorides were not detected in any of these samples.

Table 5-2 OT001 Surface Soil Field Test Results for Chlorides

Field Test Sample ID	Chloride Result (ppm)
OT001-1	1.33
OT001-2	3.10
OT001-3	2.21
OT001-4	2.47
OT001-5	2.25
Antenna No. 1	2.30
Antenna No. 2	3.09
Antenna No. 3	0.26
Antenna No. 4	3.42

Notes:

ID identification
ppm parts per million

Figure 5-3 PI01 Surface Soil Field Testing Grid Location

5.2.3 Analytical Sampling

Analytical samples were collected of both surface soil and subsurface soil based on information gathered during reconnaissance and field testing. A total of six analytical samples were collected from OT001. All sample locations are depicted on Figure 5-4 and all sample depths and analyses are provided in Table 5-3.

Table 5-3 OT001 Analytical Sampling

Sample ID	Depth (feet bgs)	AK 102/103 DRO/RRO	AK 101 GRO	EPA 8270 PAH	EPA 8082 PCBs	EPA 6000 RCRA Metals
OT001-S01-0	1	X			X	X
OT001-S02-0	1	X			X	X
OT001-S03-0	1	X			X	X
OT001-S04-0	1	X			X	X
OT001-S05-0	10	X	X	X		X
OT001-S06-0	3	X	X	X	X	X

Notes:

AK	Alaska	GRO	Gasoline Range Organics	PCBs	polychlorinated biphenyls
bgs	below ground surface	Herb	herbicides	Pest	pesticides
DRO	Diesel Range Organics	ID	identification	RCRA	Resource Conservation and Recovery Act
EPA	Environmental Protection Agency	PAH	polyaromatic hydrocarbons	RRO	Residual Range Organics

Surface soil analytical samples were collected from the perimeter of the building foundation and from around the antenna pads. Since no elevated chloride results were detected in surface soil around the former composite building foundation, one surface soil analytical sample was collected from the area of the highest chloride result and one was collected from the location of the highest PID reading.

One composite surface soil analytical sample (OT001-S04-0) was collected from two discrete locations along the eastern portion of the former composite building foundation (location of highest chloride result); and one sample (OT001-S03-0) was collected from three discrete locations along the western portion of the foundation where the elevated PID readings and strong odor were recorded. This was also the approximate location of the former diesel fill stand and tank. In addition, one analytical sample (OT001-S01-0) was composited from four discrete surface soil locations around Antenna 3 and four discrete locations from around Antenna 4. One analytical surface soil sample (OT001-S02-0) was also composited from three discrete locations around Antenna 1 and three from around Antenna 2.

Two test pits were also dug in the vicinity of the former composite building using an excavator. One test pit was excavated at the location of elevated PID readings and strong hydrocarbon odor along the western perimeter of the foundation. Fractured bedrock was encountered at three feet bgs at this location. One soil analytical sample (OT001-S06-0)

Figure 5-4 OT001 Analytical Sampling Locations

was collected from the bottom of the test pit. The second test pit was excavated at the location of the former USTs to the west of the former composite building. This test pit was excavated to 10 feet bgs and appears to have been correctly located within the former location of the USTs; which were sunk into the bedrock based on as-built drawings and historical photos of construction of the facility. Bedrock was not encountered in this test pit and no USTs were found. Due to unstable soil, the test pit was not excavated beyond 10 feet bgs. One subsurface soil sample (OT001-S05-0) was collected from the bottom of this test pit.

5.2.4 Summary of Findings

Of the six soil samples collected from OT001, five contained DRO in excess of screening criteria. DRO was the only analyte detected above screening criteria at OT001 during the 2005 investigation. Table 5-4 provides all 2005 DRO analytical results at OT001. Because PCBs were detected in previous studies in excess of current screening criteria, PCB analytical results are also provided in this table. All DRO analytical results in excess of screening criteria are also depicted on Figure 5-5. Results of all analyses are provided in Appendix A.

Table 5-4 OT001 Analytical Results

Sample ID	Sample Depth (feet bgs)	DRO (mg/Kg)	PCBs (mg/Kg)
Screening Criteria[1]		**230**	**1**
OT001-S01-0	1	**244**	0.0242 F
OT001-S02-0	1	**770J**	0.01537 F
OT001-S03-0	1	**3,030J**	0.0905 U
OT001-S04-0	1	**307**	0.1881 U
OT001-S05-0	10	**662**	NA
OT001-S06-0	3	168	0.00626 F

Notes:

[1] Soil screening criteria are defined in Section 4

Bold results exceed screening criteria

bgs below ground surface
DRO Diesel Range Organics
F Analyte was positively identified but the associated numerical value is below the RL
ID identification
J Analyte was positively identified, the quantitation is an estimation (see Appendix C)
mg/Kg milligrams per kilogram
PCBs polychlorinated biphenyls
U Analyte was analyzed for, but not detected. The associated numerical is at or below the MDL

Based on analytical results, it appears that DRO is present in surface soil associated with the former composite building and antenna arrays in excess of the screening criteria of 230 mg/Kg. The highest concentration of DRO, 3,030 mg/Kg, was found along the

Figure 5-5 OT001 Analytical Sample Results in Excess of Screening Criteria

western perimeter of the former composite building at the location of a former diesel fill stand and tank.

While bedrock appears to be located approximately three feet bgs in the vicinity of the former composite building (based on test excavations and as-built drawings), the depth to bedrock is much greater at the location of the former 20,000-gallon USTs. Test pit results confirm that the USTs were placed in a hole excavated into the bedrock. The only subsurface soil analytical sample taken in 2005 at OT001 (OT001-S05-0), collected at 10 feet bgs within this excavation, contained DRO at a concentration of 662 mg/Kg.

Based on the depth to bedrock (three feet bgs), the presence of stairs leading from the concrete foundation to the current soil grade, and the presence of contamination in surface soil around the former composite building, it appears that the surface soil at this location is primarily native soil. However, some cover soil is present overlying the antenna pads.

PCBs, detected in 1985 above the current screening criteria of 1 mg/Kg, were not detected above the screening criteria in any analytical sample collected at OT001 in 2005. The highest concentration of PCBs detected in surface soil in 2005 was 0.1881 mg/Kg.

Findings from test pit excavation indicate that bedrock is very shallow (approximately three feet bgs) in the vicinity of the former composite building and antenna arrays. This confirms details on as-built drawings of the facility, which indicate that the building was constructed on top of bedrock. It does not appear that subsurface soil or groundwater are present in the vicinity of the former composite building or antenna arrays (with the exception of subsurface soil at the former location of the 20,000-gallon USTs) and these media may be excluded from future investigation and remedial activities at this site.

5.2.5 Recommendations

Based on results of this investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil at OT001. It is also recommended that additional surface soil analytical sampling be conducted to confirm that PCBs are not present at this site. Additional test pits should be excavated to confirm the depth to bedrock in the vicinity of OT001. The extent of subsurface soil contamination associated with the two 20,000-gallon USTs should also be determined. The extent of contamination at the soil/bedrock interface at all source areas at OT001 should be defined.

5.3 FL009: SPILL/LEAK NO. 1 AT THE SEPTIC TANK

The septic system is composed of a six-inch diameter drain line extending approximately 160 feet east from the former composite building to a septic tank. The line then extends 272 feet east from the septic tank to a man-hole and then extends through another man-hole and then southeast to the septic outfall. The location of the septic system is depicted on Figure 5-6. According to as-built drawings, the septic tank was approximately 8.5 feet

Figure 5-6 FL009 Site Location

long, 5.0 feet wide, and 7.5 feet tall. The top of the septic tank was buried approximately one foot bgs. Drawings do not indicate the depth to bedrock at this location. No investigation work of the septic system prior to 2005 was reported.

5.3.1 Investigation Approach

During the 2005 PA/SI, the septic system was investigated to achieve the following objectives:

1. Determine the location and layout of the septic system;
2. Determine if the septic tank and septic drain lines were abandoned or removed; and
3. Determine if contamination is present in surface soil in association with this source area.

The investigation of this source area included site reconnaissance, surface soil field testing, and surface soil analytical sampling.

5.3.2 Reconnaissance and Field Testing

Investigation of this source area began with reconnaissance to determine the layout of the septic system and look for evidence of stressed vegetation or stained soil. As-built drawings were used to determine appropriate starting points for the investigation. The septic tank was found to be in-place and did not appear to be abandoned. An open six-inch vertical vent pipe was found at ground surface extending down into the tank. The vent pipe was found 160 feet east of the southeast corner of the former composite building. A disposable bailer was used to probe the inside of the tank through the vent pipe to determine if the tank contained liquid. The tank appeared to be dry but contained some sediment. Thick grass was found surrounding the vent pipe and no stained soil or stressed vegetation was observed. A man-hole was found approximately 0.5 feet above grade 272 feet east and down-hill from the septic tank. The man-hole appeared to be in-place and undisturbed. A second man-hole was found 100 feet to the southeast of the first man-hole. The second man-hole also appeared to be in-place and undisturbed. There was no evidence that the septic system had been abandoned. As-built drawings indicate that the septic outfall is located to the southeast of the second man-hole; however, this area was covered with snow at the time of the 2005 investigation.

Field testing of surface soil was conducted around the septic tank vent pipe and the second man-hole. Four holes were hand dug to 1 foot bgs three feet from the septic tank vent pipe as depicted on Figure 5-7 and each location was field tested using a PID by measuring the air within each hole. All readings were from 0.2 to 0.4 ppmv. A PID reading of 6 ppmv was recorded from headspace within the septic tank vent pipe.

Surface soil from all four holes around the vent pipe was then composited and the sample was field tested for chlorides using a Dexsil L200DX Chloride in Soil Immunoassay Test

Figure 5-7 FL009 Surface Soil Field Testing Locations

Kit. One additional surface soil sample was collected from a discrete location 30 feet east of the second man-hole at one foot bgs and field tested for chlorides. Chloride results from the surface soil composite sample around the vent pipe and from the surface soil sample east of the man-hole were 2.52 ppm and 1.12 ppm respectively. Previous use of this chloride test kit indicates that chloride results are typically on the order of 100 times greater than the PCB concentration in the soil tested (USAF, 2005b). For the purposes of this investigation, a result of 25 ppm of chloride was conservatively considered an elevated result. Elevated chlorides were not detected in either of these samples.

5.3.3 Analytical Sampling

One composite analytical sample of surface soil (FL009-S01-0) was collected based on information gathered during reconnaissance and field testing. The sample was collected of soil from locations next to the original field testing locations around the septic tank vent pipe. All four holes were dug to one foot bgs. The sample was analyzed for DRO, RRO, PCBs, and RCRA metals.

5.3.4 Summary of Findings

Composite surface soil sample FL009-S01-0 contained only DRO in excess of the screening criteria of 230 mg/Kg. The DRO concentration in this sample was 697 mg/Kg. No other analytes were detected in excess of screening criteria. The DRO sample result is provided in Table 5-5 and depicted on Figure 5-8. Because PCBs were also found at a nearby site (OT001) in surface soil in excess of the current screening criteria nearby during a previous investigation, the PCB result is also provided in Table 5-5. Results of all analyses are provided in Appendix A.

Table 5-5 FL009 Analytical Results

Sample ID	Depth (feet bgs)	DRO (mg/Kg)	PCBs (mg/Kg)
Screening Criteria[1]		**230**	**1**
FL009-S01-0	1	**697J**	0.0319 F

Notes:

[1] Soil screening criteria are defined in Section 4

Bold results exceed screening criteria

bgs below ground surface
DRO Diesel Range Organics
F Analyte was positively identified but the associated numerical value is below the RL
ID identification
J Analyte was positively identified, the quantitation is an estimation (see Appendix C)
mg/Kg milligrams per kilogram
PCBs polychlorinated biphenyls
U Analyte was analyzed for, but not detected. The associated numerical is at or below the MDL

Figure 5-8 FL009 Analytical Results in Excess of Screening Criteria

Based on analytical results, it appears that DRO is present in surface soil associated with the septic system in excess of the screening criteria of 230 mg/Kg. While the septic outfall could not be investigated during the 2005 study, the presence of DRO in surface soil around the septic tank vent pipe indicates that contaminants may have been flushed through the septic system and contaminated media may also be present at the septic outfall.

5.3.5 Recommendations

Based on results of the investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil at FL009. It is also recommended that the septic system outfall be investigated to determine the nature and extent of any contaminants that may have been flushed through the system. Although test pits excavated nearby at OT001 indicate that the depth to bedrock is shallow and subsurface soil and groundwater are not present, additional test pits should be excavated to determine the depth to bedrock at FL009 (both at the tank and the septic outfall) and the nature of the pipe. In addition, it is recommended that sediment remaining in the septic tank be characterized. The septic pipeline should be investigated to determine if it is intact and soil under the pipeline should be investigated at regular intervals to determine if the pipeline has leaked.

5.4 SS002: LANDFILL NO. 1 AT THE FORMER COMPOSITE BUILDING

SS002 is located adjacent to the southeast side of the former composite building and encompasses approximately 40,000 square feet (Figure 5-9). The landfill was reportedly used for disposal of building debris and asbestos during the 1991 demolition of the facility. The location of the asbestos cell was not clearly identified following demolition and an inspection crew was unable to locate the cell in 2000 (USAF, 2001a). The landfill was also surveyed in 2000 based on the extent of apparently disturbed soil. One surface soil sample collected in 1995 from an area of seepage in the northeast portion of the landfill contained DRO at a concentration of 550 mg/Kg. In 2000, the Air Force conducted an inspection of the landfill and found several areas of subsidence and exposed metal and debris.

5.4.1 Investigation Approach

During the 2005 PA/SI, Landfill No. 1 was investigated to achieve the following objectives:

1. Determine if contamination is present in cover soil over the landfill;
2. Determine the condition of the landfill cover; and
3. Confirm the location of the asbestos cell.

The investigation of this source area included site reconnaissance, surface soil field testing, and surface soil analytical sampling.

Figure 5-9 PI04 Surface Soil Field Testing Locations

5.4.2 Reconnaissance and Field Testing

Investigation of the landfill began with reconnaissance to determine the actual location and size of the landfill and inspect the condition of the cover soil. The actual size of the landfill was not apparent through visual inspection due to the presence of bare soil and snow cover surrounding the entire site. Due to these conditions, it was not apparent where soil had been disturbed versus natural soil conditions. The northern edge of the landfill appeared to be located against the southern edge of the former composite building foundation (as depicted in previous reports). Debris, such as building material, was found exposed and scattered across the surface of the landfill cover soil. The water storage tank was located within the western portion of the landfill, as depicted in previous reports. The tank contained approximately one foot of water covering soil and debris. The depth to water from the top of the water tank was approximately 1.5 feet.

A cover soil field testing grid approximately 100 feet by 200 feet was established over the landfill as depicted on Figure 5-10. PID readings were taken 50 feet at intersecting nodes within this grid. PID readings were taken by hand digging a hole to 0.5 to 1.0 feet deep and measuring the air within the hole. All PID readings were from 0.0 ppmv to 0.1 ppmv.

Soil from these locations was composited into three cover soil field testing samples. The grouping of these samples is depicted on Figure 5-10. Each of these cover soil samples was tested in the field for chlorides using a Dexsil L2000DX Chloride in Soil Immunoassay Test Kit. Previous use indicates that chloride results from this particular test kit are typically on the order of 100 times greater than the PCB concentration in the soil tested (USAF, 2005b). For the purposes of this investigation, a result of 25 ppm of chloride was conservatively considered an elevated result. Cover soil field test results for chlorides at Landfill No. 1 are provided in Table 5-6 . Elevated chlorides were not detected in any of these samples.

Table 5-6 SS002 Cover Soil Field Test Results for Chlorides

Field Test Sample ID	Chloride Result (ppm)
SS002-1	1.34
SS002-2	2.01
SS002-3	0.33

Notes:

ID identification

ppm parts per million

Figure 5-10 SS002 Surface Soil Field Testing Grid Location

5.4.3 Analytical Sampling

Two analytical soil samples were collected based on information gathered during reconnaissance and field testing. Sample locations are depicted on Figure 5-11 and sample depths and analyses are provided in Table 5-7.

Table 5-7 SS002 Analytical Sampling

Sample ID	Depth (feet bgs)	AK 102/103 DRO/RRO	EPA 8082 PCBs	EPA 8081A Pest	EPA 8151 Herb	EPA 6000 RCRA Metals
SS002-S01-0	1	X	X	X	X	X
SS002-S02-0	1	X	X	X	X	X

Notes:

AK	Alaska	Herb	herbicides	RCRA	Resource Conservation and Recovery Act
bgs	below ground surface	ID	identification	RRO	Residual Range Organics
DRO	Diesel Range Organics	PCBs	polychlorinated biphenyls		
EPA	Environmental Protection Agency	Pest	pesticides		

Cover soil sample SS002-S01-0 was collected at 1.0 feet bgs at the center of the cover soil field testing grid. Surface soil sample SS002-S02-0 was collected at 1.0 feet bgs from within a small rut or low area that appeared to collect water draining from the landfill. This location corresponds roughly with the location sampled during the 1995 PA/SI with a soil sample result of 16,000 mg/Kg of TPH and 550 mg/Kg of DRO. There was no surface water present in the area at the time of sampling.

5.4.4 Summary of Findings

There were no analytes detected above screening criteria in either of the analytical soil samples collected. Based on these results, it appears that clean soil may have been used as cover for the landfill. This was confirmed by the results of the cover soil field testing, which did not indicate the presence of elevated chlorides or VOCs. All analytical results are provided in Appendix A.

Subsidence and debris were observed on the surface of the landfill. The landfill cover does not appear to be in good condition and may allow water infiltration. The top of the water storage tank was found within the landfill, but it was not clear if the tank was used to dispose of asbestos-containing material. No markers were present to aid in locating the asbestos cell.

5.4.5 Recommendations

It is recommended that geophysics be used to better define the boundaries of the landfill. Additional analytical sampling should be performed to confirm that landfill cover soil and surface soil surrounding the landfill are uncontaminated. In addition, it is recommended that test pits be excavated around the perimeter of the landfill so that the depth to bedrock and volume of buried debris can be determined. The perimeter of the

Figure 5-11 SS002 Analytical Sample Locations

landfill should be re-surveyed.

To ensure the landfill is in compliance with ADEC Solid Waste Regulations 18 AAC 60, the following recommendations are also made:

- Adequately backfill depressions and grade to promote drainage without erosion;
- Provide sufficient cover to prevent debris eroding from the landfill;
- Take proper precautions to ensure that asbestos fibers are not released to air or surface water; and
- Install asbestos warning signs.

5.5 WP003: POL WASTE PIT AT THE FORMER COMPOSITE BUILDING

WP003 is a floor drain outfall located northeast of the former composite building. The location of WP003 is depicted on Figure 5-12. The outfall is located at the end of a six-inch diameter drain line that originates within the building and is visible on as-builts of the facility. A previous investigation of the area detected POL above current screening criteria with DRO detected as high as 75,000 mg/Kg. Previous reports do not indicate the exact location of the waste pit.

5.5.1 Investigation Approach

During the 2005 PA/SI, the POL waste pit was investigated to achieve the following objectives:

1. Determine the exact location of the waste pit;
2. Determine if contaminants are present in surface soil associated with the waste pit; and
3. Determine the depth to bedrock at the waste pit.

The 2005 investigation of this source area included site reconnaissance, surface soil field testing, test pit excavation, and surface soil analytical sampling.

Figure 5-12 WP003 Site Location

5.5.2 Reconnaissance and Field Testing

Investigation of the POL waste pit began with reconnaissance to determine the actual location of the floor drain outfall and look for evidence of stressed vegetation or stained soil. The end of a pipe was located 213 feet east of the northeast corner of the former composite building as depicted on Figure 5-12. An un-vegetated area of heavily stained soil was noted extending from the pipe outfall downhill approximately 50 feet. A strong hydrocarbon odor and stained soil was noted in the vicinity of the pipe. A small amount of soil was removed to expose the end of the pipe and approximately one gallon of water with a hydrocarbon sheen and strong hydrocarbon odor drained from the pipe. The end of the pipe is visible in Photo 5-1. Because obviously-contaminated media was found at this location, no surface field testing was performed and resources were used for analytical sampling.

Photo 5-1. WP14 floor drain outfall.

During reconnaissance of WP003, a small area of burned batteries was found 275 feet north of the northeast corner of the former composite building. The area was approximately 15 to 20 feet in diameter and contained over 12 burned batteries. Due to the burned condition of the batteries, their sizes could not accurately be determined. However, several of the batteries appeared to be at least 12-Volt in size. Soil within the area appeared stained. The batteries are shown in Photo 5-2.

Photo 5-2. WP14 burned batteries.

5.5.3 Analytical Sampling

Analytical samples were collected of surface soil based on information gathered during the reconnaissance effort. A total of four samples were collected from WP003. All sample locations are depicted on Figure 5-13 and all sample depths and analyses are provided in Table 5-8.

Table 5-8 WP003 Analytical Sampling

Sample ID	Depth (feet bgs)	AK 102/103 DRO/RRO	AK 101 GRO	EPA 8260B VOC	EPA 8270 PAH	EPA 8082 PCBs	EPA 8081A Pest	EPA 8151 Herb	EPA 6000 RCRA Metals
WP003-S01-0	2	X	X	X	X	X	X	X	X
WP003-S01-1	2	X	X	X	X	X	X	X	X
WP003-S02-0	2	X	X		X	X	X	X	X
WP003-S03-0	0.5	X				X			X
WP003-S04-0	3	X	X	X	X	X			X

Notes:

AK	Alaska	Herb	herbicides	RCRA	Resource Conservation and Recovery Act
bgs	below ground surface	ID	identification	RRO	Residual Range Organics
DRO	Diesel Range Organics	PAH	polyaromatic hydrocarbons	VOC	Volatile Organic Compound
EPA	Environmental Protection Agency	PCBs	polychlorinated biphenyls		
GRO	Gasoline Range Organics	Pest	pesticides		

One analytical surface soil sample, WP003-S01-0 (and duplicate sample WP003-S01-1), was collected from the pipe outfall at two feet bgs. A strong hydrocarbon odor and stained soil were noted during sampling. A second analytical surface soil sample, WP003-S02-0, was collected 15 feet downhill (northwest) of the pipe outfall at two feet bgs. Stained soil and a strong hydrocarbon odor were also noted at this location.

One test pit was dug approximately five feet northwest of the pipe outfall to determine the depth to bedrock and to collect an analytical soil sample just above the top of bedrock. Bedrock was found at 3.5 feet bgs and analytical surface soil sample WP003-S04-0 was collected at three feet bgs in this test pit.

One analytical surface soil sample, WP003-S03-0, was composited from four discrete locations within the area of burned batteries located north of the former composite building. All soil was collected from 0.5 feet bgs.

Figure 5-13 WP003 Analytical Sample Locations

All four of the analytical soil sample collected at WP003 during the 2005 investigation contained analytes in excess of screening criteria. Table 5-9 provides all 2005 analytical results for all analytes detected in excess of current screening criteria. Because PCBs were detected nearby in a previous study in excess of the current screening criteria, PCB results are also included in this table. All analytical results in excess of screening criteria are also depicted on Figure 5-14. Results of all analyses are provided in Appendix A.

Table 5-9 WP003 Analytical Results

Sample ID	Sample Depth (feet bgs)	DRO (mg/Kg)	RRO (mg/Kg)	Lead (mg/Kg)	Arsenic (mg/Kg)	PCBs (mg/Kg)
Screening Criteria[1]		**230**	**8,300**	**400**	**9.85**	**1**
WP003-S01-0	2	**9,250 J**	**29,800 J**	4.45	4.94	ND
WP003-S01-1	2	**7,650 J**	**18,700 J**	4.46	7.61	ND
WP003-S02-0	2	**9,380 J**	643F	3.78	9.22	0.01574 U
WP003-S03-0	0.5	98.5	506	**76,600**	3.76	ND
WP003-S04-0	3	**2,880 J**	337F	5.8	**11.5**	ND

Notes:

[1] Soil screening criteria are defined in Section 4

Bold results exceed screening criteria

bgs	below ground surface	ID	identification	PCBs	polychlorinated biphenyls
DRO	Diesel Range Organics	J	Analyte was positively identified, the quantitation is an estimation (see Appendix c)	RRO	Residual Range Organics
F	Analyte was positively identified but the associated numerical value is below the RL	mg/Kg	milligrams per kilogram	U	Analyte was analyzed for, but not detected. The associated numerical is at or below the MDL

5.5.4 Summary of Findings

Based on analytical results, it appears that DRO and RRO are present in surface soil associated with the floor drain pipe outfall in excess of screening criteria of 230 mg/Kg and 8,300 mg/Kg respectively. The highest concentration of both analytes was detected in surface soil at the pipe outfall. DRO in surface soil in excess of screening criteria appears to have migrated at least 15 feet downhill from the pipe outfall.

Arsenic marginally exceeded the background concentration of 9.85 mg/Kg in sample WP003-S04-0 (11.5 mg/Kg) which was collected at three feet below ground surface at bedrock. The sample also contained DRO concentrations of 2,880 mg/Kg.

No other analytes were detected above screening criteria at this location.

Figure 5-14 WP003 Analytical Results in Excess of Screening Criteria

Lead was detected above the screening criteria of 400 mg/Kg in surface soil associated with the area containing the burned batteries. No other analytes were detected above screening criteria at this location.

Bedrock was found at three feet bgs in the test pit excavated at the pipe outfall at WP003. This correlates with the depth to bedrock found in test pits near the former composite building.

5.5.5 Recommendations

Based on results of this investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil in excess of screening criteria at WP003. Due to the slight exceedance of arsenic, it is recommended that site specific background concentrations be determined as detailed in Section 5.1 and utilized during the potential future investigation to confirm the exceedances are not consistent with naturally occurring levels. The extent of lead in surface soil in excess of screening criteria at the burned battery area should also be determined.

5.6 LF006: OLD DISPOSAL AREA

A disposal area or landfill is located south of the south end of the runway as depicted on Figure 5-15. Previous work indicated that the extent of debris and wastes disposed of are unknown. Anecdotal evidence suggests that some heavy equipment was drained of fluids and buried in the disposal area and several 55-gallon drums were previously documented at the site. The exact location of the disposal area was not well documented during prior studies.

5.6.1 Investigation Approach

During the 2005 PA/SI, the Old Disposal Area was investigated to achieve the following objectives:

1. Determine the exact location of the old disposal area;
2. Estimate the types of debris buried within the disposal area; and
3. Determine if there is contaminated surface soil or surface water associated with the disposal area.

Investigation of this site included aerial and ground reconnaissance and analytical sampling of surface soil and surface water.

5.6.2 Reconnaissance and Field Testing

Reconnaissance of the old disposal area began with an aerial survey of the valley to determine the exact location. Partially buried debris was seen from the air located within an open pit approximately 0.5 miles south of the south end of the runway. Approximately 18 55-gallon drums were observed between the runway and the old

Figure 5-15 LF006 Site Location

disposal area. GPS coordinates for each of the drums were recorded. Survey data for these drums is provided in Appendix D. No other likely disposal areas were observed.

Ground reconnaissance was conducted within and around the open pit. The pit appeared to be a borrow pit that was then used as a disposal area. The pit was approximately 200 feet long by 75 feet wide and 20 feet deep. The north end of the pit appeared to contain an unknown quantity of buried debris that was exposed near the center of the pit. Several small test holes were hand dug to approximately three feet bgs within the apparent debris cover soil, but debris was not encountered at any location. South of the exposed debris was a small pond approximately 50 feet in diameter that contained several submerged 55-gallon drums. Several drums were also noted surrounding the pond. All drums were rusted and none contained legible markings. Dark green paint was noted on the end of one drum. Exposed debris included an engine, vehicle parts, batteries, and a small chrome cylinder that appeared to be a fire extinguisher. There was no evidence of stressed vegetation or stained soil and no sheen was noted at any location on the surface water. The disposal area is shown in Photo 5-3.

Photo 5-3. LF006 disposal area.

Ground reconnaissance was conducted in the area surrounding the disposal pit to ensure that there were no additional disposal areas. The disposal pit was the only location where debris was found.

Because the boundaries and content of the old disposal area were easily identified, no field testing was performed. Instead, resources were utilized to collect analytical samples.

5.6.3 Analytical Sampling

Analytical samples of both surface soil and surface water were collected based on information gathered during reconnaissance of the site. A total of two analytical surface soil samples and one analytical surface water sample (and duplicate surface water sample) were collected from LF006. All sample locations are depicted on Figure 5-16 and all sample depths and analyses are provided in Table 5-10.

Figure 5-16 LF006 Analytical Sample Locations

Table 5-10 LF006 Analytical Sampling

Sample ID	Depth (feet bgs)	AK102/103 DRO/RRO	AK101 GRO	EPA 8260B VOC	EPA 8270 PAH	EPA 8082 PCBs	EPA 8081A Pest	EPA 8151 Herb	EPA 6000 RCRA Metals
LF006-S01-0	0.5	X	X	X	X	X	X	X	X
LF006-S02-0	1	X	X	X	X	X	X	X	X
LF006-W01-0	na	X	X	X	X	X	X	X	X
LF006-W01-1	na	X	X	X	X	X	X	X	X

Notes:

AK	Alaska	Herb	herbicides	RCRA	Resource Conservation and Recovery Act
bgs	below ground surface	ID	identification	RRO	Residual Range Organics
DRO	Diesel Range Organics	PAH	polyaromatic hydrocarbons	VOC	Volatile Organic Compound
EPA	Environmental Protection Agency	PCBs	polychlorinated biphenyls		
GRO	Gasoline Range Organics	Pest	pesticides		

Analytical surface soil sample LF006-S01-0 was collected from the location most likely to be contaminated, which was along the toe of the slope of the exposed debris just above the water line. The sample was a composite of soil from four discrete locations along the toe of the slope. Analytical surface soil sample LF006-S02-0 was collected just south of the pond near a 55-gallon drum. Analytical surface water sample LF006-W01-0 (and duplicate sample LF006-W01-1) was collected from the northwest corner of the pond near several submerged 55-gallon drums.

5.6.4 Summary of Findings

One of the two surface soil analytical samples, LF006-S01-0 contained arsenic marginally above the background concentration of 9.85 mg/Kg. Although the arsenic concentration (11.9 mg/Kg) marginally exceeded the background concentration, it is believed that the arsenic concentration potentially indicates the presence of contamination not due to naturally occurring levels of arsenic. This conclusion is based on the fact that LF006-S01-0 was a composite sample collected from four discreet locations most likely to be contaminated. Normally, the inorganic parameters of a composite sample will fall within naturally occurring concentrations because the composite nature of the sample will in itself have a greater tendency to average out natural anomalies and mirror naturally occurring concentrations. However, if a contaminant is present in one or more of the composite sample locations, the overall composite sample concentration may exceed the background concentration. This exceedance then is not normally due to a natural anomaly or deviation from the naturally occurring concentration but due to contamination present at the site.

There were no other analytes detected above screening criteria in either of the two analytical surface soil samples collected or in the analytical surface water sample. All analytical results are provided in Appendix A.

Equipment parts, 55-gallon drums, and other facility debris were confirmed to be present within the old disposal area. The exact volume of debris is not known.

5.6.5 Recommendations

It is recommended that geophysics be used to define the boundaries of the disposal area. It is also recommended that additional cover soil, subsurface soil, and groundwater analytical sampling be conducted to determine if contamination has leached from the debris buried at the site and to further characterize the potential arsenic contamination at the site. In addition, it is recommended that site specific background concentrations be determined as detailed in Section 5.1 and utilized during the potential future investigation to confirm the arsenic exceedance is not consistent with naturally occurring levels. To ensure compliance with ADEC Solid Waste Regulations 18 AAC 60, the following recommendations are also made:

- Provide sufficient cover to prevent debris eroding from the landfill; and
- Adequately backfill depressions and grade to promote drainage without erosion.

It is also recommended that the contents of all drums at the Driftwood Bay RRS be assessed to determine the contents and the surrounding soil/water be investigated for potential impacts associated with the drums. All drums should be removed from the facility and disposed of properly.

5.7 SS004: SPILL/LEAK NO. 4 AT THE DRUM STORAGE AREA

SS04 is a former drum storage area located approximately 1,000 feet west of the south end of the Driftwood Bay runway (Figure 5-17). The source area was composed of a formal drum storage area, a wooden storage building, and a trench parallel to the former composite building access road. A 500-gallon gasoline tank was also suspected to the northeast of the wooden storage building. According to the Draft Landfill Closure Report (USAF, 1995), "The wooden Airport Storage Building was burned after removal of debris and hardware to lessen the volume in the landfill; the area was then cleaned and graded."

A previous investigation detected both DRO and GRO above current screening criteria in a surface soil sample from within the drum storage area and DRO above the current screening criteria in a surface soil sample from the west side of the former wooden storage building.

5.7.1 Investigation Approach

During the 2005 PA/SI, SS004 was investigated to achieve the following objectives:

1. Determine the locations of the drum storage area, wooden storage building, trench, and 500-gallon gasoline tank;
2. Determine if any evidence of the 500-gallon gasoline tank is present; and

Figure 5-17 SS004 Site Location

3. Determine if contaminated surface soil is present at any of the four sub-sites.

Investigation of this site included reconnaissance, surface soil field testing, test pit excavation,

5.7.2 Reconnaissance and Field Testing

Investigation of SS004 began with reconnaissance to determine site layout and look for areas of stressed vegetation or stained soil. Drawings from previous reports and as-built drawings were used to determine appropriate starting points for the investigation. The concrete foundation of the north end of the former wooden storage building was found in place. There was no evidence of stained soil, however, sparse vegetation was observed throughout the location of the former wooden storage building. A stake that appeared to correlate with a 1995 sampling location was located just east of the footprint of the former wooden storage building. An area of stressed vegetation and stained soil was observed at the formal drum storage area. The trench was located southeast of the drum storage area and bare soil with sparse vegetation was found within the trench. The trench was approximately 60 feet long by 20 feet wide. No stained soil or odor were noted within the trench. Efforts to locate remnants of the 500-gallon AST were unsuccessful. There was no evidence of stained soil or stressed vegetation at the alleged location of the former tank.

Surface soil field testing samples were collected from the location of the former wooden storage building, from the drum storage area, and from the trench. Field testing was not performed at the alleged 500-gallon AST. The following paragraphs describe field testing activities at each of these locations.

SS004: Former Wooden Storage Building Surface Soil Field Testing

A grid was established over the location of the former wooden storage building location for surface soil field testing. The grid was 90 feet long by 45 feet wide with 15-foot spacing and covered the former footprint of the building. The grid extended approximately 10 feet outside the perimeter of the building on all sides and included the area where previous studies detected fuel and VOCs in excess of current screening criteria. The grid location is depicted on Figure 5-18. PID head space readings were taken from 28 grid nodes. There were no elevated PID readings, with the highest PID reading at 0.8 ppmv. Surface soil from the 28 grid nodes was composited into four samples which were tested for chlorides using a Dexsil L2000DX Chloride in Soil Immunoassay Test Kit. The grouping of locations for chloride field testing samples (samples FWS-A through FWS-D) is depicted on Figure 5-18. Surface soil field test results for chlorides are provided in Table 5-11.

Figure 5-18 SS004 Surface Soil Field Testing Grid Location

Table 5-11 SS004: Former Wooden Storage Building Surface Soil Field Test Chloride Results

Field Test Sample ID	Chloride Result (ppm)
FWS-A	2.74
FWS-B	2.50
FWS-C	3.20
FWS-D	2.47

Notes:

ID identification

ppm parts per million

Previous use of this chloride test kit indicates that chloride results are typically on the order of 100 times greater than the PCB concentration in the soil tested (USAF, 2005b). For the purposes of this investigation, a result of 25 ppm of chloride was conservatively considered an elevated result. Elevated chlorides were not detected in any of these surface soil samples from the former wooden storage building.

SS004: Drum Storage Area Surface Soil Field Testing

A grid was established over the stained soil at the location of the drum storage area for surface soil field testing. The grid was 40 feet long by 40 feet wide with 10-foot spacing. The grid location is depicted on Figure 5-18. PID head space readings were taken from soil from each of the 25 grid nodes. Elevated PID readings were recorded in two surface soil samples within the center of the grid, with the highest PID reading at 96 ppmv. Surface soil from the 25 grid nodes was composited into four samples which were tested for chlorides using a Dexsil L2000DX Chloride in Soil Immunoassay Test Kit. The grouping of locations for chloride field testing samples (samples DS-1 through DS-4) is depicted on Figure 5-18. Surface soil field test results for chlorides are provided in Table 5-12.

Table 5-12 SS004: Drum Storage Area Surface Soil Field Test Chloride Results

Field Test Sample ID	Chloride Result (ppm)
DSA-1	3.93
DSA-2	57.5
DSA-3	3.61
DSA-4	3.44

Notes:

ID identification

ppm parts per million

Previous use of this chloride test kit indicates that chloride results are typically on the order of 100 times greater than the PCB concentration in the soil tested (USAF, 2005b).

For the purposes of this investigation, a result of 25 ppm of chloride was conservatively considered an elevated result. Elevated chlorides were detected one of the four surface soil field testing samples from the drum storage area. This location was marked for later analytical sampling.

SS004: Trench Surface Soil Field Testing

Six surface soil field testing samples were collected along a line within the trench at SS004 with 10 feet between each sample. Surface soil field testing locations are provided on Figure 5-18. PID head space readings were taken from each of the six surface soil samples. Elevated PID readings were not recorded in any of the six samples, with the highest PID result at 0.6 ppmv. Surface soil from the six locations was composited into one sample which was tested for chlorides using a Dexsil L2000DX Chloride in Soil Immunoassay Test Kit. The chloride result for this sample was 2.03 ppm.

5.7.3 Analytical Sampling

Analytical samples were collected at all four sub sites at SS004. A total of seven surface soil analytical samples (and two duplicate samples) and two subsurface soil samples were collected at SS004. All analytical sample IDs, sub sites, depths, and analyses are provided in Table 5-13.

Table 5-13 SS004 Analytical Sampling

Sample ID	Sub Site	Depth (feet bgs)	AK 102/103 DRO/RRO	AK 101 GRO	EPA 8260 VOC	EPA 8270 PAH	EPA 8082 PCBs	EPA 8081A Pest	EPA 8151 Herb	EPA 6000 RCRA Metals
SS004-S01-0	Trench	1	X	X	X	X	X	X	X	X
SS004-S02-0	DSA	1	X	X	X	X	X	X	X	X
SS004-S03-0	DSA	1	X				X			X
SS004-S04-0	FWSB	1	X	X	X	X	X	X	X	X
SS004-S05-0	FWSB	1	X				X			X
SS004-S06-0	DSA	1	X	X	X	X	X	X	X	X
SS004-S06-1	DSA	1	X	X	X	X	X	X	X	X
SS004-S07-0	DSA	6	X	X	X					X
SS004-S08-0	Trench	4.5	X	X	X	X				X
SS004-S09-0	AST	1	X	X		X				X
SS004-S09-1	AST	1	X	X		X				X

Notes:

AK	Alaska	Herb	herbicides	RCRA	Resource Conservation and Recovery Act
bgs	below ground surface	ID	identification	RRO	Residual Range Organics
DRO	Diesel Range Organics	PAH	polyaromatic hydrocarbons	**VOC**	**Volatile Organic Compound**
EPA	Environmental Protection Agency	PCBs	polychlorinated biphenyls		
GRO	Gasoline Range Organics	Pest	pesticides		

The following paragraphs describe the analytical sampling rationale for each sub site.

SS004: Former Wooden Storage Building Analytical Sampling

Because no elevated PID readings or chloride results were detected in surface soil at the former wooden storage building, soil from the grid was composited into two surface soil analytical samples. Soil from five discrete locations in the northern half of the grid was composited into surface soil sample SS004-S04-0. Soil from five discrete locations in the southern half of the grid was composited into surface soil sample SS004-S05-0. One of the five discrete locations was collected next to the apparent 1995 sample location where DRO was detected above current screening criteria. This methodology was chosen to collect soil from a wide area covering both the footprint of the building and the perimeter. Surface soil sample locations from the former wooden storage building are depicted on Figure 5-19.

SS004: Drum Storage Area Analytical Sampling

Three surface soil samples (and one duplicate sample) and one subsurface soil sample were collected for laboratory analysis from the drum storage area. Surface soil sample SS004-S02-0 was collected from the area where the highest PID readings were recorded (Figure 5-19). Surface soil sample SS004-S03-0 was a composite of soil from three discrete locations within the grid as depicted on Figure 5-19 and included soil from the area where the highest chloride result was recorded. Surface soil sample SS004-S06-0 was collected just west of the grid. Subsurface soil sample SS004-S07-0 was collected from a test pit at six feet bgs in the northwest corner of the grid. Stained soil and a strong hydrocarbon odor were noted during sampling.

SS004: Trench Analytical Sampling

One surface soil sample and one subsurface soil sample were collected for laboratory analysis from the trench. Sample locations are depicted on Figure 5-19. Because no elevated PID readings or chlorides were detected in surface soil at the trench, surface soil was composited from the entire trench for analysis. Surface soil sample SS004-S01-0 was collected of soil composited from the four field test locations. Subsurface soil sample SS004-S08-0 was collected at 4.5 feet bgs with a hand auger in the center of the trench. There was no odor or stained soil observed during sampling.

SS004: 500-gallon AST

Several attempts were made to locate any evidence of the 500-gallon AST to the east of the former wooden storage building as depicted on an as-built drawing. No evidence was found, but one analytical sample of surface soil (SS004-S09-0) was collected at one foot bgs 33 feet east of the northeast corner of the concrete pad at the former wooden storage building. This location is depicted on Figure 5-19 and was chosen based on the AST location depicted on the as-built drawing.

Figure 5-19 SS004 Analytical Sample Locations

5.7.4 Summary of Findings

Of the nine analytical soil samples collected at SS004, five contained analytes in excess of screening criteria. The following paragraphs describe analytical and other findings at each of the four sub sites.

SS004: Former Wooden Storage Building Findings

Neither of the two analytical surface soil samples collected at the former wooden storage building contained analytes in excess of screening criteria. Complete analytical results for these samples are provided in Appendix A.

Based on the presence of the concrete pad and the fact that a previous investigation of this area detected contaminants in surface soil, it appears that surface soil at this location is native soil that was present during facility operation.

SS004: Drum Storage Area Findings

Of the three surface soil analytical samples collected at the drum storage area, two contained DRO in excess of screening criteria. DRO was the only analyte found above screening criteria in surface soil at the drum storage area. DRO and total chromium were detected above screening criteria in the one subsurface soil sample collected at the drum storage area. Table 5-14 provides all 2005 DRO and chromium results from the drum storage area. All DRO and chromium results in excess of screening criteria are depicted on Figure 5-20. All results for all analyses are provided in Appendix A.

Table 5-14 SS004: Drum Storage Area Analytical Results

Sample ID	Sample Depth (feet bgs)	DRO (mg/Kg)	Total Chromium (mg/Kg)
Screening Criteria[1]		**230**	**23**
SS004-S02-0	1	**16,700 J**	2.34
SS004-S03-0	1	**2,140 J**	5.34
SS004-S07-0	6	**556M**	**38.2**

Notes:

[1] Soil screening criteria are defined in Section 4

Bold results exceed screening criteria

bgs below ground surface
DRO Diesel Range Organics
ID identification
J Analyte was positively identified, the quantitation is an estimation (see Appendix E)
M A matrix effect was present
mg/Kg milligrams per kilogram
PCBs polychlorinated biphenyls

Figure 5-20 SS004 Analytical Results in Excess of Screening Criteria

Based on analytical results, it appears that DRO in excess of screening criteria of 230 mg/Kg is present in surface soil at the drum storage area. The highest concentration of DRO, 16,700 mg/Kg, was found in surface soil from the southwest corner of the drum storage area grid (SS004-S02-0). Although no PCBs or other chlorinated compounds were detected above screening criteria in surface soil at the drum storage area, chloride field testing did detect one elevated result and may indicate the presence of a contaminant.

The subsurface soil sample (SS004-S07-0) collected contained both DRO and total chromium in excess of the screening criteria of 230 mg/Kg and 23 mg/Kg respectively. DRO was detected at 556 mg/Kg and total chromium was detected at 38.2 mg/Kg in this subsurface soil sample. No other analytes were detected above screening criteria in this sample.

SS004: Trench Findings

Of the two analytical soil samples collected from the trench at SS004, one contained two inorganic analytes in excess of screening criteria. Mercury was detected above the screening criteria of 1.24 mg/Kg and arsenic was detected above the background concentration of 9.85 mg/Kg in subsurface soil sample SS004-S08-0, which was collected at 4.5 feet bgs in the center of the trench. Mercury in this sample was detected at a concentration of 1.67 mg/Kg and arsenic was detected at a concentration of 15.1 mg/Kg. The analytical results are depicted on Figure 5-20. No other analytes were detected above screening criteria in either of the analytical soil samples collected at the trench in 2005.

SS004: 500-gallon AST Findings

DRO was detected above the screening criteria of 230 mg/Kg in both the primary and duplicate surface soil analytical samples collected at the approximate location of the 500-gallon AST. DRO results for the primary and duplicate samples (SS004-S09-0 and SS004-S09-1) were 1,230 mg/Kg and 1,320 mg/Kg respectively. These analytical results are depicted on Figure 5-20. No other analytes were detected above screening criteria in these samples.

5.7.5 Recommendations

The following recommendations are based on the 2005 findings of the investigation at SS004.

SS004: Former Wooden Storage Building Recommendations

Although no evidence of contamination was encountered during the 2005 investigation of the former wooden storage building, two previous investigations did detect analytes in excess of current screening criteria in surface soil. It is therefore recommended that subsurface investigation of the site be performed to determine if subsurface soil or groundwater have been impacted.

SS004: Drum Storage Area Recommendations

Analytical results and field testing indicate the presence of contaminants in surface and subsurface soil at the drum storage area. It is recommended that surface soil and subsurface soil and groundwater be investigated to further delineate the nature and extent of contamination at this site.

SS004: Trench Recommendations

Analytical results indicate that mercury and arsenic may be present above screening criteria in subsurface soil at the trench. It is recommended that additional subsurface investigation be performed to determine the extent of mercury and arsenic in excess of screening criteria at the trench. Due to the slight exceedances of both mercury and arsenic, it is also recommended that site specific background concentrations be determined as detailed in Section 5.1 and utilized during the potential future investigation to confirm the exceedances are not consistent with naturally occurring levels.

SS004: 500-gallon AST Recommendations

Based on analytical results, it appears that DRO is present in excess of screening criteria at the approximate location of the former 500-gallon AST. It is recommended that additional investigation of surface soil, subsurface soil, and groundwater be performed to determine the extent of contamination associated with the tank. Given the indeterminate history of this tank, analysis of analytical samples should be expanded to include VOCs, PCBs, and pesticides in at least one sample at this location.

5.8 SS005: SPILL/LEAK NO. 5 AT THE MOGAS TANK AT THE RUNWAY

A MOGAS storage tank was reportedly located in the turnaround area on the south end of the runway during facility operation. The tank was a 2,500-gallon steel-welded AST. The former location of the tank was poorly documented in previous reports, but the general area is depicted on Figure 5-21.

Two previous studies collected analytical surface soil samples at the former tank location. None of the samples contained analytes above current screening criteria. A summary of these studies is provided in Section 2.3.

5.8.1 Investigation Approach

During the 2005 PA/SI, the former location of the MOGAS tank at the runway was investigated to achieve the following objectives:

1. Determine the location of the former MOGAS tank;
2. Determine if the tank was an AST or UST;
3. Determine if contamination is present in soil or water at SS005; and
4. Determine the depth to groundwater at SS005.

Figure 5-21 SS005 Site Location

The investigation of this area included site reconnaissance, surface soil field testing, and surface soil and groundwater analytical sampling.

5.8.2 Reconnaissance and Field Testing

Investigation of the former MOGAS tank began with reconnaissance to look for any evidence of the former tank location and for areas of stressed vegetation or stained soil. As-built drawings, photos of the turnaround area during facility operation, and former investigation reports were all used to aid the reconnaissance effort. Unfortunately, none of these resources accurately indicate the former location of the tank. A search of the area did not provide any evidence of the former location and no obviously stressed vegetation or stained soil was located. Several areas of surface water were observed throughout the turnaround and the water table was found to be very close to the surface throughout.

Because no evidence of the exact location of the MOGAS tank was found, a surface soil field testing grid was established over the western two thirds of the runway turnaround as depicted on Figure 5-22. The grid was 225 feet long by 50 feet wide with 25 foot spacing between each grid node. Surface soil from each of the 30 grid nodes was collected and heated head space from each location was measured with a PID from a sealed plastic bag. None of the head space readings were elevated, with the highest reading at 0.5 ppmv. No odor or stained soil was detected at any location. Groundwater was encountered from just below the surface to one foot bgs throughout the grid. There was no evidence of a sheen on groundwater at any location. All headspace readings were taken from soil collected just above the water table.

5.8.3 Analytical Sampling

Analytical samples were collected of both surface soil and groundwater at SS005 based on the results of reconnaissance and field testing. One surface soil analytical sample and two groundwater analytical samples were collected from the locations depicted on Figure 5-23. Sample IDs and analyses are provided in Table 5-15.

Table 5-15 SS005 Analytical Sampling

Sample ID	Matrix	Sample Depth (feet bgs)	AK 102/103 DRO/RRO	AK 101 GRO	EPA 8260 VOC	EPA 6000 RCRA Metals
SS05-S01-0	Surface Soil	0-0.5	X	X	X	X
SS05-W01-0	Groundwater	0.25	X	X	X	X
SS05-W02-0	Groundwater	0.25	X	X	X	X

Notes:

AK	Alaska	Herb	herbicides	RCRA	Resource Conservation and Recovery Act
bgs	below ground surface	ID	identification	RRO	Residual Range Organics
DRO	Diesel Range Organics	PAH	polyaromatic hydrocarbons	VOC	Volatile Organic Compound
EPA	Environmental Protection Agency	PCBs	polychlorinated biphenyls		
GRO	Gasoline Range Organics	Pest	pesticides		

Figure 5-22 SS005 Surface Soil Field Testing Grid Location

Figure 5-23 SS005 Analytical Sample Locations

Since there was no evidence of the former location of the MOGAS tank and no evidence of contamination found during reconnaissance and field testing, analytical samples were collected from the most likely former locations of the tank. Analytical surface soil sample SS005-S01-0 was collected from the northwest corner of the turnaround, which would have been a safe location for the tank during facility operation. One groundwater sample was collected at the approximate location of sampling activities during previous investigations. A second groundwater sample was collected from the southwest corner of the SS005 grid, just north of the entrance to the access road. This would have been a convenient location for the tank during facility operation and appears to match the location of a possible tank shown in a photo taken at the turnaround area during unloading of an aircraft (circa 1970s). Groundwater from these two sample locations was collected by hand digging a hole to approximately 1.5 feet bgs and allowing the hole to fill. Water was sampled by using a clean unpreserved sample container to dip water from the hole and fill other sample containers.

5.8.4 Summary of Findings

Based on the shallow water table at SS005, it appears that the MOGAS tank would have been an AST rather than a UST. No evidence of the location was found.

There were no analytes detected above screening criteria in any of the three analytical samples collected at SS005 in 2005. Complete analytical results are provided in Appendix A. Although the exact location of the former MOGAS tank could not be determined, the field testing grid covered all likely former locations. Analytical samples were high graded to collect media from the most likely former locations and no contaminated media was detected. In addition, two previous studies of SS005 also found no evidence for contaminated media. Based on these results, it appears that no contamination associated with the former MOGAS tank is present at SS005.

5.8.5 Recommendations

Based the results of this PA/SI and the results of two previous studies, it does not appear that contamination is present in surface soil or shallow groundwater associated with the former AST. However, it is recommended that monitoring wells be installed and sampled to accurately measure potential volatile chemical concentrations in groundwater and to determine groundwater flow direction and gradient. It is also recommended that downgradient surface water drainages be investigated for potential impacts.

5.9 SS007: SPILL/LEAK NO. 7 AT THE POL TANK AREA

The POL tank area was located on the beach approximately 3,000 feet east of the north end of the runway as depicted on Figure 5-24. The POL tank area consisted of two 250,000-gallon ASTs, a fuel pumphouse, and a 25,000-gallon MOGAS AST located on the beach to the west of the main tank area. The location of the two 250,000-gallon ASTs and fuel pumphouse is hereafter referred to in this report as the former tank farm area. Fuel from the 250,000-gallon ASTs was pumped west through a two-inch diameter

Figure 5-24 SS007 Site Location

fuel line to the former composite building. Previous work included excavation of oiled sand within the tank foundations and collection of analytical surface soil samples. DRO was detected above the current screening criteria at concentrations as high as 13,300 mg/Kg at the former tank farm area. No analytical samples have been collected from the location of the former 25,000-gallon MOGAS tank. The former location of this tank was not well documented in previous reports.

5.9.1 Investigation Approach

During the 2005 PA/SI, the former POL tank area was investigated to achieve the following objectives:

1. Determine if there was a beach landing area near the former tank farm area;
2. Determine the exact location of the former tank farm area;
3. Determine the exact location of the former 25,000-gallon MOGAS tank;
4. Determine if there is contaminated media associated with the former tank farm area.

The investigation of this site included site reconnaissance, surface soil field testing, and surface soil analytical sampling.

5.9.2 Reconnaissance and Field Testing

Investigation of SS007 began with aerial and ground reconnaissance to determine the layout of the site and look for areas of stressed vegetation and stained soil. Drawings from previous reports, aerial photos, and as-built drawings were used to determine appropriate starting points for the investigation. Concrete foundations of the two 250,000-gallon ASTs were found to be in place with no apparent oiled sand remaining. Earthen berms were found surrounding the east, west, and south portions of the tank farm area. The former pumphouse concrete foundation was found in place to the northwest of the west tank pad. Vegetation within the tank farm area was not obviously stressed and no stained soil was observed. Due to aggressive reworking of the beach area by wave action, no evidence of a beach landing area is present near the tank farm. The condition of the beach and POL Tank Area are shown in Photo 5-4.

Photo 5-4. SS007 POL tank area.

Several attempts were made by aerial and ground reconnaissance to locate the former location of the 25,000-gallon MOGAS tank, but no evidence of its location was encountered. It appears that the former location has been aggressively reworked by wave activity. Only natural deposits of large cobbles were found at the likely former tank locations.

A surface soil field testing grid was established within the area of the former tank farm area as depicted on Figure 5-25. The grid covered approximately 110 feet by 250 feet and was staked with 15 feet between each node. A total of 49 grid nodes were staked. A hole was hand dug to approximately one foot bgs at every other grid node and PID readings were taken by reading the ambient air within each hole. Elevated PID readings (greater than one ppmv) were recorded at several locations within the grid as depicted on Figure 5-25. The highest PID reading recorded was 6.1 ppmv, which was taken five feet north of the former pumphouse concrete pad. Hydrocarbon odors were detected in several of the samples with elevated PID readings.

5.9.3 Analytical Sampling

Analytical samples were collected of surface soil at the former tank farm area based on the information gathered during reconnaissance and field testing. A total of four analytical surface soil samples were collected at SS007. All sample locations are depicted on Figure 5-26 and all sample depths and analyses are provided in Table 5-16.

Table 5-16 SS007 Analytical Sampling

Sample ID	Depth (feet bgs)	AK 102/103 DRO/RRO	AK 101 GRO	EPA 8260 VOC	EPA 8270 PAH	EPA 6000 RCRA Metals
SS007-S01-0	1	X				X
SS007-S02-0	1	X				X
SS007-S03-0	1	X	X	X	X	X
SS007-S04-0	1	X	X	X	X	X

Notes:

AK	Alaska	GRO	Gasoline Range Organics	RRO	Residual Range Organics
bgs	below ground surface	ID	identification	VOC	Volatile Organic Compound
DRO	Diesel Range Organics	PAH	polyaromatic hydrocarbons		
EPA	Environmental Protection Agency	RCRA	Resource Conservation and Recovery Act		

Two analytical surface soil samples were collected at locations of elevated PID readings and two additional surface soil samples were collected at the pad centers. Analytical surface soil sample SS007-S01-0 was collected at one foot bgs from the center of the west tank pad. A slight hydrocarbon odor was detected during sampling. Surface soil sample SS007-S02-0 was collected at one foot bgs from the center of the east tank pad.

Figure 5-25 SS007 Surface Soil Field Testing Grid Location

Figure 5-26 SS007 Analytical Sample Locations

A strong hydrocarbon odor was detected at this location during sampling. Surface soil sample SS007-S03-0 was collected at one foot bgs from four feet north of the former pumphouse foundation. A strong hydrocarbon odor was detected during collection of this sample. Surface soil sample SS007-S04-0 was collected at one foot bgs approximately 63 feet south of the center of the west tank pad at a location where elevated PID readings were detected.

5.9.4 Summary of Findings

Of the four analytical surface soil samples collected at SS007, two contained analytes in excess of screening criteria. Both DRO and benzo(a)pyrene were detected above screening during the 2005 investigation. Table 5-17 provides all 2005 DRO and benzo(a)pyrene analytical results at SS007. All analytical results in excess of screening criteria are also provided on Figure 5-27. Results of all analyses for all samples are provided in Appendix A.

Table 5-17 SS007 Analytical Results

Sample ID	Sample Depth (feet bgs)	DRO (mg/Kg)	Benzo(a)pyrene (mg/Kg)
Screening Criteria[1]		**230**	**0.9**
SS007-S01-0	1	72.8 J	na
SS007-S02-0	1	**3,900 M**	na
SS007-S03-0	1	**13,700 J**	**2.37 M**
SS007-S04-0	1	37.4 J	0.0788

Notes:

[1] Soil screening criteria are defined in Section 4

Bold results exceed screening criteria

bgs below ground surface
DRO Diesel Range Organics
ID identification
J Analyte was positively identified, the quantitation is an estimation (see Appendix E)
M A matrix effect was present
mg/Kg milligrams per kilogram

Based on analytical results, it appears that DRO and benzo(a)pyrene are present in surface soil at SS007 above the screening criteria of 230 mg/Kg and 0.9 mg/Kg respectively. The highest concentration of DRO was detected in surface soil from the north side of the former pumphouse foundation. Based on field testing results, it appears that fuel constituents may be present in surface soil in several areas within the bermed area of the former tank farm.

Due to reworking of the beach by natural processes (normal wave action and storm surge events), all evidence of the former location of the 25,000-gallon MOGAS tank and possible beach landing area has been removed.

Figure 5-27 SS007 Analytical Results in Excess of Screening Criteria

5.9.5 Recommendations

Based on the results of this investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil at the former tank farm area at SS007. It also recommended that a subsurface investigation be performed to determine if subsurface soil or groundwater has been impacted by fuel constituents associated with the former tank farm area.

Because the beach at the likely former locations of the 25,000-gallon MOGAS tank and the possible beach landing area at SS007 has been aggressively reworked through natural processes leaving only large cobbles, it is highly unlikely that any contaminants are present. However, it is recommended that additional limited study be conducted to confirm this conclusion.

5.10 SS008: SPILL/LEAK NO. 8 AT THE POL PIPELINE

The fuel supply lines serving the former composite building consisted of two pipelines. A four-inch diameter fill line originated at a fill stand on the beach at the west end of Driftwood Bay. This four-inch line extended along the beach through the pumphouse to the 250,000-gallon ASTs located on the beach to the east of the north end of the runway. A two-inch diameter pipeline then transported fuel from the ASTs approximately three miles to two 20,000-gallon USTs at the former composite building. The location of the pipeline corridor from the ASTs to the former composite building is depicted on Figure 5-28.

Previous work at SS008 included removal of above ground portions of the pipeline and collection of analytical surface soil samples along the pipeline corridor just north of the north end of the runway. DRO was detected at a concentration of 5,360 mg/Kg in one surface soil sample. Section 2.3 provides a more detailed summary of previous work.

5.10.1 Investigation Approach

During the 2005 PA/SI, the former POL pipeline corridor was investigated to achieve the following objectives:

1. Determine if the pipeline was above ground or buried;
2. Determine if the pipeline was removed;
3. Determine if there was a beach landing area near the termination of the 4-inch fuel pipeline at the west end of Driftwood Bay; and
4. Determine if surface soil contamination is present along the pipeline corridor.

The investigation of the pipeline corridor included aerial and ground reconnaissance, surface soil field testing, and surface soil analytical sampling.

Figure 5-28 SS008 Site Location

5.10.2 Reconnaissance and Field Testing

Investigation of the pipeline corridor began with aerial and ground reconnaissance to determine if remnants of the pipeline were in place and look for areas of stressed vegetation or stained soil. Drawings from previous reports and as-built drawings were used to determine appropriate starting points for the investigation. Portions of the pipeline were found in place along the beach and on a steep slope to the west of the beach. At many locations, the pipe was found to be disjointed with open ends. The pipeline appeared to be intact where it was in-place on the slope. There was no indication of residual product remaining in the pipeline noted at any location. A fill stand with a large valve was found in place at the termination of the 4-inch fuel pipeline at the west end of Driftwood Bay (Photo 5-5). In place portions of both pipelines and the fill stand are depicted on Figure 5-28. There was no evidence of stressed vegetation or stained soil at any location along the pipeline corridor. Vegetation along the beach was found to be uniformly thick with large hummocks, which made locating the pipeline difficult.

Photo 5-5. SS008 fill stand valve.

Surface soil field testing was performed every 200 feet along the entire pipeline corridor from the former composite building to the POL tank farm area (SS007). Field testing consisted of hand digging a hole to approximately 1 foot bgs and taking PID readings of ambient air within the hole. There were no elevated PID readings or hydrocarbon odor detected at any location from the former composite building to the beach. Two areas of elevated PID readings and hydrocarbon odor were detected along the beach. The first was under the fill stand at the termination of the 4-inch fuel pipeline at the west end of Driftwood Bay. The PID reading at this location was 3.1 ppmv. The second location was approximately 700 feet east of the fill stand just north of the north end of the runway. The PID reading at this location was 28.2 ppmv. No other PID readings above 1 ppmv or hydrocarbon odor were detected in surface soil along the beach.

5.10.3 Analytical Sampling

One analytical surface soil sample was collected from each of the two areas of elevated PID readings and hydrocarbon odor. Analytical sample locations are depicted on Figure 5-29 and sample depths and analyses are provided in Table 5-18.

Table 5-18 SS008 Analytical Sampling

Sample ID	Depth (feet bgs)	AK 102/103 DRO/RRO	EPA 6000 RCRA Metals
SS008-S01-0	1.5	X	X
SS008-S02-0	1.5	X	X

Notes:

bgs below ground surface
DRO Diesel Range Organics
EPA Environmental Protection Agency
ID identification
mg/Kg milligrams per kilogram
RCRA Resource Conservation and Recovery Act
RRO Residual Range Organics

Analytical surface soil sample SS008-S01-0 was collected at 1.5 feet bgs directly under the fill stand at the termination of the 4-inch fuel pipeline at the west end of Driftwood Bay. Analytical surface soil sample SS008-S02-0 was collected at the second location of elevated PID readings at 1.5 feet bgs approximately 700 feet east of the fill stand under a section of in place two-inch fuel pipe.

5.10.4 Summary of Findings

Of the two analytical surface soil samples collected from SS008, one contained DRO in excess of screening criteria. DRO was the only analyte detected above screening criteria during the 2005 investigation. Table 5-19 provides DRO results for both surface soil samples collected and Figure 5-30 depicts the DRO analytical result in excess of screening criteria. Results of all analyses are provided in Appendix A.

Table 5-19 SS008 Analytical Results

Sample ID	Sample Depth (feet bgs)	DRO (mg/Kg)
Screening Criteria[1]		**230**
SS008-S01-0	1.5	111
SS008-S02-0	1.5	**9,600 J**

Notes:

[1] Soil screening criteria are defined in Section 4

Bold results exceed screening criteria

bgs below ground surface
DRO Diesel Range Organics
ID identification
J Analyte was positively identified, the quantitation is an estimation (see Appendix E)
mg/Kg milligrams per kilogram

Figure 5-29 SS008 Analytical Sample Locations

Figure 5-30 SS008 Analytical Results in Excess of ScreeningCriteria

Based on analytical results and field testing, it appears that DRO is present in surface soil associated with the pipeline in at least one location along the beach. DRO was found at 9,600 mg/Kg in one analytical surface soil sample, which exceeds the screening criteria of 230 mg/Kg. No evidence of contaminated media was detected from the former composite building to the beach.

5.10.5 Recommendations

Based on the results of this investigation, it is recommended that additional study be performed to further determine the nature and extent of contamination associated with the former POL pipeline along the beach. It is recommended that study activities be conducted at shorter intervals (less than 200 feet between each location) along this portion of the pipeline corridor. It is also recommended that the analytical suite along this portion of the POL pipeline corridor be expanded to include GRO, VOCs, and PAHs where DRO contamination is found. Study activities should also include subsurface investigation to determine if subsurface soil or groundwater has been impacted.

Based on the results of reconnaissance and field testing along the POL pipeline corridor from the former composite building to the beach, it appears that no contaminated media is present. Therefore, no further action is recommended for this portion of the POL pipeline corridor.

5.11 SS010: SPILL/LEAK NO. 2 AT THE FORMER WATER SUPPLY PUMP HOUSE

A pipeline transported water from Snuffy Creek to a pumphouse located approximately one mile west of the south end of the runway along the access road to the former composite building. The location of the former pumphouse is depicted on Figure 5-31. Water was piped from the pumphouse to a 24,000-gallon storage tank located approximately 100 feet south of the former composite building. The pumphouse was presumably powered by a generator that was supplied by a 550-gallon UST. Attempts were made to locate the UST during previous investigations, but were not successful.

5.11.1 Investigation Approach

During the 2005 PA/SI, the former water supply pumphouse was investigated to achieve the following objectives:

1. Determine the location of the 550-gallon UST and determine if the UST was previously removed; and
2. Determine if subsurface soil contamination is present associated with the former pumphouse UST.

The investigation of this site included reconnaissance, overburden excavation, test pit excavation, and subsurface soil sampling.

Figure 5-31 SS010 Site Location

5.11.2 Reconnaissance and Overburden Removal

Investigation of the water supply pumphouse began with aerial and ground reconnaissance to determine the appropriate approach to the investigation. Upon arrival at the site, the entire pumphouse area was found to be covered with up to 15 feet of overburden caused by a landslide. Overburden included large boulders up to six feet in diameter. An excavator was used to safely remove as much of the overburden as possible while not creating the potential for another landslide. Due to heavy rains throughout the duration of the project, only a limited amount of overburden could safely be removed. This work was conducted in conjunction with repairs to the access road to the former composite building (see Section 6).

Once overburden was removed, the former water supply pumphouse concrete pad was exposed and several small diameter pipes (approximately one-inch) were located. Approximately 15 feet to the northeast of the concrete pad, a large piece of deformed metal, which appeared to be the top of a UST, was located just below the grade of the road surface. At this time, a strong hydrocarbon odor and sheen was detected in saturated soil removed from the top of the metal and in soil surrounding the north end of the former water supply pumphouse. Water with a sheen and strong hydrocarbon odor appeared to be coming from under the metal. Because obvious contamination was detected while exposing the metal, no field testing was conducted. Due to the potential for creating a falling rock hazard, no additional soil was removed from around the metal to confirm that this was a tank.

5.11.3 Analytical Sampling

One analytical soil sample (and one duplicate sample) was collected from the north side of the former water supply pumphouse. Sample locations are depicted on Figure 5-32. Analytical soil sample WPHS-S01-0 (and duplicate sample WPHS-S01-1) was collected approximately one foot below the grade of the road 10 feet north of the former water supply pumphouse concrete foundation. A strong hydrocarbon odor was noted during sample collection. Both samples were analyzed for DRO, RRO, PAHs, and RCRA metals.

5.11.4 Summary of Findings

Both the primary and duplicate sample collected at the former water supply pumphouse contained DRO in excess of screening criteria. No other analytes were detected above screening criteria in these samples. DRO sample results are provided in Table 5-20 and on Figure 5-33. Results of all analyses are provided in Appendix A.

Figure 5-32 SS010 Analytical Sample Locations

Figure 5-33 SS010 Analytical Results in Excess of Screening Criteria

Table 5-20 SS010 Analytical Results

Sample ID	Sample Depth (feet bgs)[1]	DRO (mg/Kg)
Screening Criteria[2]		**230**
WPHS-S01-0	1	**7,570 J**
WPHS-S01-1	1	**8,640 J**

Notes:

[1] - depth below road grade

[2] – Soil screening criteria are defined in Section 4

Bold results exceed screening criteria

bgs below ground surface

DRO Diesel Range Organics

ID identification

J Analyte was positively identified, the quantitation is an estimation (see Appendix E)

mg/Kg milligrams per kilogram

Based on analytical results, it appears that a release has occurred at the former water supply pumphouse and DRO is present in soil in excess of the screening criteria of 230 mg/Kg. The highest concentration detected was 8,640 mg/Kg in duplicate soil sample WPHS-S01-1.

It appears that the 550-gallon UST is still in place; however, due to safety concerns, soil surrounding the metal could not be removed to confirm that a UST was located. Based on the sheen noted on saturated soil surrounding the metal, it is likely that this is the UST.

5.11.5 Recommendations

Based on the results of this investigation, it is recommended that additional investigation be conducted to confirm that the metal found to the northeast of the former water supply pumphouse is a UST. If a UST is located, it is recommended that the tank be removed and the surrounding area be investigated to determine the extent of contamination. If no UST is present, it is recommended that investigation of the surrounding area still be conducted to determine the extent of contamination. The analytical suite should be expanded to include GRO and VOCs during additional investigation. Because the slope above the former water supply pumphouse is unstable, slope stabilization methods should be employed prior to study or removal activities to ensure the safety of the workers.

5.12 SS011: SPILL/LEAK NO. 3 AT THE FORMER LIGHTING VAULT AT THE RUNWAY

The former lighting vault was located approximately 650 feet southwest of the south end of the runway along the access road to the former composite building (Figure 5-34). A 10-foot by 15-foot concrete foundation is still in place at this location. Historical photos show what appears to be a small AST against the west outside wall of the building. One soil sample collected during a previous investigation contained benzo(a)pyrene in excess of the current screening criteria. No other analytes were detected above screening criteria during any previous investigation. A summary of previous investigations is provided in Section 2.3.

Figure 5-34 SS011 Site Location

5.12.1 Investigation Approach

During the 2005 PA/SI, the former lighting vault at the runway was investigated to achieve the following objectives:

1. Determine the location of the former lighting vault and AST; and
2. Determine if surface soil contamination is present in association with the former lighting vault and AST.

The investigation of this location included site reconnaissance and surface soil analytical sampling.

5.12.2 Reconnaissance

Investigation of the former lighting vault at the runway began with reconnaissance to determine the site layout and to look for any areas of stressed vegetation or stained soil. Drawings from previous reports and as-built drawings were used to determine appropriate starting points for the investigation. The small concrete foundation of the former lighting vault was found in place approximately 650 feet west of the runway turnaround just south of the access road to the former composite building. The foundation is approximately 10 feet by 15 feet in size. There was no observed evidence of stressed vegetation or stained soil surrounding the concrete foundation. Due to the small size of the former lighting vault at the runway, field testing was not performed. Instead, quantitative analytical sampling was performed.

5.12.3 Analytical Sampling

Three analytical surface soil samples were collected from the perimeter of the former lighting vault foundation. Sample locations are depicted on Figure 5-35 and sample depths and analyses are provided in Table 5-21.

Table 5-21 SS011 Analytical Sampling

Sample ID	Depth (feet bgs)	AK 102/103 DRO/RRO	AK 101 GRO	EPA 8270 PAH	EPA 8082 PCBs	EPA 6000 RCRAMetals
SS011-S01-0	1	X			X	X
SS011-S02-0	1	X			X	X
SS011-S03-0	1	X	X	X		X

Notes:

AK	Alaska	GRO	Gasoline Range Organics	RCRA	Resource Conservation and Recovery Act
bgs	below ground surface	ID	identification	RRO	Residual Range Organics
DRO	Diesel Range Organics	PAH	polyaromatic hydrocarbons	VOC	Volatile Organic Compound
EPA	Environmental Protection Agency	PCBs	polychlorinated biphenyls		

Figure 5-35 SS011 Analytical Sample Locations

Analytical surface soil sample SS011-S01-0 was composited from four discrete locations along the south and east sides of the former lighting vault foundation. Soil at each discrete location was collected at approximately one foot bgs. Analytical surface soil sample SS011-S02-0 was composited from four discrete locations along the north and west sides of the former lighting vault foundation. Soil was collected at approximately one foot bgs. Analytical surface soil sample SS011-S03-0 was collected at one discrete location 10 feet west of the west side of the former lighting vault foundation at a location of a possible AST. The sample was also collected at one foot bgs.

5.12.4 Summary of Findings

Of the three analytical surface soil samples collected at SS011, one contained DRO in excess of the screening criteria. DRO was the only analyte detected above screening criteria at this site during the 2005 investigation. Table 5-22 provides all DRO results at SS011. The DRO result in excess of the screening criteria is also depicted on Figure 5-36. Results of all analyses are provided in Appendix A.

Table 5-22 Analytical Results in Excess of Screening Criteria

Sample ID	Sample Depth (feet bgs)	DRO (mg/Kg)
Screening Criteria[1]		**230**
SS011-S01-0	1	170
SS011-S02-0	1	3.67
SS011-S03-0	1	**887**

Notes:

[1] Soil screening criteria are defined in Section 4

Bold results exceed screening criteria

bgs	below ground surface	PCBs	polychlorinated biphenyls
DRO	Diesel Range Organics	mg/Kg	milligrams per kilogram
ID	identification		

Based on analytical results, it appears that DRO is present in surface soil in excess of the screening criteria in association with the former lighting vault at the runway. DRO was found at 887 mg/Kg at the possible location of an AST on the west side of the former lighting vault foundation.

Benzo(a)pyrene, detected above the current screening criteria during a previous investigation, was analyzed for in surface soil sample SS011-S03-0. This analyte was detected at 0.0243 mg/Kg in this sample, which is significantly lower than the screening criteria of 0.9 mg/Kg.

Figure 5-36 SS011 Analytical Results in Excess of Screening Criteria

5.12.5 Recommendations

Based on the results of this investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil at SS011. It is also recommend that subsurface investigation be conducted to determine if subsurface soil or groundwater has been impacted.

5.13 TU012: SPILL/LEAK NO. 9 AT THE FORMER USTS

As-built drawings of the Driftwood Bay RRS indicate the location of a fuel tank northeast of the former lighting vault. The location is depicted on Figure 5-37. The type of product contained in the tank and the purpose of the tank is not discernable from as-built drawings. However, the tank may have supplied fuel to a generator at the former lighting vault which supplied power to all runway lights. In 1991, a contractor reportedly located and removed three USTs from this area. These included a 1,000-gallon diesel UST, a 750-gallon MOGAS UST, and a 250-gallon MOGAS UST. Following UST removal, the contractor reportedly used a thermal remediation unit to treat an estimated 30 cubic yards of contaminated soil associated with the tanks. No additional investigation of this source area has been reported.

5.13.1 Investigation Approach

During the 2005 PA/SI, the former location of the USTs was investigated to achieve the following objectives:

1. Determine the location of the former USTs;
2. Determine if surface and subsurface soil contains contaminants above screening criteria; and
3. Determine if any USTs remain at the site.

The investigation of this area included site reconnaissance, surface soil field testing, test pit excavation, and surface soil and subsurface soil analytical sampling.

5.13.2 Reconnaissance and Field Testing

Investigation of the former USTs began with reconnaissance to determine the layout of the site and look for areas of disturbed soil that may have been former excavations where the USTs were removed. Previous reports indicate that the location is to the northeast of the former lighting vault. Possibly disturbed soil was found to the northeast of the former lighting vault foundation.

Apparently undisturbed wet areas surround the south and east sides of this area. A metal detector was used to search the area for evidence of remaining USTs, but none were detected. There was no evidence of stressed vegetation or stained soil.

Figure 5-37 TU012 Site Location

A surface soil field testing grid was established over the area as depicted on Figure 5-38. The grid averaged 45 feet wide by 45 feet long with grid nodes spaced approximately 15 feet apart. Surface soil field testing samples were collected at every other grid node and PID head-space readings were taken of each these samples. A total of 16 PID head-space readings were taken with no elevated results. The highest PID result was 0.6 ppmv. There was no odor detected at any location.

5.13.3 Analytical Sampling

Three surface soil analytical samples and one subsurface soil analytical sample were collected from TU012. All sample locations are depicted on Figure 5-39 and all sample depths and analyses are provided in Table 5-23.

Table 5-23 TU012 Analytical Sampling

Sample ID	Depth (feet bgs)	AK 102/103 DRO/RRO	AK 101 GRO	EPA 8260 VOC	EPA 8270 PAH	EPA 6000 RCRA Metals
TU012-S01-0	1	X	X	X	X	X
TU012-S02-0	1	X				
TU012-S03-0	1	X	X	X		X
TU012-S04-0	6	X	X	X		X

Notes:

AK	Alaska	GRO	Gasoline Range Organics	RCRA	Resource Conservation and Recovery Act
bgs	below ground surface	ID	identification	RRO	Residual Range Organics
DRO	Diesel Range Organics	PAH	polyaromatic hydrocarbons	VOC	Volatile Organic Compound
EPA	Environmental Protection Agency	PCBs	polychlorinated biphenyls		

Analytical surface soil sample TU012-S01-0 was collected at one foot bgs at the approximate center of the TU012 field testing grid. Sample TU012-S02-0 was collected at one foot bgs near the northeast corner of the grid. Sample TU012-S03-0 was collected at one foot bgs approximately 10 feet east of the TU012 grid at an area of apparently stressed vegetation. A test pit was dug with an excavator in the northeast corner of the grid and analytical subsurface soil sample TU012-S04-0 was collected at six feet bgs from the bottom of the excavation.

5.13.4 Summary of Findings

None of the four analytical soil samples collected during the 2005 investigation contained analytes in excess of screening criteria. Complete analytical results are provided in Appendix A. Disturbed soil was found at the location where previous removal of the USTs was indicated. There is no evidence of any remaining tanks at this location.

Figure 5-38 TU012 Surface Soil Field Testing Grid Location

Figure 5-39 TU012 Analytical Sample Locations

5.13.5 Recommendations

Based on the results of this investigation, it is recommended that additional subsurface investigation be conducted to confirm that subsurface soil and groundwater were not impacted by contaminants from the former USTs. In addition, the investigation area should be expanded to ensure the former location of the USTs, which was poorly documented in previous reports, is covered.

5.14 ADDITIONAL POINTS OF INTEREST

During development of the work plan for this PA/SI, the ADEC provided comments concerning several additional points of interest that were not included within the 12 previously discussed IRP sites. While it was outside the scope of this project to fully investigate each of these additional points of interest, some reconnaissance or sampling was conducted at most. Table 5-24 provides a list of the additional points of interest and a brief description of work conducted at each. A summary of findings at each of these points of interest is provided in the following paragraphs.

Table 5-24 2005 Work Conducted at the Additional Points of Interest

Point of Interest	2005 Work Conducted
1958 Construction Camp	Reconnaissance
500-gallon Gasoline Tank at the Drum Storage Area	Investigated under SS004 (see Section 5.7)
Ammunition Storage Shed	Reconnaissance
Beach Hardstand near POL Tank Area	Investigated under SS007 (see Section 5.9)
Drainage Ditch bordering Runway	Reconnaissance
Drums along the Road to Wide Bay	Reconnaissance
Fish Pond northeast of the Drum Storage Area	Reconnaissance
Heavy Equipment Storage Building	Reconnaissance and analytical sampling
Red Cinder Dome Rock Quarry	Reconnaissance
Water Storage Tank	Investigated under SS002 (see Section 5.4)

5.14.1 Summary of 2005 Work Conducted at Additional Points of Interest

1958 Construction Camp

During construction of the Driftwood Bay RRS in 1958, workers lived in a construction camp located near the former wooden storage building just west of the runway. Reconnaissance was conducted at this location during the 2005 PA/SI to look for any

evidence of the former camp. No evidence of the camp or any potential contaminated areas that could be associated with the camp were observed during reconnaissance. No field testing or analytical sampling was conducted.

Ammunition Storage Shed

An ammunition storage shed located along the access road near the former composite building is shown on as-built drawings of the facility. Reconnaissance of the former location of the shed was conducted during the 2005 PA/SI. Partially buried construction debris was observed at the approximate location of the shed as depicted on the as-built drawings. No field testing or analytical sampling was conducted.

Drainage Ditch Bordering the Runway

Drainage ditches border the runway and empty into Snuffy Creek and Driftwood Bay. Reconnaissance of the drainage ditches was conducted during the 2005 PA/SI to look for areas of sheen, stressed vegetation, and wildlife. No sheen or stressed vegetation was observed during the investigation and no evidence of fish or other wildlife was observed. No field testing or analytical sampling was conducted.

Drums along the Road to Wide Bay

Drums were reportedly observed along the road to Wide Bay south of the Driftwood Bay RRS. During the 2005 PA/SI, this route was repeatedly flown over during crew transportation between Dutch Harbor and Driftwood Bay. No drums were observed during the investigation; however, the top of the pass through which the road passes was snow covered throughout the investigation.

Fish Pond Northeast of the Drum Storage Area

A small pond containing fish was described in the 1995 PA/SI Report (USAF, 1996). Reconnaissance of the pond was conducted during the 2005 PA/SI to determine if fish or other wildlife were present. The pond, which was approximately 15 feet in diameter, was located northeast of the drum storage area as described in the report. The pond did not appear to be connected to any other water source and did not contain fish or any other wildlife at the time of the investigation. No field testing or analytical sampling was conducted.

Heavy Equipment Storage Building

As-built drawings of the facility indicate that a heavy equipment storage building was located approximately 1,000 feet to the south of the south end of the runway. No previous investigation of the building was conducted.

Reconnaissance was conducted during the 2005 PA/SI to identify the former location of the building and look for areas of stressed vegetation and stained soil. The location of the building, as depicted on Figure 5-40, was determined through the use of as-built drawings. The area contained only sparse vegetation and was surrounded by thick and apparently undisturbed vegetation. While no building foundation was found, the area

Figure 5-40 Heavy Equipment Storage Building Investigation Location

appeared to match the dimensions of the building shown on as-built drawings. Several scraps of metal were found within the area along with a depression that appeared to contain buried debris.

Two analytical surface soil samples were collected as depicted on Figure 5-40. Both samples were collected at one foot bgs in areas of bare soil with apparent stressed vegetation. Sample analyses are provided in Table 5-25.

Table 5-25 Heavy Equipment Storage Building Analytical Sampling

Sample ID	AK 102/103 DRO/RRO	AK 101 GRO	EPA 8260 VOC	EPA 8270 PAH	EPA 8082 PCBs	EPA 8081A Pest	EPA 8151 Herb	EPA 6000 RCRA Metals
HESB-S01-0	X		X	X	X	X	X	X
HESB-S02-0	X	X	X	X	X	X	X	X

Notes:

AK	Alaska	Herb	herbicides	RCRA	Resource Conservation and Recovery Act
bgs	below ground surface	ID	identification	RRO	Residual Range Organics
DRO	Diesel Range Organics	PAH	polyaromatic hydrocarbons	VOC	Volatile Organic Compound
EPA	Environmental Protection Agency	PCBs	polychlorinated biphenyls		
GRO	Gasoline Range Organics	Pest	pesticides		

DRO was detected in excess of the screening criteria of 230 mg/Kg in surface soil sample HESB-S01-0 at a concentration of 2,210 mg/Kg. The DRO analytical result for this sample is depicted on Figure 5-40. No other analytes were detected above screening criteria in this sample and no analytes were detected above screening criteria in sample HESB-S02-0.

Red Cinder Dome Rock Quarry

The Red Cinder Dome Rock Quarry is located approximately two miles west of the runway along the access road to the former composite building. The ADEC expressed concern that the quarry may have been used as a landfill at some point during the facility history. During the 2005 PA/SI, reconnaissance was conducted at the site by air and by ground. No evidence of buried debris was seen by during any reconnaissance effort at the quarry. During ground reconnaissance, the there was no evidence noted of erosion or subsidence in the quarry. Obvious bedrock was not observed. Reconnaissance of the quarry was conducted purely by visual techniques and no field testing or analytical sampling was conducted.

5.14.2 Additional Points of Interest Recommendations

The following recommendations have been made based on the results of this investigation.

1958 Construction Camp

It is recommended that additional reconnaissance be conducted to determine the location of the former camp and field testing and/or analytical sampling be performed if evidence of the camp is located.

Ammunition Storage Shed

Analytical samples of soil in the vicinity of the former storage shed should be analyzed to determine if explosives residue is present.

Drainage Ditch Bordering the Runway

It is recommended that analytical samples of surface water within the drainage ditch be collected to determine if contaminants from upgradient sites are migrating through this pathway.

Drums along the Road to Wide Bay

It is recommended that additional aerial reconnaissance of the pass be conducted at a time when the road is free of snow.

Fish Pond Northeast of the Drum Storage Area

It is recommended that additional reconnaissance be conducted of the pond during later summer months to determine if fish are actually present in the pond. If so, analytical sampling of surface water and/or sediment should be conducted.

Heavy Equipment Storage Building

It is recommended that additional study be performed to define the nature and extent of contamination associated with the heavy equipment storage building.

Red Cinder Dome Rock Quarry

Based on reconnaissance conducted in 2005, it appears that the quarry was not used as a landfill. No further action is recommended for this point of interest.

6.0 ROAD REPAIR

This section of the Driftwood Bay PA/SI Report includes a discussion of the field procedures employed to mobilize all equipment and personnel and the procedures used to repair the existing road at Driftwood Bay RRS on Unalaska Island, Alaska. This work performed in conjunction with a runway repair project that was also conducted at Driftwood Bay. All field activities were performed according to the procedures detailed in the Work Plan dated May 2005 (USAF, 2005a).

6.1 FIELD TEAM AND APPROACH

The prime contractor worked with several subcontractors throughout this task. The following are a list of those used in execution of the work:

- Magone Marine – Barge Transportation and Heavy Equipment Supplier;
- Maritime Helicopters – Helicopter Transportation; and
- Northern Mechanical – Heavy Equipment Supplier.

The original scope of work for this task was:

> Use heavy equipment "to make the road to the LRRS site passable for vehicle travel" (USAF. 2005d.).

The scope of work accomplished during the field effort and discussed in this section includes:

- Mobilization of equipment and personnel to Driftwood Bay RRS;
- Pre-repair reconnaissance;
- Road repairs; and
- Demobilization of equipment and personnel from Driftwood Bay RRS.0

6.2 FIELD ACTIVITIES

The following sections provide a chronological discussion of the work conducted and challenges encountered during the execution of this task. Work was conducted between 18 May and 20 June 2005.

Photo 1. A bulldozer and excavator were required to help unload the remaining equipment from the barge.

6.2.1 Mobilization

The field crew was mobilized by commercial aircraft to Dutch Harbor, Alaska on 17 and 18 May 2005. The helicopter arrived in Dutch Harbor from Homer, Alaska on 18 May 2005 and began transporting the crew between Dutch Harbor and Driftwood Bay on 19 May 2005 to conduct reconnaissance work. The excavator used for the project was rented from a Dutch Harbor based contractor (Northern Mechanical). Due to heavy seas, equipment and supplies could not be barged to Driftwood Bay until 23 May 2005. All road and runway repair equipment was unloaded on the beach at Driftwood Bay on 24 May 2005.

Barge landing at the beach was difficult. Due to the shallow nature of Driftwood Bay, large cobbles on most of the beach, and the sharp angle of the beach slope, the barge needed several hours to find a suitable landing location. Once the barge landed, the bulldozer and excavator were unloaded and used to help the remaining equipment onto the beach.

6.2.2 Pre-Repair Reconnaissance

Prior to commencement of repair work, ground and aerial reconnaissance was performed to determine the condition of the road and plan a safe approach for repairs. The road was found to be washed out in two main locations as shown on Photo 2. Both washed out areas were located within the bottom quarter of the road.

Photo 2. The road was found to be washed out in two main locations.

At the first washout, the road was covered with up to 15 feet of material ranging in size from large boulders to gravel. A culvert that formerly transported water from Snuffy Creek under the road had been blocked by the landslide and water was running down and across the road. However, the unburied portion of the culvert on the downhill side of the road appeared to be in good condition. Minor repairs would also be required at the location where Snuffy Creek was currently crossing the road. At the second washout, the road had been eroded several feet on the downhill side and would require excavation and a new culvert. From the second washout to the former composite building, the road was found to be in good condition and passable for four-wheel drive vehicles.

6.2.3 Road Repair

Initial repairs were made by excavating the material that had covered the road at the first washout. The culvert underlying the landslide was exposed on the uphill side and Snuffy

Creek was again directedunder the road (see Photo 3). Minor repairs were also made below the first washout at the location Snuffy Creek had been crossing the road. While the road was still wet following repairs at this area, it was immediately passable with a four-wheel drive pick-up truck.

At the second washout, a small amount of material was removed from the uphill side of the road to make this area slightly wider and safe for vehicles. A culvert was then placed at the location of this washout to allow water to pass under the road and decrease the chance of a future washout (see Photo 4). This portion of the road was also immediately passable following repair. The excavator was the driven to the top of the road to compact the surface and pick-up truck followed behind. The truck had no problems reaching the former composite building and the road was safe for vehicle traffic.

Photo 3. The culvert underlying the landslide was exposed on the uphill side.

6.2.4 Demobilization

Road repairs were completed on 29 May 2005. The excavator remained on site from 29 May to June 1 to aid in the on-going runway repair project. On 2 June 2005, the field crew prepared all equipment for barging to Dutch Harbor. Due to weather, the barge could not safely reach the beach until 3 June 2005. At that time, all equipment was loaded and barged back to Dutch Harbor.

Photo 4. The second washout was widened and a culvert installed.

6.3 CONCLUSION

Project work was completed as indicated in the project Work Plan (USAF. 2005d.). Despite challenges encountered during execution of field work, the project was completed on schedule and within budget.

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7.0 CONCLUSIONS AND RECOMMENDATIONS

As discussed in previous sections, the objective of the 2005 PA/SI efforts at the Driftwood Bay RRS was to determine if contamination is present at the former facility and document locations of contaminated media. The objectives were met for each of the 12 IRP sites investigated during the 2005 PA/SI and were met for 9 of 10 additional points of interest. Table 7-1 details the objectives for each of the 12 IRP sites, provides a brief answer to the specific objectives, lists the contaminants identified at the sites that were above screening criteria, and summarizes the recommendations for further actions. The following subsections provide more detailed recommendations for further actions at each of the 12 IRP sites and the additional points of interest.

In accordance with the project STATEMENT OF WORK, EPA's Hazard Ranking System (HRS) was used to score the Driftwood Bay RRS site using "HRS Quickscore Version 2.2". Scoresheets are included in Appendix B of this report. The HRS score for this site was determined to be lower than 28.5, indicating that the site is not a candidate for the NPL.

Table 7-1 Driftwood Bay PA/SI Objectives and Recommendations

Site	Objectives for the 2005 PA/SI	Answers to Objectives	Contaminants Identified	Recommendations for Further Action
FL009 – Spill/Leak No. 1 at the Septic Tank	1. Determine the location and layout of the septic system; 2. Determine if the septic tank and septic drain lines were abandoned or removed; and 3. Determine if contamination is present in surface soil in association with this source area.	1. Location determined; 2. Septic tank and drain lines left in place; and 3. Yes, contamination in surface soil is present.	• DRO at 670 mg/Kg in one surface soil composite sample	• Determine the extent of contamination in surface soil at the tank area and the septic outfall area. • Determine depth to bedrock. • Determine if pipeline is intact. • Conduct subsurface investigation to determine if pipeline has leaked.
LF006 – Old Disposal Area	1. Determine the exact location of the old disposal area; 2. Estimate the types of debris buried within the disposal area; and 3. Determine if there is contaminated surface soil or surface water associated with the disposal area.	1. Exact location determined; 2. Types of debris included equipment parts, drums, and other general facility debris; and 3. Potential surface soil contamination was present and no surface water contamination was detected.	• Arsenic at 11.9 mg/Kg at one surface soil composite sample	• Determine the boundaries of the debris cell with a geophysical survey. • Conduct additional sampling of cover soil, subsurface soil, and groundwater to determine if contaminants have leached from the disposal area. • Determine site-specific background concentrations for inorganic contaminants. • Provide sufficient cover soil and backfill depressions. • Assess contents of drums and remove and dispose of all drums properly.

Table 7-1 Driftwood Bay PA/SI Objectives and Recommendations *(continued)*

OT001 – Former Composite Building and Antenna Arrays	1. Determine if contamination is present in surface soil in association with this source area; 2. Determine depth to bedrock at OT001; 3. Determine if surface water is present at OT001; 4. Determine if a 20,000-gallon UST is still in place near the former composite building; and 5. Determine if subsurface soil contamination is present in association with the former 20,000-gallon USTs.	1. Contamination was present in the surface soil; 2. Bedrock was encountered at 3 feet bgs except in area of 20,000 gal UST; 3. No surface water was present within one mile; 4. The 20,000 gallon UST was not in place; and 5. Contamination was detected at 10 ft bgs within a test pit excavated within the 20,000 gallon UST area.	• DRO up to 3,030 mg/Kg in surface soil	• Determine the extent of contamination in surface soil. • Confirm that PCBs are not present at this site. • Confirm depth to bedrock. • Determine extent of subsurface soil contamination beneath and downgradient of former USTs. • Determine the extent of contamination at the soil/bedrock interface at OT001.
SS002 – Landfill No. 1 at the Former Composite Building	1. Determine if contamination is present in cover soil over the landfill; 2. Determine the condition of the landfill cover; and 3. Confirm the location of the asbestos cell.	1. No contamination was detected; 2. The landfill cover was not in good condition and debris was visible beneath it; and 3. The asbestos cell could not be located.	• None detected	• Perform geophysical survey to delineate the boundary of the landfill. • Perform additional analytical testing to confirm the cover material and surrounding surface soil is not contaminated. • Excavate test pits around the perimeter of the landfill to confirm the extent of debris and determine the depth to bedrock. • Resurvey the boundaries of the landfill. • Grade, cover, and install asbestos warning signs.

Table 7-1 Driftwood Bay PA/SI Objectives and Recommendations *(continued)*

SS004 – Spill/Leak No. 4 at the Drum Storage Area	1. Determine the locations of the drum storage area, wooden storage building, trench, and 500-gallon gasoline tank; 2. Determine if any evidence of the 500-gallon gasoline tank is present; and 3. Determine if contaminated surface soil is present at any of the four sub-sites.	1. The drum storage areas, the foundation of the wooden storage building, and the trench were located; 2. No evidence of the tank was discovered; and 3. Three of the four sub-sites contained contamination.	• DRO up to 16,700 mg/Kg in surface soil • Chromium at 38.2 mg/Kg at one surface soil composite sample • Mercury at 1.24 mg/Kg at one surface soil composite sample • Chromium at 15.1 mg/Kg at one surface soil composite sample	• Conduct subsurface investigation at the Former Wooden Storage Building. • Perform additional surface investigation and subsurface investigation at the Drum Storage Area. • Conduct subsurface investigation at the trench. • Establish site-specific background concentrations of inorganic contaminants. • Conduct additional surface and subsurface investigation at the 500-gallon AST and expand analyses to include VOCs, PCBs, and pesticides in at least one sample.
SS005 – Spill/Leak No. 5 at the MOGAS Tank at the Runway	1. Determine the location of the former MOGAS tank; 2. Determine if the tank was an AST or UST; 3. Determine if contamination is present in soil or water at SS005; and 4. Determine the depth to groundwater at SS005.	1. The location of the former MOGAS tank was not confirmed; 2. Assumed the tank was an AST due to shallow ground water at the site; 3. No contamination was present in soil or water; and 4. Depth to groundwater was approximately 1.5 feet bgs.	• None detected	• Install and sample monitoring wells. • Establish groundwater flow direction. • Investigate downgradient surface water drainages.

Table 7-1 Driftwood Bay PA/SI Objectives and Recommendations *(continued)*

SS007 – Spill/Leak No. 7 at the POL Tank Area	1. Determine if there was a beach landing area near the former tank farm area; 2. Determine the exact location of the former tank farm area; 3. Determine the exact location of the former 25,000-gallon MOGAS tank; 4. Determine if there is contaminated media associated with the former tank farm area.	1. No beach landing area was discovered; 2. The exact location of the former tank farm area was determined; 3. No evidence of the 25,000-gallon MOGAS tank was determined; and 4. Contaminated media associated with the former tank farm area was discovered.	• DRO up to 13,700 mg/Kg in surface soil • Benzo(a)pyrene at 2.37 mg/Kg at one surface soil sample	• Determine the extent of contamination in surface soil. • Conduct subsurface investigation. • Conduct additional limited study to confirm that the 25,000-gallon MOGAS tank pad and the possible beach landing area have been eroded by natural processes.
SS008 – Spill/Leak No. 8 at the POL Pipeline	1. Determine if the pipeline was above ground or buried; 2. Determine if the pipeline was removed; 3. Determine if there was a beach landing area near the termination of the 4-inch fuel pipeline at the west end of Driftwood Bay; and 4. Determine if surface soil contamination is present along the pipeline corridor.	1. The pipeline was determined to be above ground; 2. Portions of the pipeline remained along the pipeline corridor; 3. No beach landing was discovered; and 4. Contamination was encountered along the pipeline corridor.	• DRO at 9,600 mg/Kg in one surface soil sample	• Determine the extent of contamination in the surface and subsurface along the former POL pipeline along the beach. • Expand analytical suite to include GRO, VOCs, and PAHs in some samples.

Table 7-1 Driftwood Bay PA/SI Objectives and Recommendations *(continued)*

SS010 – Spill/Leak No. 2 at the Former Water Supply Pump House	1. Determine the location of the 550-gallon UST and determine if the UST was previously removed; and 2. Determine if subsurface soil contamination is present associated with the former pumphouse UST.	1. Due to safety concerns sufficient soil could not be removed to positively identify the location of the UST; and 2. Contamination is associated with the former pumphouse UST.	• DRO up to 8,640 mg/Kg in soil	• Stabilize slope above former water pumphouse prior to any work. • Confirm that a UST is present. • Remove UST if found. • Determine the extent of contamination in surface soil and the subsurface. • Expand analytical suite to include GRO, VOCs, and PAHs in at least one sample.
SS011 – Spill/Leak No. 3 at the Former Lighting Vault at the Runway	1. Determine the location of the former lighting vault and AST; and 2. Determine if surface soil contamination is present in association with the former lighting vault and AST.	1. The location of the former lighting vault was determined and the potential location of the AST; and 2. Contamination is present in association with the former lighting vault and AST.	• DRO in one soil sample at 887 mg/Kg	• Determine the extent of contamination in surface and the subsurface.
TU012 – Spill/Leak No. 9 at the Former USTs	1. Determine the location of the former USTs; 2. Determine if surface and subsurface soil contains contaminants above screening criteria; and 3. Determine if any USTs remain at the site.	1. Presumed location of the former USTs determined; 2. No contamination detected; and 3. No evidence of remaining USTs was encountered.	• None detected	• Perform additional surface and subsurface investigation.

Table 7-1 Driftwood Bay PA/SI Objectives and Recommendations *(continued)*

WP003 – POL Waste Pit at the Former Composite Building	1. Determine the exact location of the waste pit; 2. Determine if contaminants are present in surface soil associated with the waste pit; and 3. Determine the depth to bedrock at the waste pit.	1. The location of the waste pit was determined; 2. Widespread contamination was identified associated with the waste pit; and 3. The depth to bedrock was 3 feet bgs.	• DRO up to 9,380 mg/Kg in surface soil • RRO up to 29,800 mg/Kg in surface soil • Lead in one surface soil sample at 76,600 mg/Kg • Arsenic in one surface soil sample at 11.5 mg/Kg	• Determine the extent of contamination in surface soil and the soil/bedrock interface. • Determine site-specific background concentrations of inorganic contaminants. • Determine the extent of lead in surface soil at the burned battery site. • Possibly include the discovered burned battery site as a new site
Additional Points of Interest	1. Perform reconnaissance at 10 additional sites and limited sampling.	1. Performed reconnaissance and/or investigations at 7 of the additional sites. Three of the sites were covered under investigations at other areas.	• DRO at 2,210 mg/Kg in one surface soil sample at the heavy equipment storage facility.	• Perform additional actions at 6 sites • Perform no further action at one site. • Three of the sites were covered under investigations at other sites.

7.1 OT001: FORMER COMPOSITE BUILDING AND ANTENNA ARRAYS RECOMMENDATIONS

Based on results of this investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil at OT001. It is also recommended that additional surface soil analytical sampling be conducted to confirm that PCBs are not present at this site. Additional test pits should be excavated to confirm the depth to bedrock in the vicinity of OT001. The extent of subsurface soil contamination associated with the two 20,000-gallon USTs should also be determined. The extent of contamination at the soil/bedrock interface at all source areas at OT001 should be defined.

7.2 FL009: SPILL/LEAK NO. 1 AT THE SEPTIC TANK RECOMMENDATIONS

Based on results of the investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil at FL009. It is also recommended that the septic system outfall be investigated to determine the nature and extent of any contaminants that may have been flushed through the system. Although test pits excavated nearby at OT001 indicate that the depth to bedrock is shallow and subsurface soil and groundwater are not present, additional test pits should be excavated to determine the depth to bedrock at FL009 (both at the tank and the septic outfall) and the nature of the pipe. In addition, it is recommended that sediment remaining in the septic tank be characterized. The septic pipeline should be investigated to determine if it is intact and soil under the pipeline should be investigated at regular intervals to determine if the pipeline has leaked.

7.3 SS002: LANDFILL NO. 1 AT THE FORMER COMPOSITE BUILDING RECOMMENDATIONS

It is recommended that geophysics be used to better define the boundaries of the landfill. Additional analytical sampling should be performed to confirm that landfill cover soil and surface soil surrounding the landfill are uncontaminated. In addition, it is recommended that test pits be excavated around the perimeter of the landfill so that the depth to bedrock and volume of buried debris can be determined. The perimeter of the landfill should be re-surveyed.

To ensure the landfill is in compliance with ADEC Solid Waste Regulations 18 AAC 60, the following recommendations are also made:

- Adequately backfill depressions and grade to promote drainage without erosion;
- Provide sufficient cover to prevent debris eroding from the landfill;
- Take proper precautions to ensure that asbestos fibers are not released to air or surface water; and

Install asbestos warning signs.

7.4 WP003: POL WASTE PIT AT THE FORMER COMPOSITE BUILDING RECOMMENDATIONS

Based on results of this investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil in excess of screening criteria at WP003.

Due to the slight exceedance of arsenic, it is recommended that site specific background concentrations be determined as detailed in Section 5.1 and utilized during the potential future investigation to confirm the exceedances are not consistent with naturally occurring levels. The extent of lead in surface soil in excess of screening criteria at the burned battery area should also be determined.

7.5 LF006: OLD DISPOSAL AREA RECOMMENDATIONS

It is recommended that geophysics be used to define the boundaries of the disposal area. It is also recommended that additional cover soil, subsurface soil, and groundwater analytical sampling be conducted to determine if contamination has leached from the debris buried at the site and to further characterize the potential arsenic contamination at the site. In addition, it is recommended that site specific background concentrations be determined as detailed in Section 5.1 and utilized during the potential future investigation to confirm the arsenic exceedance is not consistent with naturally occurring levels. To ensure compliance with ADEC Solid Waste Regulations 18 AAC 60, the following recommendations are also made:

- Provide sufficient cover to prevent debris eroding from the landfill; and
- Adequately backfill depressions and grade to promote drainage without erosion.

It is also recommended that the contents of all drums at the Driftwood Bay RRS be assessed to determine the contents and the surrounding soil/water be investigated for potential impacts associated with the drums. All drums should be removed from the facility and disposed of properly.

7.6 SS004: SPILL/LEAK NO. 4 AT THE DRUM STORAGE AREA RECOMMENDATIONS

The following recommendations are based on the 2005 findings of the investigation at SS004.

SS004: Former Wooden Storage Building Recommendations

Although no evidence of contamination was encountered during the 2005 investigation of the former wooden storage building, two previous investigations did detect analytes in excess of current screening criteria in surface soil. It is therefore recommended that subsurface investigation of the site be performed to determine if subsurface soil or groundwater have been impacted.

SS004: Drum Storage Area Recommendations

Analytical results and field testing indicate the presence of contaminants in surface and subsurface soil at the drum storage area. It is recommended that surface soil and subsurface soil and groundwater be investigated to further delineate the nature and extent of contamination at this site.

SS004: Trench Recommendations

Analytical results indicate that mercury and arsenic may be present above screening criteria in subsurface soil at the trench. It is recommended that additional subsurface investigation be performed to determine the extent of mercury and arsenic in excess of screening criteria at the trench. Due to the slight exceedances of both mercury and arsenic, it is also recommended that site specific background concentrations be determined as detailed in Section 5.1 and utilized during the potential future investigation to confirm the exceedances are not consistent with naturally occurring levels.

SS004: 500-gallon AST Recommendations

Based on analytical results, it appears that DRO is present in excess of screening criteria at the approximate location of the former 500-gallon AST. It is recommended that additional investigation of surface soil, subsurface soil, and groundwater be performed to determine the extent of contamination associated with the tank. Given the indeterminate history of this tank, analysis of analytical samples should be expanded to include VOCs, PCBs, and pesticides in at least one sample at this location.

7.7 SS005: SPILL/LEAK NO. 5 AT THE MOGAS TANK AT THE RUNWAY RECOMMENDATIONS

Based the results of this PA/SI, it is recommended that monitoring wells be installed and sampled to accurately measure potential volatile chemical concentrations in groundwater and to determine groundwater flow direction and gradient. It is also recommended that downgradient surface water drainages be investigated for potential impacts.

7.8 SS007: SPILL/LEAK NO. 7 AT THE POL TANK AREA RECOMMENDATIONS

Based on the results of this investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil at the former tank farm area at SS007. It also recommended that a subsurface investigation be performed to determine if subsurface soil or groundwater has been impacted by fuel constituents associated with the former tank farm area.

Because the beach at the likely former locations of the 25,000-gallon MOGAS tank and the possible beach landing area at SS007 have been aggressively reworked through natural processes leaving only large cobbles, it is highly unlikely that any contaminants are present. However, it is recommended that additional limited study be conducted to confirm this conclusion.

7.9 SS008: SPILL/LEAK NO. 8 AT THE POL PIPELINE RECOMMENDATIONS

Based on the results of this investigation, it is recommended that additional study be performed to further determine the nature and extent of contamination associated with the former POL pipeline along the beach. It is recommended that study activities be conducted at shorter intervals (less than 200 feet between each location) along this portion of the pipeline corridor. It is also recommended that the analytical suite along this portion of the POL pipeline corridor be expanded to include GRO, VOCs, and PAHs where DRO contamination is found. Study

activities should also include subsurface investigation to determine if subsurface soil or groundwater has been impacted.

Based on the results of reconnaissance and field testing along the POL pipeline corridor from the former composite building to the beach, it appears that no contaminated media is present. Therefore, no further action is recommended for this portion of the POL pipeline corridor.

7.10 SS010: SPILL/LEAK NO. 2 AT THE FORMER WATER SUPPLY PUMP HOUSE RECOMMENDATIONS

Based on the results of this investigation, it is recommended that additional investigation be conducted to confirm that the metal found to the northeast of the former water supply pumphouse is a UST. If a UST is located, it is recommended that the tank be removed and the surrounding area be investigated to determine the extent of contamination. If no UST is present, it is recommended that investigation of the surrounding area still be conducted to determine the extent of contamination. The analytical suite should be expanded to include GRO and VOCs during additional investigation. Because the slope above the former water supply pumphouse is unstable, slope stabilization methods should be employed prior to study or removal activities to ensure the safety of the workers.

7.11 SS011: SPILL/LEAK NO. 3 AT THE FORMER LIGHTING VAULT AT THE RUNWAY RECOMMENDATIONS

Based on the results of this investigation, it is recommended that additional study be performed to determine the extent of contamination in surface soil at SS011. It is also recommend that subsurface investigation be conducted to determine if subsurface soil or groundwater has been impacted.

7.12 TU012: SPILL/LEAK NO. 9 AT THE FORMER USTS RECOMMENDATIONS

Based on the results of this investigation, it is recommended that additional subsurface investigation be conducted to confirm that subsurface soil and groundwater were not impacted by contaminants from the former USTs. In addition, the investigation area should be expanded to ensure the former location of the USTs, which was poorly documented in previous reports, is covered.

7.13 ADDITIONAL POINTS OF INTEREST RECOMMENDATIONS

Eleven additional points of interest were initially identified for inclusion in this PA/SI. A reconnaissance and/or investigation were performed at 7 of the additional sites. Three of the sites were covered under investigations at other IRP sites included in this PA/SI and no action was performed at one site. The following recommendations have been made for the 7 additional sites where a reconnaissance and/or investigation were performed and the one site where no action was performed.

1958 Construction Camp

A reconnaissance was conducted at this location during the 2005 PA/SI. No evidence of the camp or any potential contaminated areas were observed and no field testing or analytical sampling was conducted. It is recommended that additional reconnaissance be conducted to determine the location of the former camp and field testing and/or analytical sampling be performed if evidence of the camp is located.

Ammunition Storage Shed

A reconnaissance of the former location of the shed was conducted during the 2005 PA/SI. Partially buried construction debris was observed at the approximate location of the shed. No field testing or analytical sampling was conducted. Analytical samples of soil in the vicinity of the former storage shed should be analyzed to determine if explosives residue is present.

Drainage Ditch Bordering the Runway

A reconnaissance of the drainage ditches was conducted during the 2005 PA/SI. No sheen or stressed vegetation was observed during the investigation and no field testing or analytical sampling was conducted. It is recommended that analytical samples of surface water within the drainage ditch be collected to determine if contaminants from upgradient sites are migrating through this pathway.

Drums along the Road to Wide Bay

During the 2005 PA/SI, the road to Wide Bay south of the Driftwood Bay RRS where the drums were reportedly observed was repeatedly flown over during crew transportation between Dutch Harbor and Driftwood Bay. No drums were observed during the investigation; however, the top of the pass through which the road passes was snow covered. It is recommended that additional aerial reconnaissance of the pass be conducted at a time when the road is free of snow.

Fish Pond Northeast of the Drum Storage Area

Reconnaissance of the pond was conducted during the 2005 PA/SI. No field testing or analytical sampling was conducted. It is recommended that additional reconnaissance be conducted of the pond during later summer months to determine if fish are actually present in the pond. If so, analytical sampling of surface water should be conducted.

Heavy Equipment Storage Building

Reconnaissance was conducted during the 2005 PA/SI to identify the former location of the building and look for areas of stressed vegetation and stained soil. Two analytical surface soil samples were collected and one sample exceeded the screening criteria for DRO. It is recommended that additional study be performed to define the nature and extent of contamination associated with the heavy equipment storage building.

Red Cinder Dome Rock Quarry

Based on reconnaissance conducted in 2005, it appears that the quarry was not used as a landfill. No further action is recommended for this point of interest.

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APPENDIX A – ANALYTICAL DATA

APPENDIX B – HAZARD RANKING

APPENDIX C – QA/QC REPORT