DECLARATION OF PROJECT CLOSEOUT DECISION
FOR
YAKUTAT AIR BASE FORMERLY USED DEFENSE SITE
CON/HTRW PROJECT F10AK0606-08
INVESTIGATION COMPLETE, NO CONTAMINATION
YAKUTAT, ALASKA

STATEMENT OF BASIS

Authority for the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) for Containerized Hazardous, Toxic, and Radioactive Waste (CON/HTRW) projects is derived from the Defense Environmental Restoration Program, 10 United States Code (USC) 2701-2707. The decision to close out the CON/HTRW project (F10AK0606-08) named "Investigation Complete, No Contamination", is based on the results of site investigations and remedial activities completed by the U.S. Army Corps of Engineers – Alaska District (USACE) in 1984, 1999, 2001, 2005, 2006, 2010 and 2014.

SITE DESCRIPTION AND HISTORY

Yakutat, located at the mouth of Yakutat Bay, is approximately 225 miles northwest of Juneau and 380 miles southeast of Anchorage at 59° 33' N Latitude, 139° 44' W Longitude. The thirteen sites are scattered across the former Yakutat Air Base.

A hazardous, toxic, and radioactive waste (HTRW) project (F10AK0606-02) was authorized for the Yakutat Air Base in 1995 after completing a Findings and Determination of Eligibility (FDE). The results of the FDE indicated that the Yakutat Air Base met the eligibility requirements for inclusion in the DERP-FUDS. In 2015, a revised Inventory Project Report (INPR) was completed to modify the existing -02 HTRW project and delineate the project into multiple CON/HTRW projects (F10AK0606-04 through -19). Thirteen no further action projects were combined into a single project (F10AK0606-08) named "Investigation Complete, No Contamination".

The 13 Areas of Concern (AOCs) comprising the F10AK0606-08 CON/HTRW project have been recommended for site closeout by USACE, based upon the results of environmental investigations which have identified no DOD-related environmental hazards. The 13 AOCs with no DOD-related contaminants remaining above cleanup levels or background levels are:

1) A1 – Air Corps Increase Group No. 2
2) Aka Lake
3) Kardy Lake
4) Summit Lake
5) B1 – AWFC 20 kW Powerhouse, Unit 1 - No. 1205
6) B2 – AWFC 15 kW Powerhouse, Standby Unit - No. 1211
7) B3 – AWFC Tank and Associated Piping, Bath - No. 1213
8) G1 – Minor Naval Air Facility (Seaplane Base) Suspected piping & debris
9) G2 – Minor NAF (Seaplane Base) Suspected Underground Storage Tank (UST) 1 & debris
10) G3 – Minor NAF (Seaplane Base) Suspected USTs 2&3
11) N1 – Aircraft Warning System (AWS) Station Powerhouse - No. 904
12) N2 – AWS Station (excluding N1)
13) O1 – Air Corps Warehouse Group No. 2

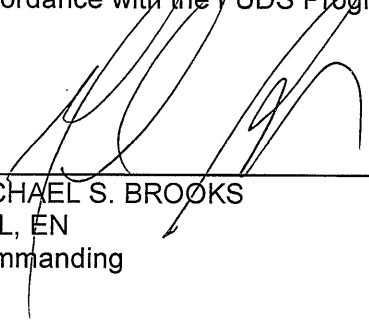
DESCRIPTION OF THE DECISION

Based on the results of site visits, remedial investigations and site histories, no DOD-related contaminants of concern were found above cleanup levels or background concentrations at the 13 AOCs and USACE has determined that no further action is required at these sites. The decision of Project Closeout is protective of public health, welfare, and the environment.

DECLARATION

In accordance with the Defense Environmental Restoration Program for Formerly Used Defense Sites, the U.S. Army Engineer District, Alaska, has completed the investigation of the 13 subject AOCs at the Yakutat Air Base FUDS (Project F10AK0606-08), located in Yakutat, Alaska. This Declaration of Project Closeout supports the conclusion that the detected chemicals of concern do not pose unacceptable risk to human health or the environment. No further environmental actions are required by the Department of Defense at these project locations. This decision may be reviewed and modified in the future if any new information becomes available which indicates the presence of eligible CON/HTRW that may cause a risk to human health or the environment.

This Declaration of Project Closeout has been prepared and approved by the undersigned in accordance with the FUDS Program Policy, Engineer Regulation (ER) 200-3-1, May 10, 2004.



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United States Army
Corps of Engineers

Formerly Used Defense Sites Program

Project Closeout Report

Containerized Hazardous, Toxic, or Radioactive Waste
Project # F10AK0606-08

Investigation Complete, No Contamination

Yakutat Air Base Formerly Used Defense Site
Yakutat, Alaska

July 2018

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Acronyms and Abbreviations

ADEC	Alaska Department of Environmental Conservation
AOC	Area of Concern
AWFC	Air Warning Filter Center
AWS	Aircraft Warning System
CAA	Civil Aeronautics Administration
COC	Chemical of Concern
CON/HTRW	Containerized Hazardous, Toxic, and Radioactive Waste
COPC	Chemical of Potential Concern
DOD	Department of Defense
DRO	Diesel Range Organics
ERDA	Environmental Restoration Defense Account
INPR	Inventory Project Report
FUDS	Formerly Used Defense Sites
K.D.	Knocked Down
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
PCB	Polychlorinated Biphenyl
PCP	Pentachlorophenol
POL	Petroleum, Oil, and Lubricants
RI	Remedial Investigation
SQuiRT	Screening Quick Reference Table
TOC	Total Organic Carbon
UCL	Upper confidence level
USACE	United States Army Corps of Engineers
USFS	U.S. Forest Service
UST	Underground Storage Tank
WAA	War Assets Administration
WWII	World War II

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1. INTRODUCTION

The Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) authorizes the cleanup of contamination resulting from past military activities at sites no longer owned by the Department of Defense (DOD) per 10 United States Code (USC) 2701-2707. A hazardous, toxic, and radioactive waste (HTRW) project (F10AK0606-02) was authorized for the Yakutat Air Base property (F10AK0606) in 1995 after completing a Findings and Determination of Eligibility (FDE). The results of the FDE indicated that the Yakutat Air Base met the eligibility requirements for inclusion in the DERP-FUDS. In 2015, a revised Inventory Project Report (INPR) was completed to modify the existing -02 HTRW project and delineate the project into multiple containerized hazardous, toxic, and radioactive waste (CON/HTRW) projects (F10AK0606-04 through -19). Thirteen no further action projects were combined into a single project (F10AK0606-08) named "Investigation Complete, No Contamination".

The 13 AOCs proposed for closeout are tracked by Alaska Department of Environmental Conservation (ADEC) with Hazard Identification numbers: 3718, 3720, 3721, and 26341. The ADEC's Contaminated Sites Program Database is available through the State of Alaska's Division of Spill Prevention and Response web page (www.dec.alaska.gov/spar).

The 13 Areas of Concern (AOCs) comprising the F10AK0606-08 CON/HTRW project have been recommended for site closeout by USACE, based upon the results of environmental investigations which have identified no DOD-related environmental hazards.

This Project Closeout Report is issued by the Alaska District, USACE pursuant to ER 200-3-1, paragraph 4-7.4.1.1.

1.1 SITE LOCATION AND BRIEF DESCRIPTION

Yakutat, Alaska is approximately 225 miles northwest of Juneau and 380 miles southeast of Anchorage, Alaska at 59° 33' N Latitude, 139° 44' W Longitude (Section 30, Township 27 South, Range 34 East, Copper River Meridian). Located at the mouth of Yakutat Bay, the community is bounded by the Wrangell-Saint Elias Mountains and Yakutat Bay to the north, the Tongass National Forest to the south and east, and the Gulf of Alaska to the west. The FUDS sites, scattered around the Yakutat Air Base, are not connected via road to other permanent Southeast Alaska communities, and are only accessible by air or water (see Figure 2).

1.1.1 Areas of Concern Locations

The approximate central locations, Section/Township/Range, Land Owner and ADEC Hazard ID of the AOCs are found in Table 1. All of the AOCs are in the Copper River Meridian.

Table 1

AOC Name	Latitude	Longitude	Section	Township	Range	Land Owner	ADEC Haz ID
A1 – Air Corps Increase Group No. 2	59.5095531° N	139.6939252° W	8	28 South	34 East	USFS	3718
Aka Lake	59.518477° N	139.791138° W	3	28 South	33 East	State of Alaska, Native Corporation & Native Allotment	26341
Kardy Lake	59.530084° N	139.821753° W	33	28 South	33 East	State of Alaska, Native Corporation & Native Allotment	26341
Summit Lake	59.510494° N	139.762611° W	11	28 South	33 East	USFS	26341
B1 – AWFC 20 kW Powerhouse, Unit 1 - No. 1205	59.5153003° N	139.7092178° W	6	28 South	34 East	USFS	3720
B2 – AWFC 15 kW Powerhouse, Standby Unit - No. 1211	59.5153742° N	139.7085423° W	6	28 South	34 East	USFS	3720
B3 – AWFC Tank and Associated Piping, Bath - No. 1213	59.5157665° N	139.7084419° W	25	28 South	34 East	USFS	3720
G1 – Minor NAF (Seaplane Base) Suspected piping & debris	59.5417678° N	139.7572902° W	25	27 South	33 East	City	26341
G2 – Minor NAF (Seaplane Base) Suspected UST1 & Debris	59.542119° N*	139.756528° W*	25	27 South	33 East	City	26341
G3 – Minor NAF (Seaplane Base) Suspected USTs 2 & 3	59.541773° N*	139.758832° W*	19	27 South	33 East	City	26341
N1 – Aircraft Warning System (AWS) Station Powerhouse - No. 904	59.5541030° N	139.7280216° W	19	27 South	34 East	Private	3721
N2 – AWS Station (excluding N1)	59.554246° N*	139.725058° W*	19	27 South	34 East	Private & City	26341
O1 – Air Corps Warehouse Group No. 2	59.508939961° N	139.6805839° W	8	28 South	34 East	USFS/State of Alaska DOT	3718

* Estimated Location

1.2 HISTORY OF YAKUTAT AIR BASE

U.S. military interest in Yakutat began by Executive Order in 1929 with the creation of the Yakutat Bay Naval Reservation. As early as 1936, the War Department was considering Yakutat as a site for a military airfield. Soon after World War II (WWII) began in Europe (September, 1939) the Civil Aeronautics Administration (CAA) embarked on a program of building and improving airfields in Alaska with both commercial and tactical values in mind. The first government use of the area was a CAA radio range commissioned in June 1940 on a site near Yakutat village. The War Department acquired 46,083 acres from the Department of the Interior (U.S. Forest Service), Department of the Navy, and the Department of Commerce (Lighthouse Reserves) for the establishment of an "Auxiliary Landing Field and Staging Area". In October 1940, Army Engineer troops arrived to begin construction of the Yakutat Landing Field (also known as the Yakutat Air Base). Constructed by military engineers and members of the Civilian Conservation Corps, the landing field was completed on June 15, 1943.

Construction of the naval facilities was authorized in August 1939. The Minor Naval Air Facilities seaplane base was established as a Naval Air Facility in September 1942, and redesignated as a “Naval Auxiliary Air Facility” in February 1943. Construction began with civilian contractors and was later completed with the help of Naval Seabees.

The Yakutat Air Base was intended as an advanced airfield supporting pursuit and bombardment aircraft against Japanese invasion forces. However, as western Aleutian bases expanded and the Japanese were stopped on Attu and Kiska, its military value diminished significantly and no aircraft were permanently assigned. Instead, the base served as a ferrying post and temporary station for aircraft squadrons and as a refueling stop between the 48 contiguous states and points in Alaska.

In December 1943, after the Japanese were expelled from the Aleutians, military activities were gradually reduced with personnel and equipment being transferred elsewhere. A similar reduction took place at the seaplane base, which was officially closed on July 22, 1944. The airfield was redesignated Yakutat Army Air Base in 1944, and in April of that year, it was placed on caretaker status until the end of war.

The Yakutat Air Base was declared surplus by the Army in December 1945 and ceased operations in 1946. On December 1, 1945, the CAA assumed responsibility for maintenance and operation, leading to the transfer of the air base and all associated facilities from the Army to CAA on April 4, 1947. Improvements, equipment, and materials, not transferred to CAA, were declared excess by the War Department to the War Assets Administration (WAA) for disposal in June 1948, pursuant to the Surplus Property Act of 1944.

Beginning in 1946, ownership of the air base property was relinquished and retransferred to the Department of the Interior, Bureau of Land Management (Tract B containing 42,437 acres - in two portions: July 1946 and March 1947), the Department of Commerce (Tract C, 147 acres – November 1948), and the Department of the Navy (Tract A, 3,500 acres

– March 1949). In 1953, the Yakutat Bay Naval Reservation was revoked, which withdrew 266 acres for the CAA (now known as the Federal Aviation Administration), and returned the remainder to the Tongass National Forest.

1.3 INVESTIGATION HISTORY

Site visits and remedial investigations have been conducted at the 13 AOCs as part of ongoing activities at the former Yakutat Air Base. A brief summary of the related investigations for each AOC is listed in Table 2. Results and details of these investigations can be found in the referenced documents. The specific site features are included in Figures 3 through 9 of Attachment 1.

Table 2 – Previous Investigations, Debris Cleanup Action, and Reports

Documents Referenced	FRMD #	Report Title	Report Date	Subject AOCs addressed
USACE 1984 (aka ERDA)	F10AK060601_01.04_0500_p	Environmental Restoration Defense Account Debris Cleanup and Site Restoration Design, Yakutat, Alaska	Jul-84	A1, N1, N2
USACE 2003a	F10AK060602_03.10_0006_a	2000 Remedial Investigation Report – Final – Remedial Investigation/Feasibility Study, Yakutat Area, Alaska	Feb-03	Aka, Kardy, Summit Lakes, A1, G1, G2, G3, N1, O1
USACE 2003b	F10AK060602_03.10_0005_a	2001 Remedial Investigation Report – Final – Remedial Investigation/Feasibility Study Yakutat Area, Alaska	Mar-03	A1, B1, B2, B3, G1, G2, G3, N1, O1, Aka, Kardy, Summit Lakes
USACE 2006a	F10AK060602_03.10_0001_a	Final Focused Remedial Investigation, Former Yakutat Air Force Base, Yakutat, Alaska	Apr-06	B1, B2, B3, O1
USACE 2006b	F10AK060602_03.10_0002_a	2005 Final Focused Remedial Investigation, Former Yakutat Air Force Base, Yakutat, Alaska	Aug-06	Aka, Kardy, and Summit Lakes
USACE 2007a	F10AK060602_03.10_0004_a	Former Yakutat Air Force Base Remedial Investigation Report, Yakutat, Alaska, Final	Mar-07	B1, B2
USACE 2010	F10AK060602_04.09_0503_a	Final Feasibility Study Report, Former Yakutat Air Force Base, Yakutat, Alaska	Jul-10	A1, Aka, Kardy, Summit Lakes, B1, B2, B3, G1, G2, G3, N1, O1
USACE 2012	F10AK060602_03.10_0008_a	2010 Supplemental Remedial Investigation Former Yakutat Air Force Base, Yakutat, Alaska	Feb-12	N1
USACE 2016	F10AK060602_03.10_0012_a	2014 Final Supplemental Remedial Investigation, Former Yakutat Air Base, Formerly Used Defense Site	May-16	O1

1.3.1 AOC A1 – Air Corps Increase Group No. 2

The Air Corps Increase Group No. 2 consisted of a mess hall (building 534) and approximately 13 Quonset huts for living quarters (buildings 536-548). The 1948 WAA Surplus Property Report describes the quarters as Quonset Huts and the mess hall as a "knocked down" (K.D.) prefabricated steel structure. The report also indicates that buildings 535 and 539 were not present during the property inventory.

AOC A1 consists of the overall former housing area and the structural debris disposal at each of the former building sites (see Figure 2). AOC A1 is located on the south side of Cannon Beach Road, approximately 1 mile west of Engineer's Road (Airport Road). USACE documents indicate that the buildings and military generated debris in the area were buried on site during the 1984 Environmental Restoration Defense Account (ERDA) cleanup. Demolish and bury in place was the disposal method chosen by the United States Forest Service (USFS) for the structural debris on USFS land. Building remains were buried in excavated pits and covered with soil. The as-built drawings showing the locations and disposal method for this site are found on sheet C7 of the ERDA report (USACE 1984). Consistent with the 1948 post-war inventory, the ERDA cleanup report identified 11 building ruins at the former A.C. Increase Group site. The ERDA cleanup effort addressed asbestos removal at other areas, but asbestos was not identified in this location.

During Remedial Investigation (RI) efforts by USACE in 1999 and 2000, two separate site walkovers were conducted in the general area of AOC A1. During one walkover, a large, earthen mound (approximately 25 feet by 35 feet) was observed on site and was initially suspected as being the disposal area for 11 military structures formerly in the area. The mound was covered with unstressed vegetation. In 2015, ADEC and USACE visited the site and found the mound.

During the second walkover, an area approximately 800 feet south of AOC A1 was visually evaluated. The location was a suspected drum storage area. No evidence of debris disposal or other environmental concern was found. Based on their findings, USACE recommended no further investigation at AOC A1 (USACE 2003a, USACE 2003b).

Analysis of historical aerial imagery show that the mound was created during WWII, apparently a result of the site preparation and ditching for drainage. Aerial photographs following the ERDA cleanup also document that the individual building remains were buried in place, consistent with the disposal method described in the ERDA report.

In summary, COCs were not identified at AOC A1, and based upon the RI findings, no further DOD action is required for AOC A1.

1.3.2 Aka, Kardy, and Summit Lakes

As part of the USACE RI effort in 2000-2001, USACE received verbal accounts from the community indicating that the DOD disposed of drums and equipment debris in Aka,

Kardy, and Summit Lakes. In response to these reports, Beach Road, along and pull-offs to the lakes, was inspected, but no drums or metal was seen. No evidence of DOD disposal was found. Most likely, the community members were recalling the Coast Guard dumping south of these lakes, which was not related to DOD. Two non-DOD dumps are known to be located between the south edge of Aka Lake and Coast Guard Road (also called Ophir Creek Road): one dump is situated on the north side of Coast Guard Road between Aka Lake and Summit Lake, and the other dump is located east of Beach Road 0.3 miles north of the junction of Beach and Coast Guard Roads. Two drums and other buried debris were also observed in this area. The two debris areas have been identified by long-time Yakutat residents as "Coast Guard dumps". Another community member reported that his uncle had been a contractor at the Coast Guard station and said they dumped equipment and trash into Summit Lake (also referred to as "Coast Guard Lake"). Based upon the site investigations and community information, the dumps have been determined to be related to Coast Guard activities at the former LORAN Station, which operated for 29 years (1950 through 1979), and are therefore not FUDS-eligible.

In 2005, thorough visual inspections and geophysical surveys were conducted by USACE at Summit, Aka, and Kardy Lakes. Extra care was taken to investigate areas along the lakes that may have been historically accessed by a vehicle for the purpose of dumping. No evidence of drums or debris was observed at Summit and Kardy Lakes. One partially-submerged barrel/drum of unknown origin was identified along the shoreline of Aka Lake. Sediment and surface water samples were collected around this drum. Lead and bis(2-ethylhexyl)phthalate in surface water were detected at concentrations exceeding applicable cleanup levels. A subsequent site visit was made in 2006 to inspect the Aka Lake drum. The label identified the drum as the property of Chevron, and therefore not related to DOD activities (USACE 2007).

Based on the RI efforts conducted in 2000 and 2005, which found no DOD-related drum dumps or contamination, no further DOD action is required for Summit, Aka, and Kardy Lakes.

1.3.3 AOC B – Air Warning Filter Center Overview

The Air Warning Filter Center (AWFC) was built and used during World War II to control the information regarding aircraft approaching the base.

The Air Warning Filter Center consisted of a Filter Center structure (1204), recreation hall (1206), pump house (1207), quarters (1208, 1209, 1210, 1214, 1215, and 1216), a warehouse with a standby generator (1211), mess hall (1212), bathhouse (1213) and a latrine (1218). According to the 1948 WAA Surplus Property Report, the quarters were Quonset Huts and the Filter Center and mess hall were "knocked down" (K.D.) prefabricated steel structures. The petroleum tank was not on the 1948 list and was likely removed before this time. The structures collapsed in place sometime after the transfer of the property following WWII. This AOC was not included in the 1984 ERDA cleanup.

AOC B consists of the overall area of the former structures listed above and a former petroleum tank (Figure 5). In 2001, a remedial investigation at AOC B, was divided into

three sub-AOCs: AOCs B1, B2, and B3, focusing on areas where contamination was likely to be found. According to the WWII plans, power was to be supplied by a 20-kilowatt generator (Powerhouse No. 1, AOC B1, aka building 1205), and a standby 14-kilowatt generator (Auxiliary Powerhouse No. 2, AOC B2, aka warehouse building 1211). Fuel was to be supplied by semi-underground 200 to 500-gallon fuel tanks (AOC B3) nearby (USACE 2003b). According to historical documents, not all of these facilities were constructed. The 1944 *History of Yakutat Landing Field* states that the technical facilities had not been completed by the Signal Corps at the AWFC camp, or at the AWS [AOC N] north of the village (USACE 1944).

For AOC B, three of 27 surface soil samples had detections of pentachlorophenol (PCP) (0.0064, 0.0223 and 0.0254 mg/Kg). PCP was a common preservative used for wood in contact with the ground. All of the PCP detections were in proximity of building structures and treated wood used in these structures is thought to be the source. These samples exceeded the ADEC Method 2 soil migration to groundwater cleanup level (18 AAC 75, 2017) of 0.0043 mg/kg. A 95% LCL total organic carbon (TOC) results value of 4001 mg/kg was calculated using the background data from the 2001 RI (see Attachment 1). This 95% LCL TOC value was used in the ADEC online Method Three Calculator to calculate an alternative migration to groundwater cleanup level 0.014 mg/kg for PCP (ADEC 2017b). There were only two exceedances compared to this alternative cleanup level. There were no exceedances of the Method 2 residential cleanup level of 1.1 mg/kg and no detections of PCP in the subsurface soil or in the groundwater.

The PCP soil data was compiled and a 95% UCL value of 0.00421 mg/kg was calculated using ProUCL version 5.1. This value is representative of the site-wide exposure, and less than the ADEC Method Two migration to groundwater cleanup level of 0.0043 mg/kg and the alternative migration to groundwater cleanup level of 0.014 mg/kg.

The primary future exposure pathways include direct contact or ingestion of contaminants in soil and groundwater, outdoor air inhalation, and indoor air inhalation (vapor intrusion). However, the groundwater pathway is considered insignificant based on all the available chemical data showing concentrations below 1/10th Table C groundwater cleanup levels (ADEC 2017). Insignificant pathways are not carried forward in the evaluation of risk. Likewise, the migration to groundwater contaminant transport mechanism is considered minimal and not evaluated further.

This indicates that the representative contaminant concentrations do not pose unacceptable risk for direct contact / ingestion or inhalation, since they are lower than the risk-based levels. Therefore, although the exposure pathways are complete, they are either insignificant (groundwater) or do not pose unacceptable risk to potential current or future receptors. No further DOD action is required for AOC B – Air Warning Filter Center.

1.3.3.1 Cumulative Risk

The overall cumulative risk for AOC B was calculated using the ADEC Online Calculator (ADEC 2017a). PCP and mercury were the only analytes detected. The maximum detected values from the source area were used as exposure point concentrations for

these constituents. The results show a cumulative hazard index two orders of magnitude below the ADEC risk benchmark, and the cumulative cancer risk meets the ADEC risk standard of 1 x 10^{-5}.

1.3.3.2 AOC B1 – AWFC 20kW Powerhouse, Unit 1 - No. 1205

AOC B1 contained power generation equipment (e.g., generators, transformers, etc.) to supply power for the AWFC. A rectangular concrete slab foundation approximately 14 feet by 20 feet and framed by a vertical curb was present in the area (USACE 2003b). The structure is also referred to as Powerhouse No. 1.

AOC B1 and B2 were first sampled as part of the 2001 USACE Yakutat Air Base Remedial Investigation. Four surface soil samples were collected in the areas of AOC B1 and B2; analytical results indicated diesel range organic (DRO) concentrations in the soil ranging from non-detect to 23 mg/kg (USACE 2007). The practical quantitation limit (PQL) for each DRO analysis was less than the 230 mg/kg ADEC cleanup level.

Surface and subsurface soil and groundwater sampling was conducted during the 2001 RI. Three locations around the perimeter of the powerhouse foundation were sampled to determine whether surface soil contamination exists. Borings AP-053, AP-054 and AP-055 were advanced at AOC B1. Monitoring Wells AP-053, AP-054 and AP-055 were installed in these borings and sampled (USACE 2003b). The surface and subsurface soil was sampled for GRO, DRO, RRO, Volatile Organic Compounds (VOCs), Semi-volatile Organic Compounds (SVOCs), PCBs, Pesticides, Herbicides, and Metals.

Arsenic concentrations up to 8.0 mg/kg in surface and subsurface soil samples exceeded the ADEC Method 2 soil cleanup level of 3.7 mg/kg (USACE 2003b). However, the detected concentrations of arsenic are below the established background concentration of 11.6 mg/kg (USACE 2009). No other metals in surface and subsurface soil exceeded ADEC Method 2 soil cleanup levels.

Groundwater sampling was also conducted by USACE during the 2001 RI field activities at Monitoring Wells AP-053, AP-054 and AP-055. Lead concentrations in groundwater samples collected from Wells AP-053, AP-054 and AP-055 [up to 0.0439 milligrams per liter (mg/L)] exceeded the ADEC groundwater cleanup level of 0.015 mg/L. USACE concluded that the elevated concentrations were likely due to suspended solids associated with turbidity in the sample resulting from purging and sampling using a bailer. Elevated lead concentrations were not detected in soil at AOC B1. No other metals in groundwater exceeded ADEC groundwater cleanup levels (USACE 2003b).

The 2001 RI sampling also addressed PCBs and petroleum contaminants at all of the soil sample locations. No evidence of PCB contamination was detected at AOC B1. Evidence of petroleum contamination was detected in trace amounts; however, those concentrations were below applicable ADEC cleanup levels (USACE 2003b).

In 2004, USACE conducted groundwater sampling at AOC B1 during Focused RI field activities. Well AP-055 was purged using low-flow techniques and sampled for lead. Lead

was detected at 0.0041 mg/L in the triplicate sample collected from the well which is less than the ADEC Table C groundwater cleanup level of 0.015 mg/L. The project and duplicate sample did not contain detectable concentrations of lead. The PQL for each analysis was 0.00015 mg/L (USACE 2006a).

Additional groundwater sampling was conducted by USACE during a RI in 2006. Two monitoring wells at AOC B1 (AP-053 and AP-054) were sampled and analyzed for lead by EPA Method SW6020. Lead was detected in the two samples at 0.00017 and 0.000236 mg/L, which are less than the ADEC Table C groundwater cleanup level of 0.015 mg/L (USACE 2007).

In summary, COCs found were not above cleanup levels at AOC B1, therefore, no further DOD action is required at AOC B1.

1.3.3.3 AOC B2 – AWFC 15kW Powerhouse, Standby Unit - No. 1211

AOC B2 supported the AWFC in the event that an additional or supplemental source of electrical power was necessary. The plan was for the auxiliary generator to be located at one end of a Quonset hut storage building. Two rectangular foundations with collapsed Quonset huts were present in this area, roughly aligned in a north-south orientation. The design was for the generator to be located in the southern end of the south building; however, a chimney cap, a faucet, and other piping possibly associated with the generator were found near the north foundation (USACE 2003b). The Standby Unit Powerhouse No. 1211 is also referred to as the Auxiliary Powerhouse No. 2 (see Figure 5).

Surface and subsurface soil and groundwater sampling was conducted by USACE during the 2001 RI field activities. Five locations near the two concrete foundations were sampled to determine whether surface contamination exists. Since both foundations were considered to be potential source areas, four borings were advanced at this AOC (AP-056, AP-057, AP-058, and AP-059). Monitoring Wells AP-056, AP-057, AP-058, and AP-059 were installed in these borings and sampled (USACE 2003b). The surface and subsurface soil was sampled for GRO, DRO, RRO, VOCs, SVOCs, PCBs, Pesticides, Herbicides, and Metals.

In the 2001 RI, PCP was detected in one surface soil sample at a concentration of 0.0223 mg/kg at sample location B2SS0006. This concentration of PCP in the surface soil sample exceeded the ADEC alternative Method 3 soil cleanup level of 0.014 mg/kg. PCP was not detected in the subsurface soil samples.

Arsenic concentrations up to 7.3 mg/kg in surface and subsurface soil samples exceed the ADEC Method 2 soil cleanup level of 3.7 mg/kg. Arsenic concentrations in surface and subsurface soil samples, however, were below the established background concentration of 11.6 mg/kg (USACE 2009).

Chromium concentrations in surface soil were below the ADEC Method 2 soil cleanup level of 25 mg/kg. Chromium concentrations up to 31 mg/kg in subsurface soil exceeded the ADEC Method 2 soil cleanup level. Chromium concentrations in subsurface soil,

however, were below the established background concentration of 37 mg/kg. No other metals in surface or subsurface soil exceeded ADEC Method 2 soil cleanup levels (USACE 2003b).

Groundwater sampling was also conducted by USACE during the 2001 RI field activities. Lead (up to 0.0834 mg/L), arsenic (up to 0.0575 mg/L), and chromium (up to 0.136 mg/L) concentrations in groundwater samples collected from Wells AP-056, AP-057, AP-058 and AP- 059 exceeded ADEC groundwater cleanup levels of 0.015 mg/L, 0.01 mg/L, and 0.1 mg/L, respectively. USACE concluded that the elevated concentrations of these metals were likely due to suspended solids associated with turbidity in the sample resulting from purging and sampling using a bailer. No other analytes in groundwater exceeded ADEC groundwater cleanup levels (USACE 2003b).

The 2001 RI sampling also addressed PCBs and petroleum contaminants at all of the soil sample locations. No evidence of PCB contamination was detected at AOC B2. Evidence of petroleum contamination was detected in trace amounts; however, those concentrations were below applicable ADEC cleanup levels (USACE 2003b).

In 2004, USACE conducted groundwater sampling at AOC B2 during Focused RI field activities. Well AP-059 was appropriately purged and sampled for lead. Lead was not detected in the groundwater sample. Well AP-056 could not be purged and sampled due to a surge block obstruction and sand present in the well casing (USACE 2006a). Additional groundwater sampling was conducted by USACE during the 2006 RI. Two monitoring wells at AOC B2 (AP-057 and AP-058) were sampled and analyzed for lead by EPA Method SW6020. In addition, Well AP-058 was sampled and analyzed for arsenic and chromium by EPA Method SW6020. Concentrations of lead were detected in the two samples at 0.000059 and 0.000207 mg/L, which are less than the ADEC Table C groundwater cleanup level of 0.015 mg/L. Both arsenic and chromium were detected in Well AP-058 at concentrations of 0.00019 and 0.0008 mg/L, respectively, which are both less than the corresponding ADEC Table C groundwater cleanup level of 0.01 and 0.1 mg/L (USACE 2007).

In summary, COCs were not identified above cleanup levels or background at AOC B2, and therefore no further DOD action is required at AOC B2.

1.3.3.4 AOC B3 – AWFC Tank and Associated Piping

According to a WWII as-built, a concrete storage tank associated with a bathhouse was located at AOC B3 (see Figure 5). A 15-foot square foundation with vertical curbs was present on a mound approximately 5 feet high north of the Auxiliary Powerhouse No. 2 area (AOC B2). This foundation had several vertical curbs delineating possible internal wall supports and is in the location of the former bathhouse. A 4-foot square, concrete storage tank with an opening on top was present approximately 12 feet south of the foundation. A 4-inch pipe extends out to the south side of the tank and angles into the ground. The tank contained what appeared to be rainwater and was presumed to be a cistern associated with the bathhouse (USACE 2003b).

In 2001, USACE performed a geophysical survey and surface and subsurface soil and groundwater sampling. One surface location near the bathhouse foundation was sampled to determine whether surface soil contamination exists. Two borings (AP-060 and AP-061) were advanced at this AOC. Monitoring Wells AP-060 and AP-061 were installed in these borings and sampled. The geophysical survey was conducted at this site prior to sampling activities to delineate the extent of piping associated with the former storage tank. Results of the geophysical survey indicate that piping exists between the foundation and tank and continues to the south approximately 25 feet (USACE 2003b).

PCP was detected in two surface soil samples at AOC B3 (0.0254 & 0.0064 mg/kg). The concentration of PCP in the surface soil samples exceeded the ADEC Method 2 soil migration to groundwater cleanup level of 0.0043 mg/kg and for one sample slightly exceed the alternative cleanup level of 0.014 mg/kg. Neither sample exceeded the residential cleanup level. PCP was not detected in subsurface soil or groundwater. As stated above, the groundwater pathway is considered insignificant based on all the available chemical data showing concentrations below 1/10th Table C groundwater cleanup levels.

Arsenic concentrations in surface and subsurface soil exceeded the ADEC Method 2 soil cleanup level of 3.7 mg/kg but were below the established background concentration of 11.6 mg/kg. Chromium concentrations in subsurface soil exceeded the ADEC Method 2 soil cleanup level of 25 mg/kg. Chromium concentrations in surface soil were less than the ADEC Method 2 soil cleanup level. No other analytes in soil exceeded ADEC Method 2 soil cleanup levels. Chromium concentrations in subsurface soil are below the established background concentration of 37 mg/kg (USACE 2003b).

Lead concentrations in groundwater samples collected from Wells AP-060 and AP-061 exceeded the ADEC groundwater cleanup level of 0.015 mg/L. The maximum concentration detected was 0.039 mg/L. USACE concluded that elevated concentrations were likely due to suspended solids associated with turbidity in the sample resulting from purging and sampling using a bailer. Elevated concentrations were not detected in soils at this AOC. Because of the exceedances, lead in groundwater was not eliminated as a chemical of potential concern (COPC) at AOC B3. The RI report recommended follow-on groundwater sampling using a submersible pump or other low-flow sampling technique to better define dissolved lead concentrations (USACE 2003b). No other analytes in groundwater exceeded ADEC groundwater cleanup levels.

In 2004, one monitoring well at AOC B3 (AP-061) was resampled and analyzed for lead. Well AP-061 was appropriately purged and sampled for lead. Concentrations of lead were not detected in AP-061. Well AP-060 could not be sampled as the casing had been broken off and the end of the 2-inch pipe was not visible in the ground (USACE 2006a). Based on the sample result from Well AP-061, lead in groundwater at AOC B3 is no longer considered a COPC. In summary, COCs were not identified above cleanup levels or background at AOC B3, therefore, no further DOD action is required at AOC B3.

1.3.4 AOCs G1, G2 and G3 – Seaplane Base

The Minor Naval Air Facilities (MNAF), also referred to as the Seaplane Base and G Concern, was constructed to dock, house, and repair military floatplanes. G Concern is located a mile west of Yakutat on the north side of Point Carrew Road. According to a Naval Transfer of New Construction, dated June 24, 1943, a 75,000 gallon capacity aviation gasoline storage system and 3,030 linear feet of pipelines were originally planned for installation at the naval base. According to the same document, the project was cancelled. A telegram dated July 19, 1943 stated: "Installation of aviation gasoline system cancelled. All three 25,000 gallon tanks are complete with one on location. No other work accomplished on this installation." It is not known if the "on location" tank was actually installed because it does not appear on the 1944 inventory of transferred MNAF property. The three water and/or soil filled pits at the site are believed to be the excavations for the cancelled underground storage tanks (USTs). It is likely the military used tanker trucks to fuel the seaplanes and therefore the storage tanks were not necessary for operations.

AOC G1 is the "Former Pipeline Paths", G2 is the "Suspected UST1 and Debris", and G3 is the "Suspected UST2 and UST3" (see Figure 6). Three rectangle-shaped excavation pits filled with water and/or soil were present in the area. Pronounced visible spoil piles were seen on each end of the pits. Several ditches were also present. These ditches were about 2 feet deep and ran from the suspected UST pits downhill toward the dock area. The ditches are suspected to be the planned locations of the piping system which would have connected the USTs to the Seaplane Base.

Three 55-gallon drums and five gasoline cans, all heavily rusted and presumed to be remnants from World War II, were found near one of the partially backfilled pits during the 1999 site walkover (USACE 2003a, USACE 2003b).

Results of the 2000 geophysical surveys indicate that there was no buried metal associated with the excavated pits and trenches. No USTs or associated piping were found. Naval records show the installation of the piping was canceled. No soil samples contained analytes that exceeded ADEC Method 2 cleanup levels. Petroleum contamination was detected at concentrations well below ADEC cleanup levels. No contamination was identified associated with the surface debris area. No wells were installed for groundwater sampling because subsurface soil conditions encountered at this site prevented the soil borings from reaching the groundwater table by the drilling method used. Based on soil results, the presence of groundwater contamination is unlikely.

In summary, no COPCs were identified at AOCs G1, G2, and G3. No further DOD action is required at AOCs G1, G2, and G3.

1.3.5 AOC N – Aircraft Warning System (AWS) Station, Overview

N Concern was the location of the former Aircraft Warning System (AWS) Station, also known as the "Listening Post". The AWS monitored the position of all aircraft in the area

and relayed the information to the Air Warning Filter Center (AWFC) for evaluation and distribution. Historical as-builts of the site depict two barracks, a headquarters building, pumphouse, power house, and miscellaneous small structures in a heavily wooded area on a hill at the end of Monti Road, now called Ridge Road. It was noted on drawings dated March 1942 that 2 diesel fuel storage tanks, the detector building, and tower were to be furnished by the Signal Corps but to be erected by U.S. Engineers; the powerhouse equipment was also to be furnished by the Signal Corps. However, the 1944 *History of Yakutat Landing Field* states that the technical facilities were never installed by the Signal Corps at the AWS camp, or at the AWFC and therefore the diesel tanks and generator were never installed (USACE 1944). ADEC designated "Yakutat AFB Air Warning System Station" cleanup complete (ADEC Haz Id 3721) in 25 April 2012.

During the 2015 INPR revision AOC N was divided into two sub-AOCs: N1 and N2.

1.3.5.1 AOC N1 – AWS Powerhouse - No. 904

The AWS Powerhouse (Building 904), was intended to provide electrical power for the AWS Station. As stated above, the documentation show that neither the generator nor diesel fuel tanks were installed. The powerhouse remains and debris were removed in the 1984 cleanup (USACE 1984).

In 1999, USACE contractor's personnel visited the site and observed a concrete pad that was identified by a local resident as the former powerhouse foundation. Two large storage trailers nearly covered the concrete foundation. Two drums and several metal cans were also observed (USACE 2003a, USACE 2003b).

For the 2001 RI, three locations at the powerhouse foundation were sampled to determine whether surface soil contamination associated with former military use exists. DRO was detected at an estimated value of 636 mg/kg which exceeds the ADEC Method 2 soil cleanup level of 230 mg/kg. PCP was detected in the surface soil samples at a maximum concentration of 0.0637 mg/kg which exceeds the ADEC Method 2 soil cleanup level of 0.047 mg/kg. Arsenic concentrations in soil exceeded the ADEC Method 2 soil cleanup level of 3.7 mg/kg, however, the detected concentrations were below the established background concentration of 11.6 mg/kg. Cadmium was detected in one surface soil sample at a concentration of 6.98 mg/kg which exceeds the ADEC Method 2 soil cleanup level of 5.0 mg/kg. PCB contamination, possibly associated with the former powerhouse, was not detected at this AOC. No other target analytes in the surface soil samples exceeded ADEC Method 2 soil cleanup levels (USACE 2003b). In 2001, DRO, PCP, and cadmium concentrations in surface soil samples slightly exceeded ADEC Method 2 cleanup levels, but it was suspected that this contamination was limited.

In 2010, USACE conducted a more thorough investigation and DRO, PCP, and cadmium were not detected in surface or subsurface samples above ADEC Method 2 cleanup levels. ADEC has designated the site status of "cleanup complete" (ADEC Haz Id 3721) in 25 April 2012. No further DOD action is required at AOC N1.

1.3.5.2 AOC N2 – AWS Station - excluding AOC N1

AOC N2 refers to the other structures that comprised the former AWS. At the request of ADEC, USACE provided a document review of the AWS station and potential contamination identified by USACE in 1999. The structures planned for the AWS included two barracks (Buildings 902 and 903), one headquarters building (901), the previously discussed AOC N1 powerhouse (904), a detector building, transmission lines, and a pumphouse (905). The 1948 WAA Surplus Property Report stated that the "camp was evidently never completed". Historical records and photos indicate that buildings 901, 902, 903, 904, and 905 were constructed. The 1984 ERDA drawings document that buildings 901-904 were removed as part of the debris removal effort (USACE 1984).

The 1999 visit did not identify any visual contamination or potential sources associated with these structures and significant contamination is not typically associated with these types of WWII structures. No further DOD action is required at AOC N2.

1.3.6 AOC O – Air Corps Warehouse Area Group No. 2, Overview

AOC O was the site of the A.C. Warehouse Area Group No. 2 and was the smaller of the two groups of warehouses built along Utilities Road, now known as National Forest Road 9975. The site is located on United States Forest Service (USFS) property just south of N.F. Road 9975, between Cannon Beach Road and the Yakutat airport. The 1943 *Utilities Layout A.C. Expansion Area* shows that four buildings (555, 556, 557, and 558), described as 36 x 60 ft. Cowin huts, comprised the group. All four buildings were relocated to the Port of Whittier in 1948. Only the foundation for building 556 was identified during the remedial investigation. What was stored in the warehouses is unknown, but contamination from the warehouses was not suspected. The area where drums were found and identified as AOC O1 was investigated.

1.3.6.1 AOC O1 – Suspected Drum Dump

AOC O1 is the location of a suspected drum dump at the former Air Corps Warehouse Group No. 2. The four structures that originally made up the Warehouse Group were moved from Yakutat to Whittier after the air base was declared surplus in 1945. The site was described as "three empty, rusted 55-gallon drums located adjacent to a small stream/drainage ditch."

Surface and subsurface soil, groundwater, surface water, and sediment samples were collected during a remedial investigation conducted in 2001. Samples were analyzed for GRO, DRO, RRO, VOCs, PAHs, PCBs, organochlorine pesticides, chlorinated herbicides, and metals. Arsenic was detected in surface and subsurface soils at concentrations ranging from 1.96 to 15 mg/kg, which is above the ADEC Method 2 soil cleanup level of 3.7 mg/kg; however, only two surface samples had concentrations exceeding the regional background level (11.6 mg/kg; USACE 2003b). No other analytes exceeded the ADEC Method 2 soil cleanup levels. Lead was detected in groundwater at concentrations up to 0.0452 milligrams per liter (mg/L), which is above the ADEC Table C groundwater cleanup level (0.015 mg/L). The elevated lead levels were likely caused by suspended solids associated with turbidity in the sample, resulting from purging and

sampling using a bailer (USACE 2003b). Subsequent groundwater samples collected from wells AP-100 and AP 099 in 2004 showed that lead was not detected in groundwater at either location (USACE 2006).

In 2001, two surface water samples collected from the stream/drainage ditch adjacent to the site had lead concentrations of 0.0127 mg/L and 0.0128 mg/L, which exceeded the National Oceanic and Atmospheric Administration (NOAA) Screening Quick reference Table (SQuiRT) Freshwater Chronic value of 0.0025 mg/L. One sample was collected less than 50 feet downstream (south) of the concrete foundation and the second sample was collected approximately 200 feet downstream (southwest) of the concrete foundation, at the confluence of a side stream that reportedly drains the AOC O1 drum dump area (USACE 2003b).

In 2014, USACE conducted a Supplemental RI: five surface water samples were collected in the AOC O1 vicinity and analyzed for total lead, dissolved lead, and hardness. Samples were collected upstream, at the site and downstream of the historic detections. The dissolved lead was not detected at a limit of quantitation (LOQ) of 0.00025 mg/L which is well below the hardness-dependent Alaska Water Quality Standard (WQS) value calculated at 0.00293 mg/L based on average hardness for the studied water body. Total lead was not detected at a LOQ of 0.00025 mg/L which is well below the total lead Table C groundwater cleanup level of 0.015 mg/L. The corresponding limit of detection was below the calculated Alaska WQS criterion and the NOAA SQuiRT values. The analytical results demonstrate that lead is not currently present at concentrations above the human health and ecological risk-based standards in the stream/drainage ditch adjacent to AOC O1. Further human health and ecological risk evaluation is not required.

No further DOD action is required for AOC O – Air Corps Warehouse Group No. 2.

2. SUMMARY OF DECISION

Based on the results of the removal action and remedial investigation efforts completed between 1984 and 2014, and the risk evaluation, USACE has determined that no further DOD action is required for Project # F10AK0606-08, Investigation Complete, No Contamination and project closeout is protective of public health, welfare, and the environment. This Project Closeout determination may be reevaluated in the event that additional information becomes available, or previously undiscovered and FUDS-eligible contamination is present.

Project Closeout is the decision for the 13 AOCs listed below because there is no DOD-related contamination in the soil, groundwater, sediment and surface water exceeding the risk-based cleanup levels or established background concentrations:

1) A – Air Corps Increase Group No. 2
2) Aka Lake
3) Kardy Lake
4) Summit Lake

5) B1 – AWFC 20 kW Powerhouse, Unit 1 - No. 1205
6) B2 – AWFC 15 kW Powerhouse, Standby Unit - No. 1211
7) B3 – AWFC Tank and Associated Piping, Bath - No. 1213
8) G1 – Minor NAF (Seaplane Base) Suspected piping & debris
9) G2 – Minor NAF (Seaplane Base) Suspected UST1 & debris
10) G3 – Minor NAF (Seaplane Base) Suspected USTs 2&3
11) N1 – AWS Station Powerhouse - No. 904
12) N2 – AWS Station (excluding N1)
13) O – Air Corps Warehouse Group No. 2

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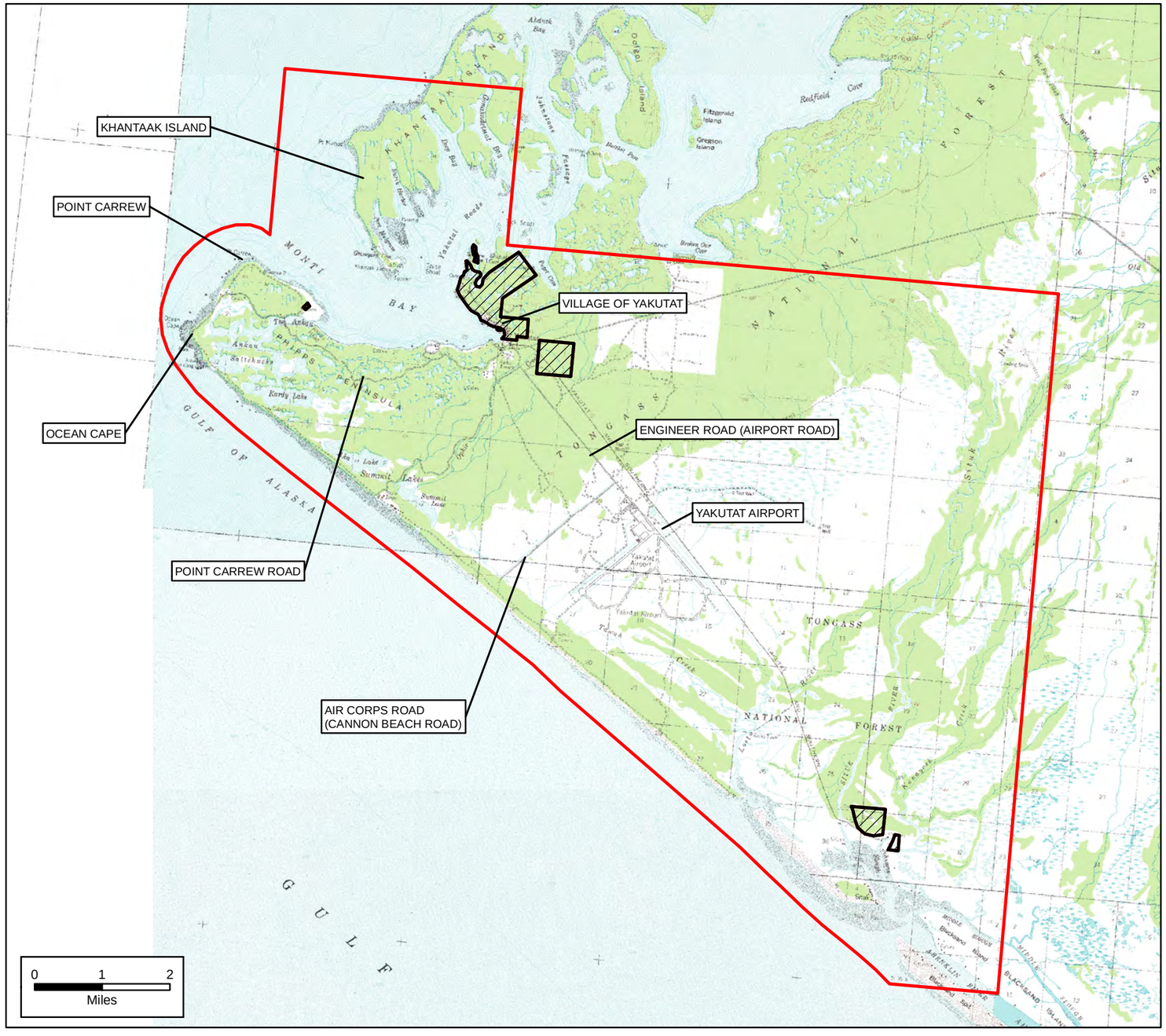

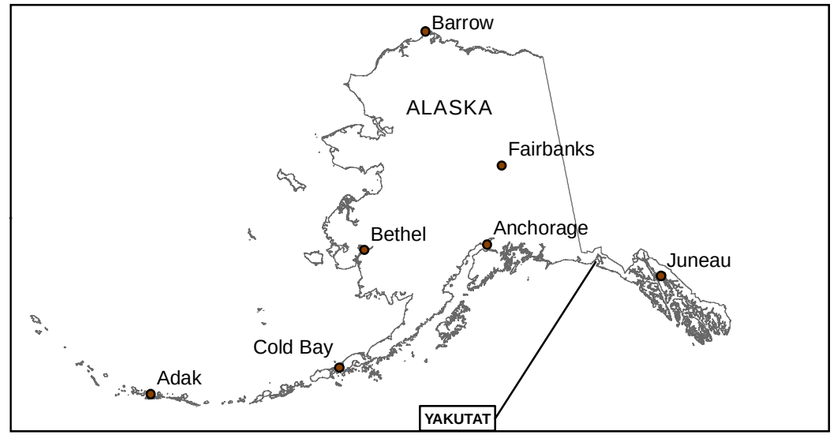

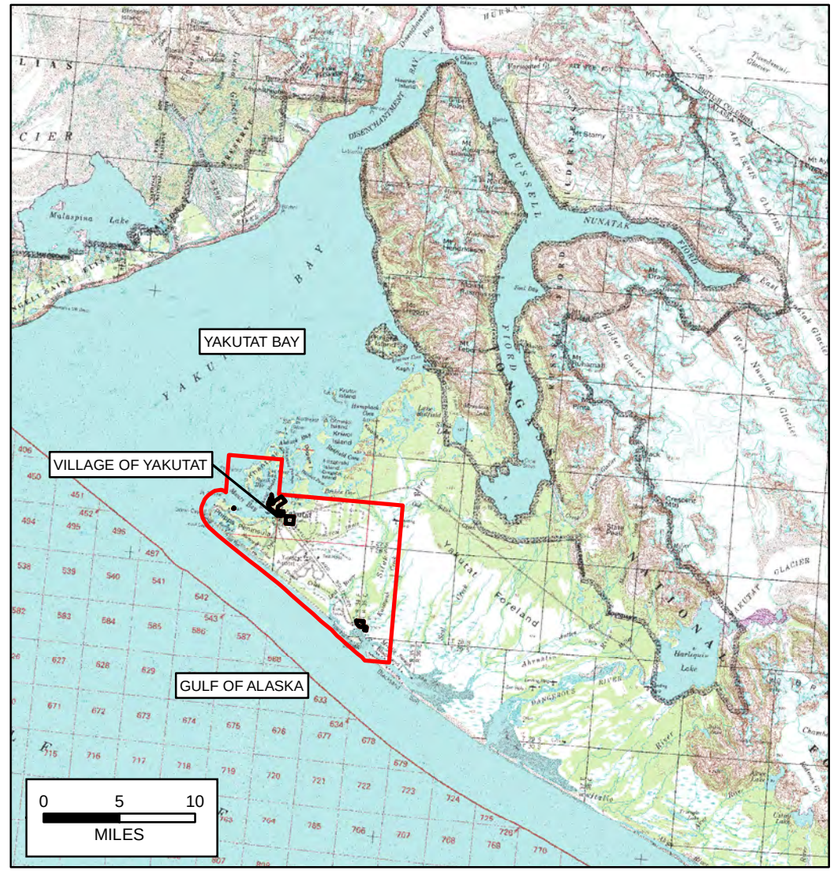

REFERENCES
BACKGROUND MAPS ARE USGS TOPOGRAPHIC MAPS:
YAKUTAT B-5, 1959, 1:63,360
YAKUTAT C-5, 1970, 1:63,360
YAKUTAT C-4, 1972, 1:63,360
YAKUTAT, ALASKA 1982, 1:250,000

NOTES
1. FUDS PROPERTY BOUNDARY IS BASED ON MAP TITLED "REAL ESTATE, YAKUTAT AIR BASE MILITARY RESERVATION" DATED 16 APRIL 1949.

ACRONYMS AND ABBREVIATIONS
USACE - U.S. ARMY CORPS OF ENGINEERS
USGS - U.S. GEOLOGICAL SURVEY

LEGEND
FUDS PROPERTY BOUNDARY
PROPERTY WAS NOT OWNED, LEASED, OR OTHERWISE POSSESSED BY DOD AND IS EXCLUDED FROM FUDS

N

LOCATION AND VICINITY MAPS

U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT

YAKUTAT AIR BASE - F10AK0606
YAKUTAT, ALASKA

FIGURE 1

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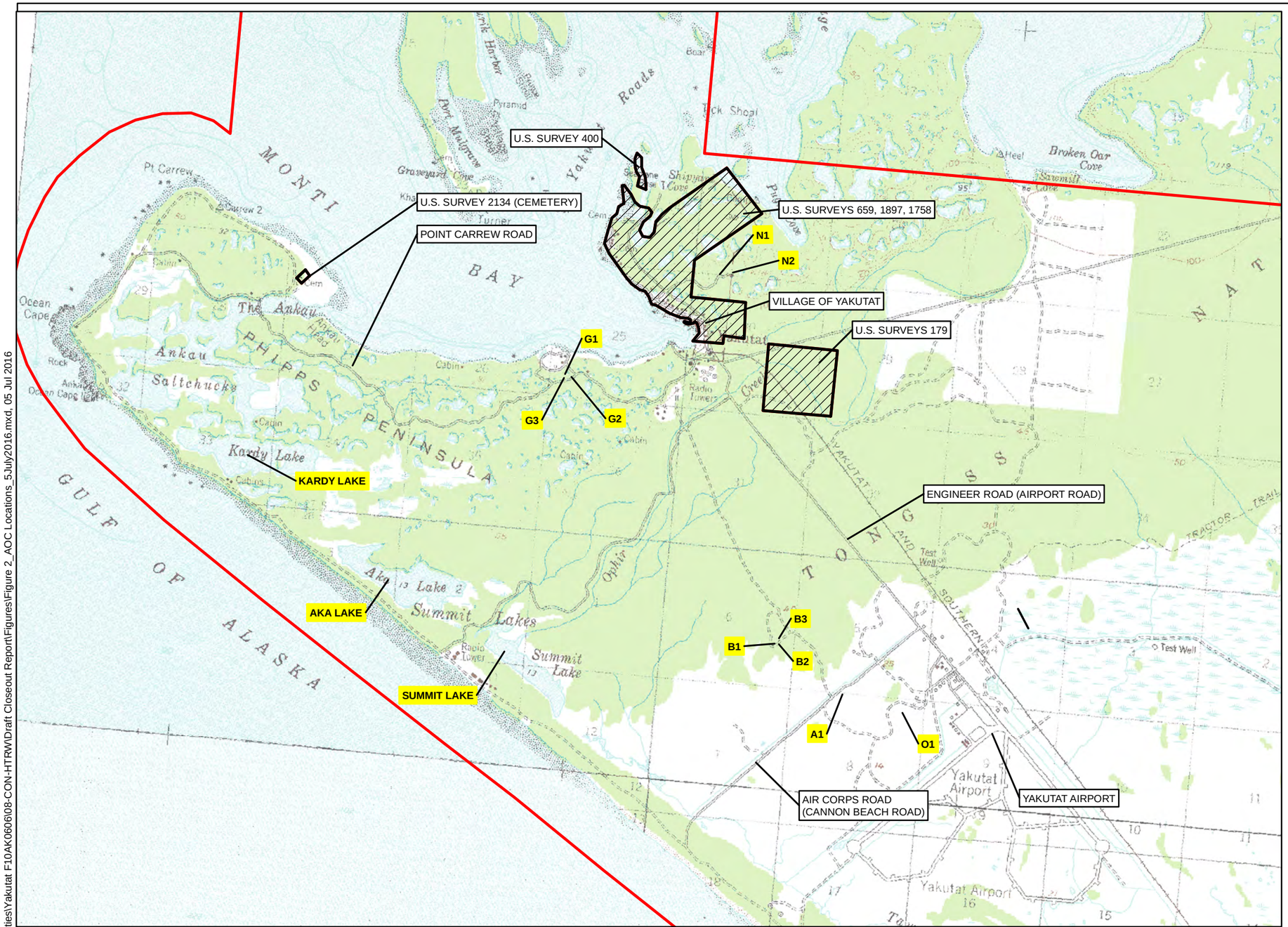
FIGURES



YAKUTAT AIR BASE NO FURTHER ACTION AOCS

CON/HTRW Project 08:

AOCS Proposed for No Further Action/NDAI

- A1 - Air Corps Increase Group No. 2
- Aka Lake
- Kardy Lake
- Summit Lake
- B1 - AWFC 20 kW Powerhouse, Unit 1 - No. 1205
- B2 - AWFC 15 kW Powerhouse, Standby Unit - No. 1211
- B3 - AWFC Tank and Associated Piping, Bath - No. 1213
- G1 - Minor NAF (Seaplane Base) Suspected piping and debris
- G2 - Minor NAF (Seaplane Base) Suspected UST1 and debris
- G3 - Minor NAF (Seaplane Base) Suspected USTs 2 and 3
- N1 - AWS Station Powerhouse - No. 904
- N2 - Aircraft Warning System (AWS) Station (excluding N1)
- O1 - Air Corps Warehouse Group No. 2

No Further Action AOC

REFERENCES
BACKGROUND MAPS ARE USGS TOPOGRAPHIC MAPS:
YAKUTAT B-5, 1959, 1:63,360
YAKUTAT C-5, 1970, 1:63,360
YAKUTAT C-4, 1972, 1:63,360

ACRONYMS AND ABBREVIATIONS
USACE - U.S. ARMY CORPS OF ENGINEERS
USGS - U.S. GEOLOGICAL SURVEY
AOC - AREA OF CONCERN

NOTES
1. FUDS PROPERTY BOUNDARY IS BASED ON MAP TITLED "REAL ESTATE, YAKUTAT AIR BASE MILITARY RESERVATION" DATED 16 APRIL 1949.
2. AOC LABELS HAVE RED BORDERS.

LEGEND
FUDS PROPERTY BOUNDARY
PROPERTY WAS NOT OWNED, LEASED, OR OTHERWISE POSSESSED BY DOD AND IS EXCLUDED FROM FUDS

N

0 0.5 1
Miles

U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT

AREA OF CONCERN (AOC) LOCATIONS

YAKUTAT AIR BASE - F10AK0606
YAKUTAT, ALASKA

FIGURE 2

O:\ESP\Private\FUDS_Properties\Yakutat F10AK0606\08-CON-HTRW\Draft Closeout Report\Figures\Figure 2_AOC Locations_5July2016.mxd, 05 Jul 2016

WAR DEPARTMENT

~~SECRET~~

CORPS OF ENGINEERS. U.S. ARMY

AOC A1

AIR CORPS EXPANSION AREA NO. 1

AIR CORPS EXPANSION AREA NO. 2

A.C. WAREHOUSE AREA

POST HEADQUARTERS

THEATRE

400 KW. POWERHOUSE (Post Power)

POWERHOUSE
1 ea Diesel-Electric Generator
Caterpillar Model 50KSS7
50 KW 3 ϕ 60 cy. 120/208 4 wire
Powered with a D-8800 unit.

PUMPHOUSE:
12'x18' conc. & frame.
5 HP 1 ϕ 3 ϕ electric centrifugal pumps
75 gpm at 63 psi total head, 900 gal pressure tank.

6" W.S. PIPE

6" C.T. SEWER LINE

Sewer Outfall

Remaining utilities construction in this area canceled

All Service Drops #8 Unless Directed Otherwise

For Utilities In Hospital Area See Dwg. YAK FO/119

For Utilities In Laundry Area See Dwg. YAK FO/120

For Utilities In Main Camp Area See Dwgs-YAK FO/60 YAK FO/55 - YAK FO/66

For Utilities In Util. Wks. Area See YAK FO/125

See dwg # YAK FO/81 for Utilities in Harbor and Approach Area.

LEGEND

- High Voltage Trans. Line
- Power Lines
- Underground Cable
- Telephone Line
- Water Line
- Sewer
- Sump Pit, 10,000 to 15,000 gal. for fire protection.

YAKUTAT LANDING FIELD
ALASKA
UTILITIES LAYOUT
A.C. EXPANSION AREA

In 1 Sheet | Sheet No. 1 | Scale: 1"=200'

200 100 0 200 400 600 800

U.S. Engineer Office, Yakutat, Alaska June 28,1943

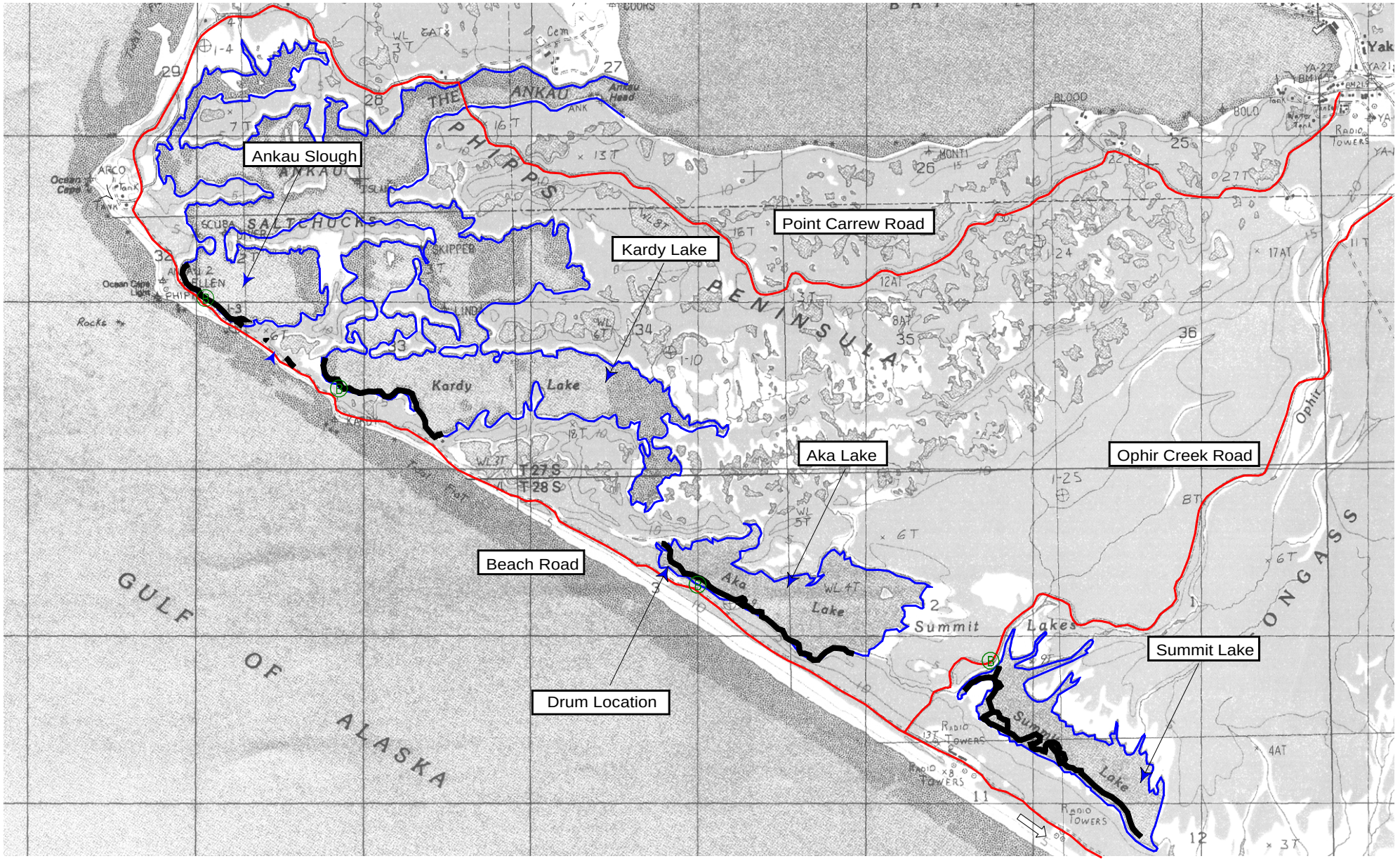
Drawn | Prepared R.H. Grosch Asst. Engr. | Recommended

Traced | Submitted | Approved

Checked PHG Philip H. Gustafson Res. Engineer Capt. Corps of Engineers | Corps of Engineers

Regraded – UNCLASSIFIED
Author. By: OCE, TT, EMGLT GCOT dated 2 Sep 48
By dd Date 6/15/54

~~SECRET~~ YAK FO/ 124 N-57/+-32



Legend

Ⓑ Approximate Boat Launch Location
(See Text for Location Description)

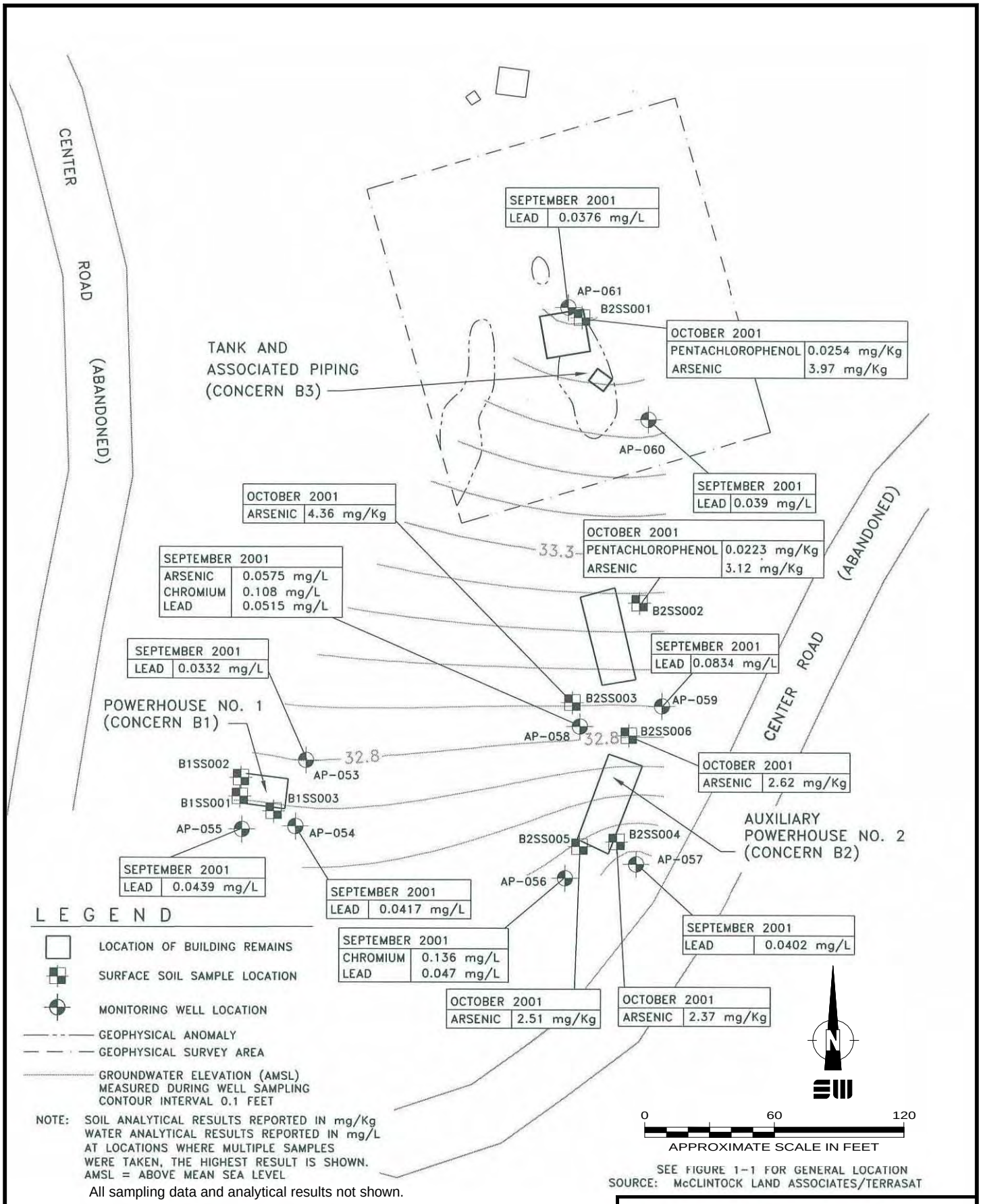
Approximate Location of NGA Geophysical Survey

0 0.5 1.0
APPROXIMATE SCALE IN MILES

Former Yakutat Air Base
Yakutat, Alaska

AKA, KARDY, SUMMIT LAKES INVESTIGATION SITE AREAS

June 2016

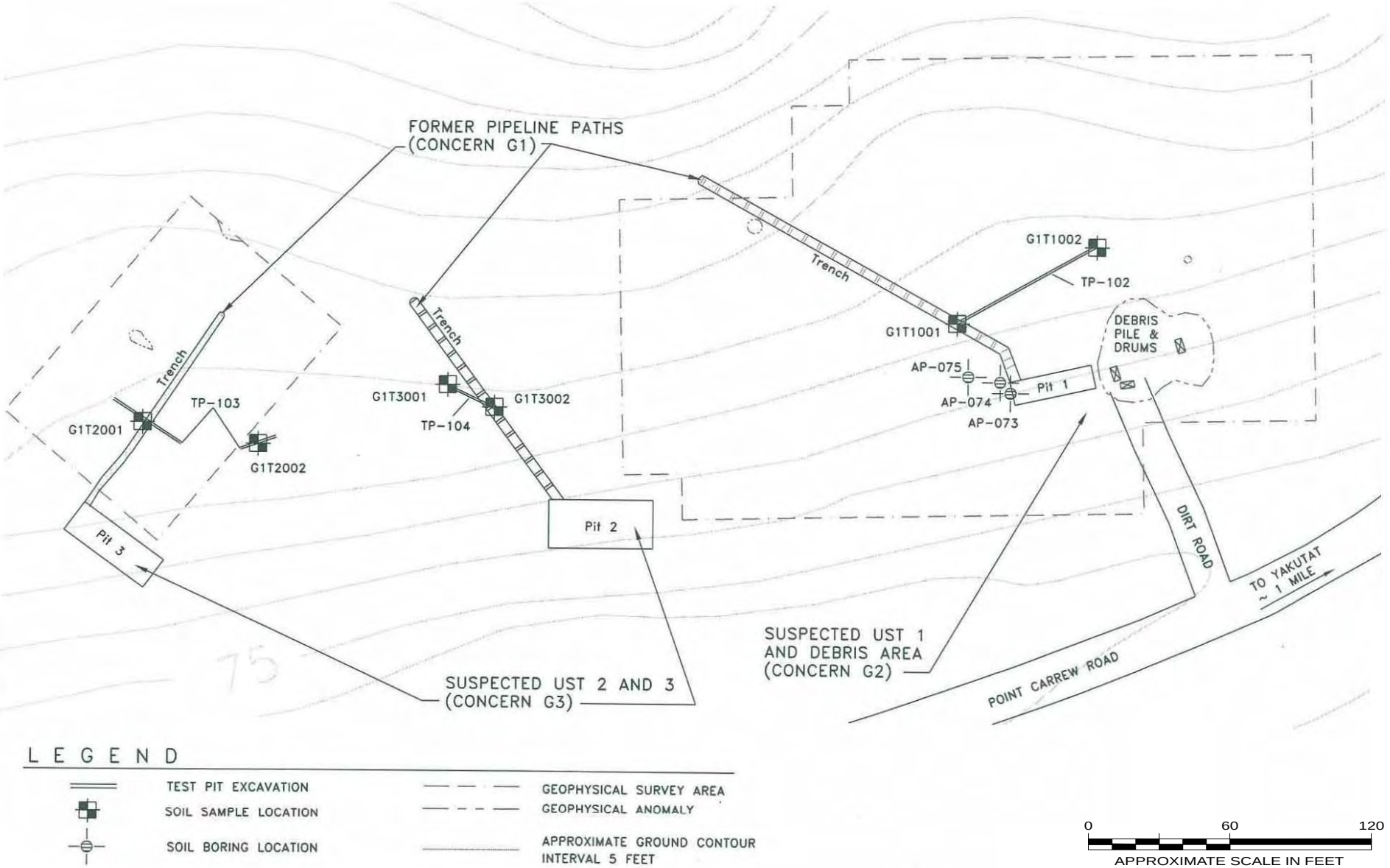


Former Yakutat Air Base
Yakutat, Alaska

AOC B1, B2, AND B3 SITE PLAN

Base map prepared for USACE by ENSR and presented in "2001 Remedial Investigation Report-Final-RI/FS, Yakutat Area, AK". Modified by Shannon & Wilson for 2010 Feasibility Study.

Figure 5

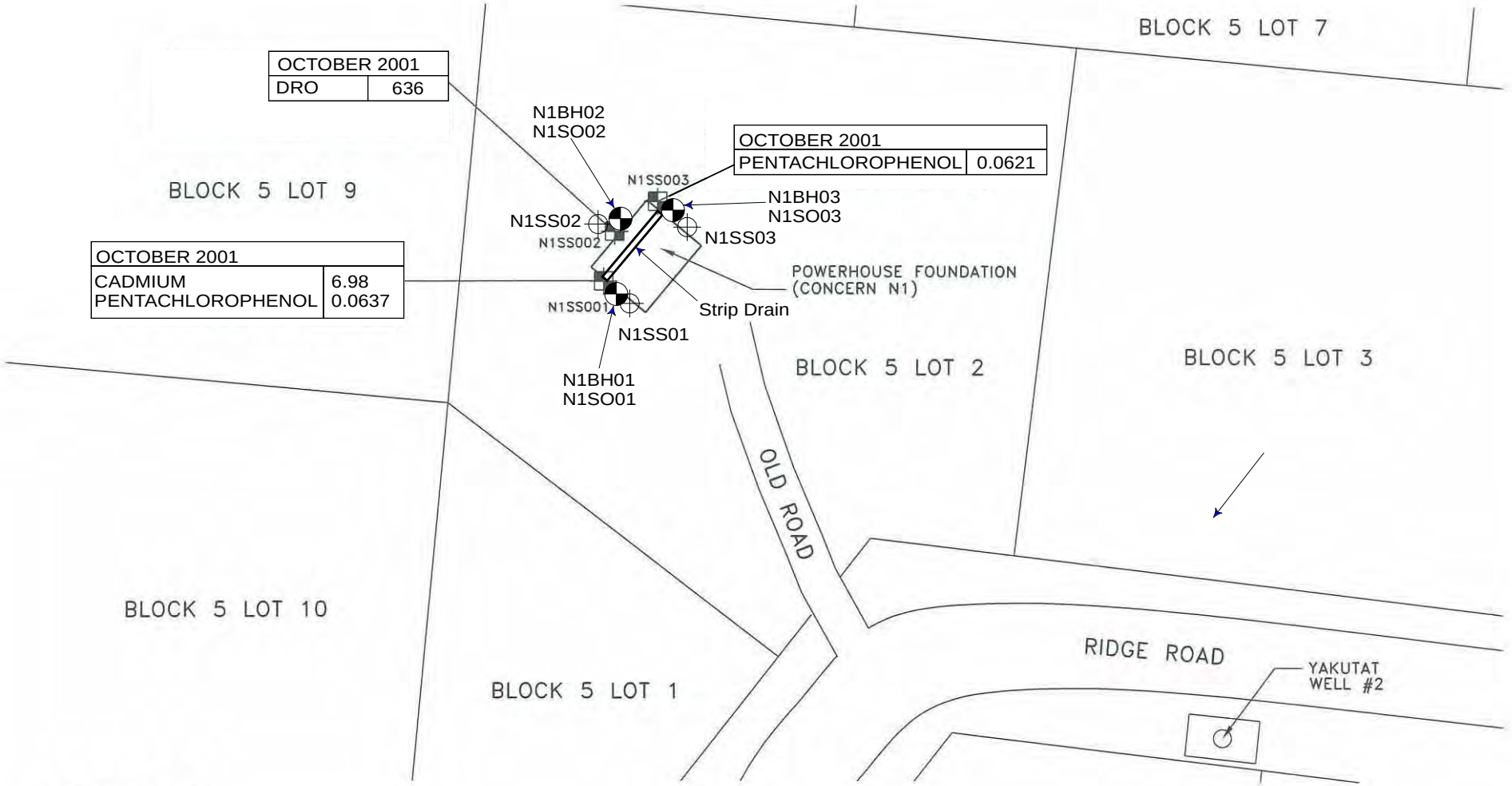


Base map prepared for USACE by ENSR and presented in
"2001 Remedial Investigation Report - Final - RI/FS, Yakutat Area, AK".
Modified by Shannon & Wilson for 2010 Feasibility Study.

Former Yakutat Air Base
Yakutat, Alaska

AOC G1, G2, AND G3 SITE PLAN

FIGURE 6



L E G E N D

SURFACE SOIL SAMPLE LOCATION by ENSR in 2001

DRO = DIESEL RANGE ORGANICS

N1BH01 N1SO01 — Approximate location of Boring N1BH01 and Subsurface Soil Sample Location N1SO01 by Shannon & Wilson in August and September 2010.

N1SS01 — Approximate Surface Sample Location N1SS01 collected by Shannon & Wilson in August and September 2010.

Note: Only concentrations exceeding the To Be Considered (TBC) Criteria are shown.

N

0 50 100

APPROXIMATE SCALE IN FEET

Base map prepared for USACE by ENSR and presented in "2005 Feasibility Study, Yakutat Area RI/FS". Modified by Shannon & Wilson

Former Yakutat Air Base
Yakutat, Alaska

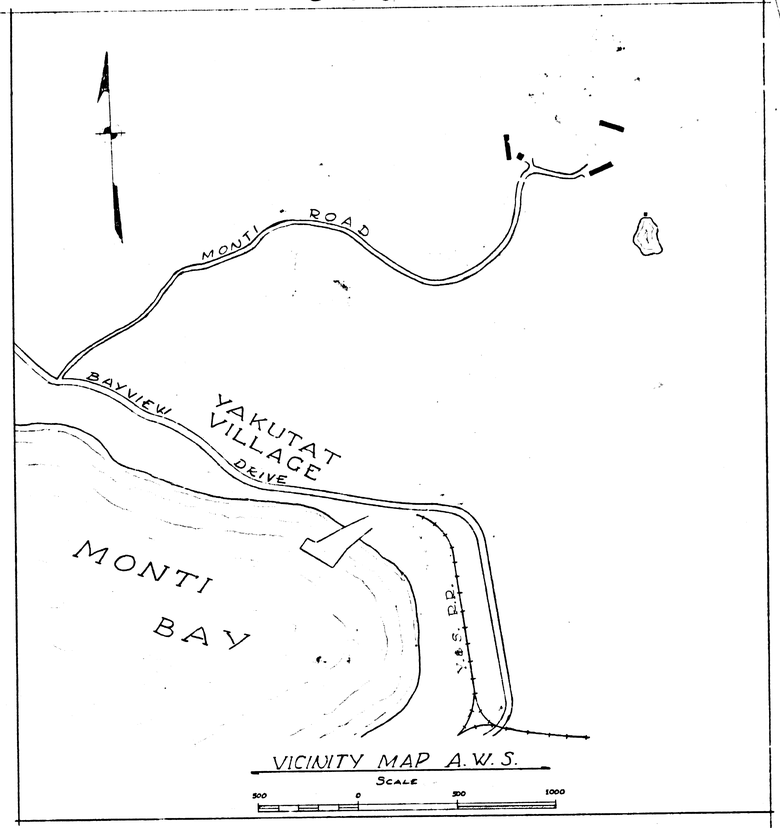
AOC N1 SITE PLAN

Figure 7

WAR DEPARTMENT

SECRET

CORPS OF ENGINEERS, U.S. ARMY



HEAVILY WOODED

Deep Ravine

HEAVILY WOODED

Bldg. No. 903

6" Conc. Tile

1½"

#6

1¼"

POWERHOUSE: Bldg. No. 904
Generators not installed, will be furnished by Signal Corps as part of technical installation.

#2

Bldg. No. 902

6" Conc. Tile

#6

1¼"

#2

Bldg. No. 901

#4

2½"

HEAVILY WOODED

Detector Bldg.

100' Tower

SCALE
50 0 50 100 150 200

Pumphouse: Bldg. No. 905
8'x8' Conc. & frame bldg.
5 HP. Centrifugal Pump
220v, 1ϕ, 90 gpm at 70#-90#
w/Meter Type Hypochlorinator

LAKE

LEGEND
Power Line
Water Line
Water Wash Line
Sewer Line
Note: All Transmission Lines are carried on trees.

Regraded – UNCLASSIFIED
Author. By: OCE, TT, ENGLT 62C7 dated 2 Sep 48
By [illegible] Date 6/4/54

No.	Revision	By	Appr.	Date

YAKUTAT LANDING FIELD

AWS
UTILITIES LAYOUT

In 1 Sheet Sheet No. 1 Scale 1" = 50'

U.S. Engineer Office, Yakutat, Alaska, June 9, 1945

Drawn: AMB
Traced:
Checked: AMB

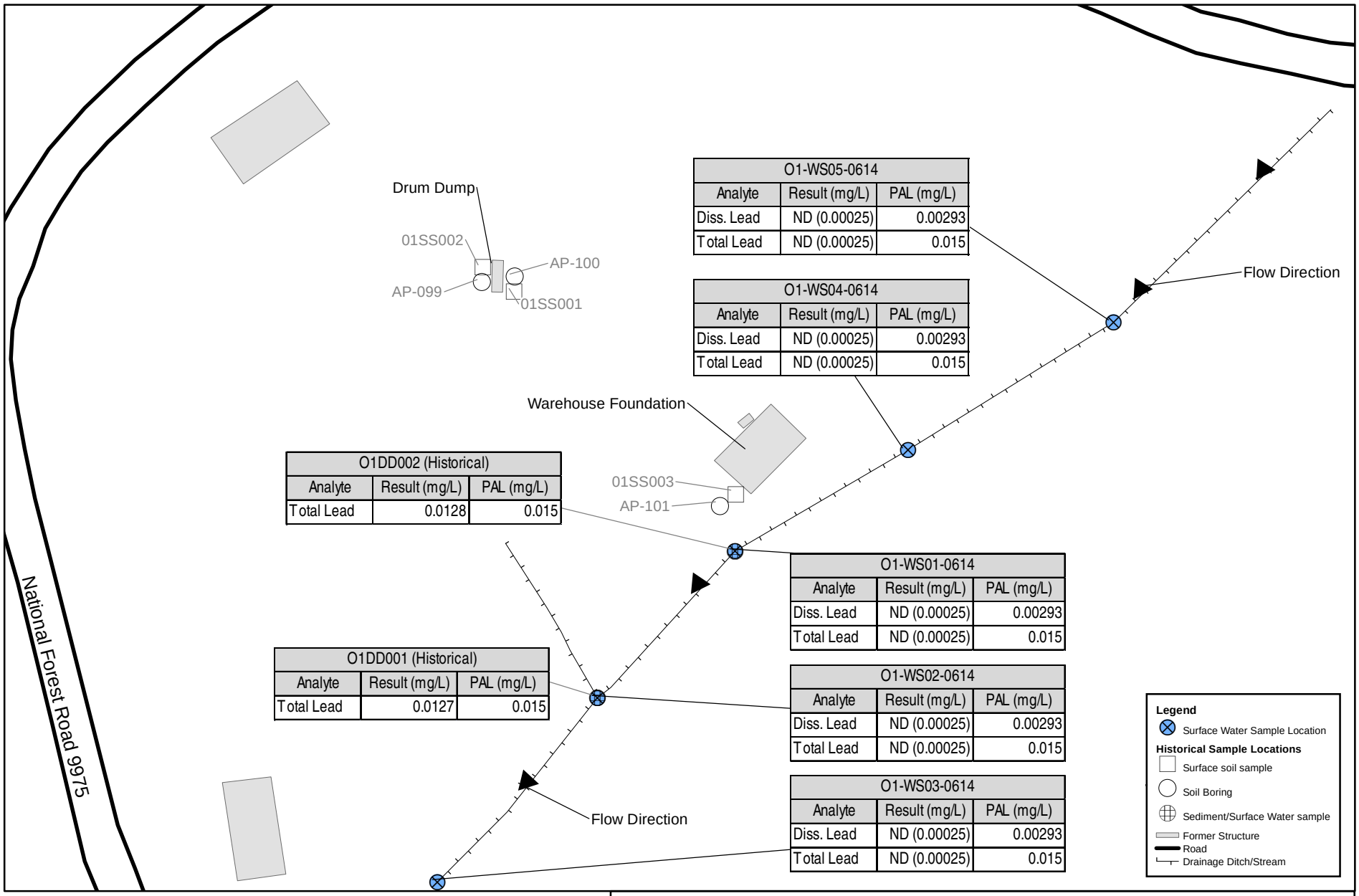
Prepared: [signature] Asst. Engr.

Recommended: [signature] Corps of Engrs.

Submitted: [signature] Corps of Engrs.

Approved: [signature] Corps of Engrs.

YAK FO/117 N-3717-19



Notes:
mg/L – milligrams per liter
ND – analyte not detected above the detection limit shown in ( )
PAL – Project Action Limit
1. Surface water PAL derived from ADEC Table C drinking water standard for total lead and hardness-dependant Alaska Water Quality Standard (chronic) for dissolved lead.
2. Historical samples O1DD001 and O1DD002 collected in October 2001.

N W E S

US Army Corps of Engineers Alaska District

0 50 100 Feet
1 in = 104 ft

AOC O1
Surface Water Analytical Results

FIGURE 9

ATTACHMENT 1 – ALTERNATIVE CLEANUP LEVEL CALCULATIONS

	A	B	C	D	E	F	G	H	I	J	K	L
1	AOC B TOC LCL Calculation											
2	UCL Statistics for Uncensored Full Data Sets											
3	Total Organic Carbon											
4	6900	mg/kg										
5	6900	mg/kg										
6	7300	mg/kg										
7	3600	mg/kg										
8	1800	mg/kg										
9	4400	mg/kg										
10	2700	mg/kg										
11	7400	mg/kg										
12	2100	mg/kg										
13	6900	mg/kg										
14	10000	mg/kg										
15												
16	User Selected Options											
17	Date/Time of Computation	ProUCL 5.15/26/2017 11:36:45 AM										
18	From File	PCP Data for Yakutat B Site 95 UCL and Method 3.xls										
19	Full Precision	OFF										
20	Confidence Coefficient	95%										
21	Number of Bootstrap Operations	2000										
22												
23												
24	Total Organic Carbon											
25												
26	General Statistics											
27	Total Number of Observations	11	Number of Distinct Observations	9								
28			Number of Missing Observations	0								
29	Minimum	1800	Mean	5455								
30	Maximum	10000	Median	6900								
31	SD	2662	Std. Error of Mean	802.7								
32	Coefficient of Variation	0.488	Skewness	0.0105								
33												
34	Normal GOF Test											
35	Shapiro Wilk Test Statistic	0.911	Shapiro Wilk GOF Test									
36	5% Shapiro Wilk Critical Value	0.85	Data appear Normal at 5% Significance Level									
37	Lilliefors Test Statistic	0.252	Lilliefors GOF Test									
38	5% Lilliefors Critical Value	0.251	Data Not Normal at 5% Significance Level									
39	Data appear Approximate Normal at 5% Significance Level											
40												
41	Assuming Normal Distribution											
42	95% Normal UCL		95% UCLs (Adjusted for Skewness)									
43	95% Student's-t UCL	6909	95% Adjusted-CLT UCL (Chen-1995)	6777								
44			95% Modified-t UCL (Johnson-1978)	6910								
45												
46	Gamma GOF Test											
47	A-D Test Statistic	0.609	Anderson-Darling Gamma GOF Test									
48	5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level									
49	K-S Test Statistic	0.287	Kolmogorov-Smirnov Gamma GOF Test									
50	5% K-S Critical Value	0.257	Data Not Gamma Distributed at 5% Significance Level									

51	Detected data follow Appr. Gamma Distribution at 5% Significance Level											
52												
53	Gamma Statistics											
54					k hat (MLE)	3.853			k star (bias corrected MLE)	2.863		
55					Theta hat (MLE)	1416			Theta star (bias corrected MLE)	1905		
56					nu hat (MLE)	84.76			nu star (bias corrected)	62.98		
57					MLE Mean (bias corrected)	5455			MLE Sd (bias corrected)	3224		
58									Approximate Chi Square Value (0.05)	45.72		
59					Adjusted Level of Significance	0.0278			Adjusted Chi Square Value	43.33		
60												
61	Assuming Gamma Distribution											
62				95% Approximate Gamma UCL (use when n>=50))		7513			95% Adjusted Gamma UCL (use when n<50)	7927		
63												
64	Lognormal GOF Test											
65					Shapiro Wilk Test Statistic	0.887			Shapiro Wilk Lognormal GOF Test			
66					5% Shapiro Wilk Critical Value	0.85			Data appear Lognormal at 5% Significance Level			
67					Lilliefors Test Statistic	0.284			Lilliefors Lognormal GOF Test			
68					5% Lilliefors Critical Value	0.251			Data Not Lognormal at 5% Significance Level			
69	Data appear Approximate Lognormal at 5% Significance Level											
70												
71	Lognormal Statistics											
72					Minimum of Logged Data	7.496			Mean of logged Data	8.469		
73					Maximum of Logged Data	9.21			SD of logged Data	0.58		
74												
75	Assuming Lognormal Distribution											
76					95% H-UCL	8570			90% Chebyshev (MVUE) UCL	8526		
77					95% Chebyshev (MVUE) UCL	9878			97.5% Chebyshev (MVUE) UCL	11755		
78					99% Chebyshev (MVUE) UCL	15441						
79												
80	Nonparametric Distribution Free UCL Statistics											
81	Data appear to follow a Discernible Distribution at 5% Significance Level											
82												
83	Nonparametric Distribution Free UCLs											
84					95% CLT UCL	6775			95% Jackknife UCL	6909		
85					95% Standard Bootstrap UCL	6731			95% Bootstrap-t UCL	6911		
86					95% Hall's Bootstrap UCL	6783			95% Percentile Bootstrap UCL	6782		
87					95% BCA Bootstrap UCL	6782						
88					90% Chebyshev(Mean, Sd) UCL	7862			95% Chebyshev(Mean, Sd) UCL	8953		
89					97.5% Chebyshev(Mean, Sd) UCL	10467			99% Chebyshev(Mean, Sd) UCL	13441		
90												
91	Suggested UCL to Use											
92					95% Student's-t UCL	6909						
93	LCL to Use											
94					95% Student's-t LCL	4001						
95												
96	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
97	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
98												
99	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
100	Recommendations are based upon data size, data distribution, and skewness.											

	A	B	C	D	E	F	G	H	I	J	K	L
101	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
102	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
103												

AOC B
Site-specific
Equation Inputs for Migration to Groundwater

Variable	Value
TR (target cancer risk) unitless	0.00001
THQ (target hazard quotient) unitless	1
LT (lifetime - resident) year	70
K (volatilization factor of Andelman) L/m^3	0.5
l_{sc} (apparent thickness of stratum corneum) cm	0.001
ED_{resw} (exposure duration - resident) year	26
ED_{reswc} (exposure duration - child) year	6
ED_{reswa} (exposure duration - adult) year	20
ED_{0-2} (mutagenic exposure duration first phase) year	2
ED_{2-6} (mutagenic exposure duration second phase) year	4
ED_{6-16} (mutagenic exposure duration third phase) year	10
ED_{16-26} (mutagenic exposure duration fourth phase) year	10
EF_{resw} (exposure frequency) day/year	350
EF_{reswc} (exposure frequency - child) day/year	350
EF_{reswa} (exposure frequency - adult) day/year	350
EF_{0-2} (mutagenic exposure frequency first phase) day/year	350
EF_{2-6} (mutagenic exposure frequency second phase) day/year	350
EF_{6-16} (mutagenic exposure frequency third phase) day/year	350
EF_{16-26} (mutagenic exposure frequency fourth phase) day/year	350
$ET_{resw-adj}$ (age-adjusted exposure time) hour/event	0.67077
$ET_{resw-madj}$ (mutagenic age-adjusted exposure time) hour/event	0.67077
ET_{resw} (exposure time) hour/day	24
ET_{reswc} (dermal exposure time - child) hour/event	0.54
ET_{reswa} (dermal exposure time - adult) hour/event	0.71
ET_{reswc} (inhalation exposure time - child) hour/day	24
ET_{reswa} (inhalation exposure time - adult) hour/day	24
ET_{0-2} (mutagenic inhalation exposure time first phase) hour/day	24
ET_{2-6} (mutagenic inhalation exposure time second phase) hour/day	24
ET_{6-16} (mutagenic inhalation exposure time third phase) hour/day	24
ET_{16-26} (mutagenic inhalation exposure time fourth phase) hour/day	24
ET_{0-2} (mutagenic dermal exposure time first phase) hour/event	0.54
ET_{2-6} (mutagenic dermal exposure time second phase) hour/event	0.54
ET_{6-16} (mutagenic dermal exposure time third phase) hour/event	0.71
ET_{16-26} (mutagenic dermal exposure time fourth phase) hour/event	0.71
BW_{reswa} (body weight - adult) kg	80
BW_{reswc} (body weight - child) kg	15
BW_{0-2} (mutagenic body weight) kg	15

BW_{2-6} (mutagenic body weight) kg	15
BW_{6-16} (mutagenic body weight) kg	80
BW_{16-26} (mutagenic body weight) kg	80
$IFW_{res-adj}$ (adjusted intake factor) L/kg	327.95
$IFWM_{res-adj}$ (mutagenic adjusted intake factor) L/kg	1019.9
IRW_{reswc} (water intake rate - child) L/day	0.78
IRW_{reswa} (water intake rate - adult) L/day	2.5
IRW_{0-2} (mutagenic water intake rate) L/day	0.78
IRW_{2-6} (mutagenic water intake rate) L/day	0.78
IRW_{6-16} (mutagenic water intake rate) L/day	2.5
IRW_{16-26} (mutagenic water intake rate) L/day	2.5
EV_{reswa} (events - adult) per day	1
EV_{reswc} (events - child) per day	1
EV_{0-2} (mutagenic events) per day	1
EV_{2-6} (mutagenic events) per day	1
EV_{6-16} (mutagenic events) per day	1
EV_{16-26} (mutagenic events) per day	1
$DFW_{res-adj}$ (age-adjusted dermal factor) cm^2-event/kg	2610650
$DFWM_{res-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	8191633
SA_{reswc} (skin surface area - child) cm^2	6365
SA_{reswa} (skin surface area - adult) cm^2	19652
SA_{0-2} (mutagenic skin surface area) cm^2	6365
SA_{2-6} (mutagenic skin surface area) cm^2	6365
SA_{6-16} (mutagenic skin surface area) cm^2	19652
SA_{16-26} (mutagenic skin surface area) cm^2	19652
DAF (dilution attenuation factor) unitless	13.2
DF (dilution factor) unitless	3.3
AF (attenuation factor) unitless	4
f_{oc} (fraction organic carbon in soil) unitless	0.004001
d_a (aquifer thickness) m - site-specific	
d (mixing zone depth) m - site-specific	5.5
L (source length parallel to ground water flow) m	32
i (hydraulic gradient) m/m	0.002
K (aquifer hydraulic conductivity) m/yr	876
I (Infiltration Rate) m/yr	0.13
p_s (soil particle density) kg/L	2.65
p_b (dry soil bulk density) kg/L	1.5
θ_w (water-filled soil porosity) L_{water}/L_{soil}	0.3
foc (fraction organic carbon in soil) g/g	0.004001

Output generated 04APR2018:15:34:10

AOC B

Site-specific

Cleanup Levels Calculator for Migration to Groundwater

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	CAS Number	Mutagen?	VOC ?	Ingestion SF (mg/kg-day)$^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Ref	Chronic RfD (mg/kg-day)	Chronic RfD Ref	Chronic RfC (mg/m^3)	Chronic RfC Ref	K_d (cm3/g)	K_{oc} (cm3/g)	H`	Dilution Attenuation Factor (DAF) (unitless)	Noncarcinogenic CL Child HI=1 (ug/L)	Carcinogenic CL TR=1.0E-5 (ug/L)	Water Concentration (Child CL × DAF) (ug/L)	Water Concentration (Cancer CL × DAF) (ug/L)	MCL	Water Concentration (MCL × DAF) (ug/L)	Cleanup Level (MCL) (mg/kg)	Cleanup Level (Child HI=1) (mg/kg)	Cleanup Level (TR=1.0E-5) (mg/kg)	Cleanup Level (mg/kg)
Pentachlorophenol	87-86-5	No	No	4.00E-01	I	5.10E-06	C	5.00E-03	I	-		2.37E+00	5.92E+02	1.00E-06	13.2	2.27E+01	4.13E-01	2.99E+02	5.45E+00	1.00E+00	1.32E+01	3.4E-02	7.69E-01	1.40E-02	1.4E-02

Output generated 04APR2018:15:34:10

AOC B
Site-specific Risk Models
Resident Equation Inputs for Soil (>40" Precipitation Zone)

Variable	Value
ED_{ress} (exposure duration - resident) yr	26
ED_{ressc} (exposure duration - child) yr	6
ED_{ressa} (exposure duration - adult) yr	20
ET_{ress} (exposure time - resident) hr/day	24
ET_{ressc} (exposure time - child) hr/day	24
ET_{ressa} (exposure time - adult) hr/day	24
BW_{ressa} (body weight - adult) kg	80
BW_{ressc} (body weight - child) kg	15
SA_{ressa} (skin surface area - adult) cm^2/day	6032
SA_{ressc} (skin surface area - child) cm^2/day	2373
LT (lifetime - resident) yr	70
$EF_{ress>40"}$ (exposure frequency - resident) day/yr	330
$EF_{ressc>40"}$ (exposure frequency - child) day/yr	330
$EF_{ressa>40"}$ (exposure frequency - adult) day/yr	330
IRS_{ressa} (soil intake rate - adult) mg/day	100
IRS_{ressc} (soil intake rate - child) mg/day	200
AF_{ressa} (skin adherence factor - adult) mg/cm^2	0.07
AF_{ressc} (skin adherence factor - child) mg/cm^2	0.2
$IFS_{res>40"-adj}$ (age-adjusted soil ingestion factor) mg/kg	34650
$DFS_{res>40"-adj}$ (age-adjusted soil dermal factor) mg/kg	97482
factor) mg/kg	157300
factor) mg/kg	403788
AF_{0-2} (skin adherence factor) mg/cm^2	0.2
AF_{2-6} (skin adherence factor) mg/cm^2	0.2
AF_{6-16} (skin adherence factor) mg/cm^2	0.07
AF_{16-30} (skin adherence factor) mg/cm^2	0.07
BW_{0-2} (body weight) kg	15
BW_{2-6} (body weight) kg	15
BW_{6-16} (body weight) kg	80
BW_{16-30} (body weight) kg	80
ED_{0-2} (exposure duration) yr	2
ED_{2-6} (exposure duration) yr	4
ED_{6-16} (exposure duration) yr	10
ED_{16-30} (exposure duration) yr	10
$EF_{0-2>40"}$ (exposure frequency) day/yr	330
$EF_{2-6>40"}$ (exposure frequency) day/yr	330
$EF_{6-16>40"}$ (exposure frequency) day/yr	330

$EF_{16\text{-}30>40"}$ (exposure frequency) day/yr	330
$ET_{0\text{-}2}$ (exposure time) hr/day	24
$ET_{2\text{-}6}$ (exposure time) hr/day	24
$ET_{6\text{-}16}$ (exposure time) hr/day	24
$ET_{16\text{-}30}$ (exposure time) hr/day	24
$IRS_{0\text{-}2}$ (soil intake rate) mg/day	200
$IRS_{2\text{-}6}$ (soil intake rate) mg/day	200
$IRS_{6\text{-}16}$ (soil intake rate) mg/day	100
$IRS_{16\text{-}30}$ (soil intake rate) mg/day	100
$SA_{0\text{-}2}$ (skin surface area) cm^2/day	2373
$SA_{2\text{-}6}$ (skin surface area) cm^2/day	2373
$SA_{6\text{-}16}$ (skin surface area) cm^2/day	6032
$SA_{16\text{-}30}$ (skin surface area) cm^2/day	6032
A_s (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	81.7066
PEF (particulate emission factor) m^3/kg	5710000000
A (PEF Dispersion Constant)	14.2253
B (PEF Dispersion Constant)	18.8366
C (PEF Dispersion Constant)	218.1845
V (fraction of vegetative cover) unitless	0.5
U_m (mean annual wind speed) m/s	4.07
U_t (equivalent threshold value)	11.32
F(x) (function dependent on U_m/U_t) unitless	0.0616
A_s (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	81.7066
foc (fraction organic carbon in soil) g/g	0.004
p_b (dry soil bulk density) g/cm^3	1.5
p_s (soil particle density) g/cm^3	2.65
θ_w (water-filled soil porosity) L_{water}/L_{soil}	0.15
θ_a (air-filled soil porosity) L_{air}/L_{soil}	0.28396
n (total soil porosity) L_{pore}/L_{soil}	0.43396
T (exposure interval) s	819936000
A (VF Dispersion Constant)	14.2253
B (VF Dispersion Constant)	18.8366
C (VF Dispersion Constant)	218.1845

Output generated 04APR2018:15:22:48

AOC B
Site-specific Risk Models
Resident Cumulative Risk Calculator for Soil (>40" Precipitation Zone)

ca=Cancer, nc=Noncancer, ca* (Where nc CL < 100 x ca CL), ca** (Where nc CL < 10 x ca CL),
max=CL exceeds ceiling limit (see User's Guide), sat=CL exceeds csat, sol=CL exceeds Solubility
I=IRIS; D=Drinking Water/Health Advisory Goals; P=PPRTV; A=ATSDR; C=Cal EPA; X=APPENDIX PPRTV SCREEN; H=HEAST; S=SURROGATE

Chemical	Mutagen?	VOC?	Volatilization Factor (m^3/kg)	Particulate Emission Factor (m^3/kg)	RBA	Concentration (mg/kg)	Ingestion HI Child	Inhalation (Volatiles) HI Child	Inhalation (Particulates) HI Child	Dermal HI Child	Noncarcinogenic HI Child	Ingestion Risk	Inhalation (Volatiles) Risk	Inhalation (Particulates) Risk	Dermal Risk	Carcinogenic Risk
Pentachlorophenol	No	No	-	5710000000	1	0.0254	0.0000612	-	-	0.0000363	**0.0000976**	1.38E-08	-	7.62E-15	9.69E-09	**2.35E-08**
**Total Risk/HI*			-	-	-	-	*0.0000612*	-	-	*0.0000363*	***0.0000976***	*1.38E-08*	-	*7.62E-15*	*9.69E-09*	***2.35E-08***

Output generated 04APR2018:15:22:48

	A	B	C	D	E	F	G	H	I	J	K	L
1	AOC B 95% UCL for PCP			UCL Statistics for Data Sets with Non-Detects								
2	Sample	D_Sample	Number									
3	0.00085	0	01B1B1001SO AP-053									
4	0.00077	0	01B1B1002SO AP-053									
5	0.00081	0	01B1B2003SO AP-054									
6	0.00078	0	01B1B2004SO AP-054									
7	0.00088	0	01B1B3005SO AP-055									
8	0.00079	0	01B1B3006SO AP-055									
9	0.00078	0	01B2B1001SO AP-056									
10	0.00089	0	01B2B1002SO AP-056									
11	0.0008	0	01B2B2003SO AP-057									
12	0.00084	0	01B2B2004SO AP-057									
13	0.00085	0	01B2B3005SO AP-058									
14	0.00066	0	01B2B3006SO AP-058									
15	0.00086	0	01B2B4007SO AP-059									
16	0.00078	0	01B2B4008SO AP-059									
17	0.00093	0	01B3B1001SO AP-060									
18	0.00091	0	01B3B1002SO AP-060									
19	0.0007	0	01B3B2003SO AP-061									
20	0.00078	0	01B3B2004SO AP-061									
21	0.00068	0	01L1B2003SO AP-077									
22	0.00064	0	01L1B2004SO AP-077									
23	0.00089	0	01L1B3005SO AP-078									
24	0.00078	0	01L1B3006SO AP-078									
25	0.0008	0	01O1B1001SO AP-099									
26	0.000602	0	01B1SS001SO B1SS001									
27	0.000762	0	01B1SS002SO B1SS002									
28	0.000805	0	01B1SS003SO B1SS003									
29	0.000832	0	01B1SS004SO B1SS001									
30	0.0254	1	01B2SS001SO B2SS001									
31	0.0223	1	01B2SS002SO B2SS002									
32	0.000933	0	01B2SS003SO B2SS003									
33	0.0064	1	01B2SS004SO B2SS004									
34	0.000614	0	01B2SS005SO B2SS005									
35	0.000694	0	01B2SS006SO B2SS006									
36												
37												

38	User Selected Options	
39	Date/Time of Computation	ProUCL 5.15/26/2017 12:25:33 PM
40	From File	pcp results.xls
41	Full Precision	OFF
42	Confidence Coefficient	95%
43	Number of Bootstrap Operations	2000

Sample

General Statistics

48	Total Number of Observations	33	Number of Distinct Observations	26
49	Number of Detects	3	Number of Non-Detects	30
50	Number of Distinct Detects	3	Number of Distinct Non-Detects	23
51	Minimum Detect	0.0064	Minimum Non-Detect	6.0200E-4
52	Maximum Detect	0.0254	Maximum Non-Detect	9.3300E-4
53	Variance Detects	1.0390E-4	Percent Non-Detects	90.91%
54	Mean Detects	0.018	SD Detects	0.0102

55				Median Detects	0.0223					CV Detects	0.565	
56				Skewness Detects	-1.554					Kurtosis Detects	N/A	
57				Mean of Logged Detects	-4.176					SD of Logged Detects	0.761	
58												
59				Warning: Data set has only 3 Detected Values.								
60				This is not enough to compute meaningful or reliable statistics and estimates.								
61												
62												
63				Normal GOF Test on Detects Only								
64				Shapiro Wilk Test Statistic	0.869		Shapiro Wilk GOF Test					
65				5% Shapiro Wilk Critical Value	0.767		Detected Data appear Normal at 5% Significance Level					
66				Lilliefors Test Statistic	0.329		Lilliefors GOF Test					
67				5% Lilliefors Critical Value	0.425		Detected Data appear Normal at 5% Significance Level					
68				Detected Data appear Normal at 5% Significance Level								
69												
70				Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs								
71				KM Mean	0.00219		KM Standard Error of Mean	0.00119				
72				KM SD	0.0056		95% KM (BCA) UCL	N/A				
73				95% KM (t) UCL	0.00421		95% KM (Percentile Bootstrap) UCL	N/A				
74				95% KM (z) UCL	0.00415		95% KM Bootstrap t UCL	N/A				
75				90% KM Chebyshev UCL	0.00577		95% KM Chebyshev UCL	0.00739				
76				97.5% KM Chebyshev UCL	0.00965		99% KM Chebyshev UCL	0.0141				
77												
78				Gamma GOF Tests on Detected Observations Only								
79				Not Enough Data to Perform GOF Test								
80												
81				Gamma Statistics on Detected Data Only								
82				k hat (MLE)	3.276		k star (bias corrected MLE)	N/A				
83				Theta hat (MLE)	0.00551		Theta star (bias corrected MLE)	N/A				
84				nu hat (MLE)	19.65		nu star (bias corrected)	N/A				
85				Mean (detects)	0.018							
86												
87				Gamma ROS Statistics using Imputed Non-Detects								
88				GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs								
89				GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)								
90				For such situations, GROS method may yield incorrect values of UCLs and BTVs								
91				This is especially true when the sample size is small.								
92				For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates								
93				Minimum	0.0064		Mean	0.0107				
94				Maximum	0.0254		Median	0.01				
95				SD	0.00346		CV	0.323				
96				k hat (MLE)	16.06		k star (bias corrected MLE)	14.62				
97				Theta hat (MLE)	6.6822E-4		Theta star (bias corrected MLE)	7.3403E-4				
98				nu hat (MLE)	1060		nu star (bias corrected)	964.8				
99				Adjusted Level of Significance (β)	0.0419							
100				Approximate Chi Square Value (964.82, α)	893.7		Adjusted Chi Square Value (964.82, β)	890.2				
101				95% Gamma Approximate UCL (use when n>=50)	0.0116		95% Gamma Adjusted UCL (use when n<50)	N/A				
102												
103				Estimates of Gamma Parameters using KM Estimates								
104				Mean (KM)	0.00219		SD (KM)	0.0056				
105				Variance (KM)	3.1409E-5		SE of Mean (KM)	0.00119				
106				k hat (KM)	0.152		k star (KM)	0.159				
107				nu hat (KM)	10.05		nu star (KM)	10.47				
108				theta hat (KM)	0.0144		theta star (KM)	0.0138				

80% gamma percentile (KM)	0.00249	90% gamma percentile (KM) 0.00653
95% gamma percentile (KM)	0.0119	99% gamma percentile (KM) 0.0273

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (10.47, α)	4.236	Adjusted Chi Square Value (10.47, β) 4.033
95% Gamma Approximate KM-UCL (use when n>=50)	0.0054	95% Gamma Adjusted KM-UCL (use when n<50) 0.00568

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.82	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.355	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00182	Mean in Log Scale -8.382
SD in Original Scale	0.0058	SD in Log Scale 1.548
95% t UCL (assumes normality of ROS data)	0.00353	95% Percentile Bootstrap UCL 0.00364
95% BCA Bootstrap UCL	0.00449	95% Bootstrap t UCL 0.00967
95% H-UCL (Log ROS)	0.00181	

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-7.121	KM Geo Mean 8.0815E-4
KM SD (logged)	0.95	95% Critical H Value (KM-Log) 2.381
KM Standard Error of Mean (logged)	0.203	95% H-UCL (KM -Log) 0.00189
KM SD (logged)	0.95	95% Critical H Value (KM-Log) 2.381
KM Standard Error of Mean (logged)	0.203	

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**
Mean in Original Scale	0.002	Mean in Log Scale -7.51
SD in Original Scale	0.00575	SD in Log Scale 1.093
95% t UCL (Assumes normality)	0.00369	95% H-Stat UCL 0.00163

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00421

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

U.S. ARMY CORPS OF ENGINEERS ALASKA DISTRICT **POA STAFF ACTION SUMMARY** HQUSACE Staff Action Handbook, the proponent is the Executive Office	1. CONTROL# PM-18-071	2. Suspense 2018-07-31 3. Today's Date 2018-07-23

4. Subject: Project Closure Document Approval for Yakutat Air Base FUDS #F10AK0606-08

5. Office Symbol	6. Action Officer	7. Telephone #	8. E-mail
PM-ESP	Christy Baez	753-5568	christy.j.baez@usace.army.mil

COORDINATION

9. Division	10. Name	11. Concur/Nonconcur	12. Comments	13. Date
6 DC	Brooks			JUL 27 2018
5 DDC	Bloedel	M –		26Jul18
4 DPM	Bowker	RCB –		7/26/18
_ EA		–		
_ E&C		–		

14. Routing	☒ DC	☒ DDC	☒ DMP	☐ EA	☐ E&C
15. For:	☐ Information	☐ Read-Ahead	☐ Decision	☒ Approval	☒ Signature

16. PURPOSE/BOTTOM LINE/DISCUSSION:

1. PURPOSE: Routing FUDS Project Closure Document for Yakutat Air Base CON/HTRW Project F10AK0606-08 through POA for DC signature.

2. BOTTOM LINE: This report documents the completion of remedial investigation activities at 13 No Further Action Sites: A1, B1, B2, B3, G1, G2, G3, N1, N2, O1, & Aka, Kardy, & Summit Lakes site and recommends closure of the -08 project.

3. DISCUSSION: Based upon the results of the removal action & remedial investigations between 1984 & 2014, USACE has determined that no further action is required at the 13 No Further Action Sites (F10AK0606-08). The ADEC regulator supports the closure decision for these sites.

4. RESOURCE IMPACT: Project closure meets the scheduled FY18 metric & documents FUDS Program progress.

17. Releaser: Stanley W. Wharry, Branch Chief, PM-ESP

18. Recommendation: Approve and sign documents

19. Action:	Approved ☒	See Me ☐	Other ☐

COORDINATION (cont.)				
20. Division	21. Name	22. Concur/Nonconcur	23. Comments	24. Date
3 OC	Ketchum	✓ –		26 Jul 18
_ RM		–		
_ CT		–		
_ RE		–		
_ RD		–		
_ LM		–		
_ IR		–		
_ SO		–		
_ SEC		–		
_ PAO		–		
_ SB		–		
_ EEO		–		
_ CPAC		–		
_ ACE-IT		–		
_ EM		–		
_ HR		–		
PM-ESP (2)	Wharry for	–		
FUDS (1)	Andraschko	–		
Misc. Offices		–		
Misc. Offices		–		
Misc. Offices		–		
Misc. Offices		–		
Misc. Offices		–		
Misc. Offices		–		
Misc. Offices		–		