



UNITED STATES AIR FORCE

**NORTH RIVER
RADIO RELAY STATION**

SITE INSPECTION REPORT

FINAL

MARCH 2005



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TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS	iii
EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION.....	1-1
1.1 PROJECT OBJECTIVES	1-1
1.2 PROJECT ACTIVITIES.....	1-1
2.0 SITE DESCRIPTION AND BACKGROUND.....	2-1
2.1 INSTALLATION LOCATION AND DESCRIPTION	2-1
2.2 INVESTIGATION HISTORY	2-1
2.3 REVIEW OF HISTORICAL DOCUMENTS	2-2
2.4 LAND USE.....	2-2
2.5 PHYSICAL CHARACTERISTICS.....	2-2
2.5.1 Climate	2-3
2.5.2 Geology.....	2-3
2.5.3 Hydrology	2-3
2.5.4 Wildlife and Subsistence Resources	2-4
2.6 REGULATORY CRITERIA.....	2-4
3.0 SITE INSPECTIONS.....	3-1
3.1 FORMER WACS.....	3-1
3.1.1 Previous Investigations	3-1
3.1.2 Site Activities.....	3-2
3.1.2.1 Surface Soil.....	3-2
3.1.2.2 Subsurface Soil	3-2
3.1.3 Results.....	3-2
3.1.3.1 Surface Soil.....	3-2
3.1.3.2 Subsurface Soil	3-3
3.1.4 Departures From the Work Plan	3-3
3.2 FORMER MAINTENANCE FACILITY.....	3-3
3.2.1 Previous Investigations	3-3
3.2.2 Site Activities.....	3-4
3.2.2.1 Surface Soil.....	3-4
3.2.2.2 Subsurface Soil	3-4
3.2.3 Results.....	3-5
3.2.3.1 Surface Soil.....	3-5
3.2.3.2 Subsurface Soil	3-5
3.2.3.3 Groundwater.....	3-6
3.2.4 Departures From the Work Plan	3-6
3.3 DECONTAMINATION AND INVESTIGATIVE-DERIVED WASTE.....	3-6
4.0 CONCLUSIONS AND RECOMMENDATIONS.....	4-1
5.0 REFERENCES.....	5-1

LIST OF TABLES

3-1	Analytical Results for Grid Surface Soil Samples Collected at the WACS	3-7
3-2	Analytical Results Above Cleanup Levels for Test Pit Soil Samples Collected at the WACS	3-8
3-3	Analytical Results Above Cleanup Levels for Test Pit Soil Samples Collected at the Maintenance Facility	3-9

LIST OF FIGURES

1-1	Project Location and Vicinity Maps	1-3
1-2	Site Map	1-5
2-1	Former WACS	2-5
2-2	Former Maintenance Facility	2-7
3-1	Former WACS – PCB Sampling Grid Locations with Results Above 1 mg/Kg.....	3-11
3-2	Former WACS Test Pit Locations	3-13
3-3	Former Maintenance Facility Test Pit Locations.....	3-15

LIST OF APPENDICES

Appendix A	Field Notes and Forms
Appendix B	Site Photographs
Appendix C	Chains-of-Custody
Appendix D	Hit Tables and Laboratory Analytical Results
Appendix E	Quality Assurance/Quality Control Review of Laboratory Data
Appendix F	611 th CEVO Sampling at Stake 37

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
ADEC	Alaska Department of Environmental Conservation
AECI	Aman Environmental Consulting Inc.
Air Force	U.S. Air Force
AST	aboveground storage tank
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES/CEVO	Civil Engineer Squadron/Environmental Restoration
DRO	diesel range organics
GRO	gasoline range organics
mg/Kg	milligrams per kilogram
MOGAS	motor vehicle gasoline
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
PCBs	polychlorinated biphenyls
PID	photoionization detector
POL	petroleum, oil, and lubricant
RCRA	Resource Conservation and Recovery Act
RRO	residual range organics
RRS	Radio Relay Station
SI	Site Inspection
SVOC	Semi-volatile organic compound
USACE	U.S. Army Corps of Engineers, Alaska District
UST	underground storage tank
VOC	volatile organic compound
WACS	White Alice Communications System

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EXECUTIVE SUMMARY

This Site Inspection (SI) Report was prepared at the direction of the Air Force Center for Environmental Excellence under contract Number F41624-03-D-8608, Task Order 27. SI fieldwork in 2004 at the U.S. Air Force (Air Force) North River Radio Relay Station (RRS) included collection of surface soil samples and excavation of test pits for subsurface soil sample collection. Site OT01 is the designation for the entire installation. Site OT01 consists of two main areas: a former White Alice Communications System (WACS), located at the top of the bluff on the north side of the Unalakleet River, and the former Maintenance Facility, located approximately 1/4 mile west of the former WACS.

OBJECTIVES AND ACTIVITIES

The objective of the 2004 SI at North River RRS was to analyze for polychlorinated biphenyls (PCBs) in surface soil and to evaluate surface and subsurface soil for petroleum, oil, and lubricants (POL) and other potential contaminants at several locations.

A sample grid, comprised of cells measuring 50-foot square, was used to establish 52 surface soil sample locations over an area of approximately 130,000 square feet to evaluate PCBs in surface soil at the former WACS. Samples were collected from approximately 0.5 feet below ground surface (bgs) and analyzed for PCBs.

Five test pits each were excavated at the former WACS and Maintenance Facility to evaluate POL in surface and subsurface soil. The test pits were excavated to refusal or extent of backhoe reach, with depths ranging from 2 to 15 feet bgs, or when groundwater was encountered. Soil samples were collected at 2-foot intervals from a backhoe bucket. Soil samples were screened in the field using a photoionization detector (PID). A surface soil sample (0.5 feet bgs), a sample from the bottom of the test pit, and a sample with the highest PID reading of the remaining samples were submitted for laboratory analysis from each test pit. Laboratory analyses consisted of diesel range organics (DRO), gasoline range organics (GRO), residual range organics, volatile organic compounds, semi-volatile organic compounds (SVOCs), PCBs/pesticides, and Resource Conservation and Recovery Act metals

WACS RESULTS

Surface soil samples collected from the former WACS contained PCBs ranging from 0.027 milligrams per kilogram (mg/Kg) to 37.3 mg/Kg, with 9 of 52 samples containing PCBs above the Alaska Department of Environmental Conservation (ADEC) Method Two cleanup level of 1 mg/Kg.

DRO was detected above the ADEC Method Two cleanup level of 250 mg/Kg in one surface and four subsurface test pit soil samples at the WACS. DRO was detected in surface soil at 5,110 mg/Kg, while DRO detections in subsurface soil above the cleanup level ranged from 266 mg/Kg to 782 mg/Kg at depths of 4 to 15 feet bgs.

MAINTENANCE FACILITY RESULTS

Surface soil samples collected from five test pits at the former Maintenance Facility contained DRO above the ADEC Method Two cleanup level of 250 mg/Kg only in Test Pit 8 (4,650 mg/Kg).

The SVOCs 2,6-dinitrotoluene and n-nitroso-di-n-propylamine were detected above ADEC Method Two cleanup levels in a surface soil sample collected from Test Pit 6. 2,6-dinitrotoluene was detected at 1.58 mg/Kg, above the ADEC Method Two cleanup level of 0.0044 mg/Kg, and n-nitroso-di-n-propylamine was detected at 0.344 mg/Kg above the ADEC Method Two cleanup level of 0.00036 mg/Kg.

Subsurface soil samples collected from five test pits the former Maintenance Facility contained DRO above the ADEC Method Two cleanup level of 250 mg/Kg in Test Pits 7, 9, and 10, ranging from 813 mg/Kg to 7,010 mg/Kg at depths of 4 to 6 feet bgs.

GRO, benzene, ethylbenzene, and bis(2-chloroethyl)ether were also detected above their respective ADEC Method Two cleanup levels in Test Pit 7 subsurface soils. GRO was detected above the ADEC Method Two cleanup level of 300 mg/Kg in four subsurface samples ranging from 319 mg/Kg to 662 mg/Kg at depths of 4 to 6 feet bgs. Benzene was detected above the ADEC Method Two cleanup level of 0.02 mg/Kg in three subsurface samples ranging from 0.173 mg/Kg to 0.401 mg/Kg, also at depths of 4 to 6 feet bgs. Ethylbenzene was detected above the ADEC Method Two cleanup level of 5.5 mg/Kg in one 4-foot bgs sample at 6.24 mg/Kg. Bis(2-chloroethyl) ether was detected at 0.0886 mg/Kg, above the ADEC Method Two cleanup level of 0.002 mg/Kg, also in the 4-foot bgs sample.

RECOMMENDATIONS

Further investigation is recommended at the former WACS and Maintenance Facility.

1.0 INTRODUCTION

This Site Inspection (SI) Report was prepared at the direction of the Air Force Center for Environmental Excellence under contract Number F41624-03-D-8608, Task Order 27. The purpose of this SI Report is to provide details on SI activities conducted at the U.S. Air Force (Air Force) North River Radio Relay Station (RRS) near Unalakleet, Alaska, during 2004. SI fieldwork in 2004 included collection of surface soil samples and excavation of test pits for subsurface soil sample collection.

1.1 PROJECT OBJECTIVES

North River RRS was built in 1958 and occupied until 1978. Between 1985 and 1995, several investigations and remedial actions occurred at the installation, primarily associated with building demolition, debris removal, and the cleanup of fuel contamination. The location of North River RRS and a layout of the installation are presented on Figures 1-1 and 1-2, respectively.

The objective of the SI at North River RRS was to analyze for the presence of polychlorinated biphenyls (PCBs) in surface soil and to evaluate surface and subsurface soil for the presence of petroleum, oil, and lubricants (POL) and other potential contaminants at several locations. Field activities were conducted in accordance with the Air Force- and Alaska Department of Environmental Conservation (ADEC)-approved SI Work Plan (USAF, 2004).

1.2 PROJECT ACTIVITIES

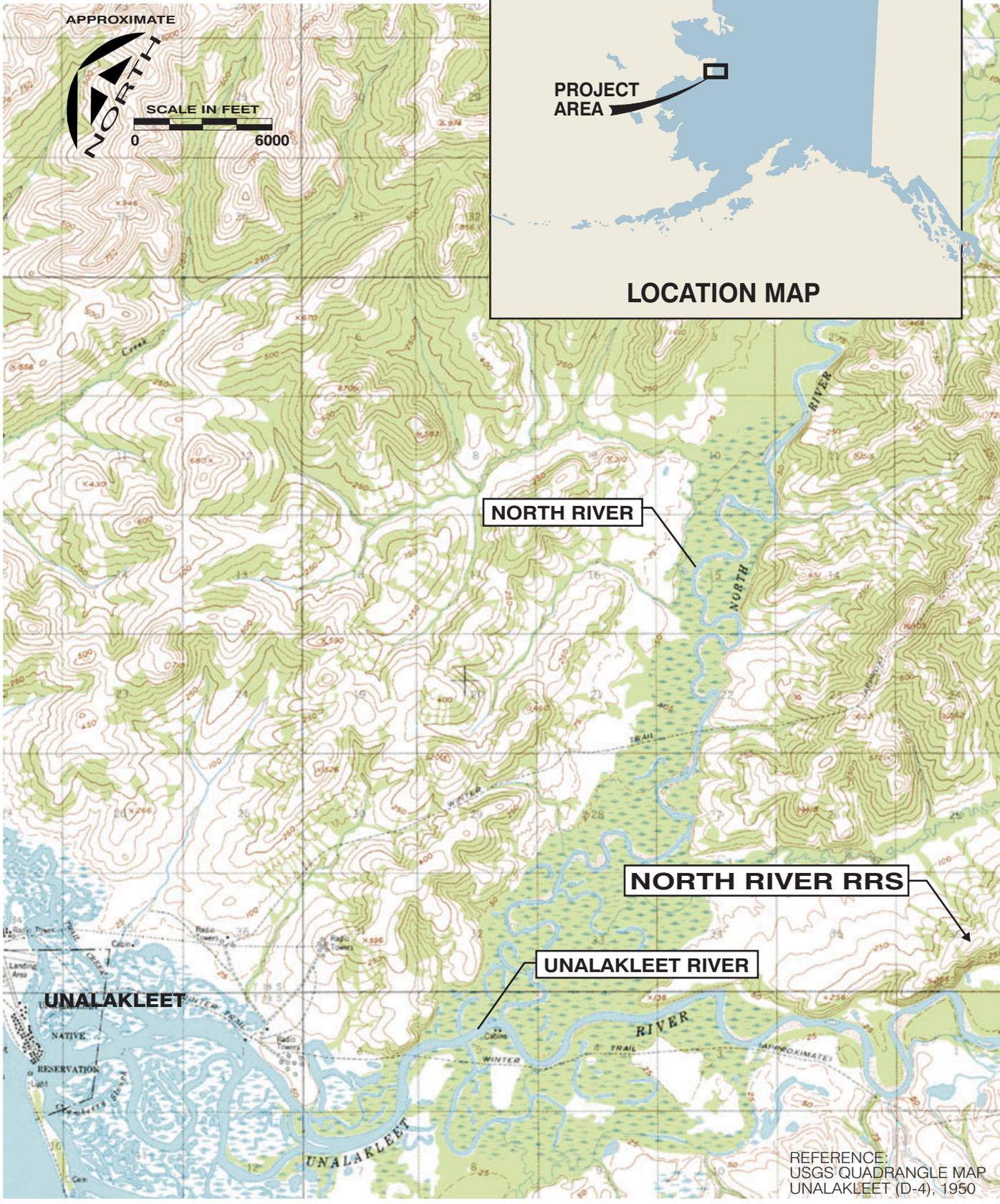
PCB contamination was found in surface soil near the former Maintenance Facility and along the road to the installation in 2003, which resulted in a time-critical removal action conducted by the 611th Civil Engineer Squadron/Environmental Restoration (CES/CEVO) in 2003 and 2004. However, PCBs had not been evaluated in soil at the former White Alice Communications System (WACS). Therefore, 52 surface soil samples were collected during the 2004 SI from a grid covering the WACS and analyzed for PCBs. Grid sampling was selected for this site to perform a uniform sampling pattern over a large area.

POL contamination was found in surface soils associated with fuel storage tanks at the WACS and former Maintenance Facility during previous investigations. Excavations in 1995 removed 3,000 cubic yards of POL-contaminated soil from the location of a former aboveground storage tank (AST) at the former WACS, and 125 cubic yards of POL contaminated soil from the location of a former underground storage tank (UST) at the former Maintenance Facility. However, confirmation samples collected at the limits of both excavations showed that POL contamination remained. Therefore, soils at the former WACS and Maintenance Facility were evaluated for POL during the 2004 SI.

Additional areas investigated during the 2004 SI included a former gasoline AST and piping at the former WACS, and a former drum storage area and floor drain outfall at the former Maintenance Facility.

Test pits were excavated in these areas to evaluate for POL and other potential contamination in soil. The test pits were located in areas most likely to have contaminated soil, based upon previous investigations, available historical information, and the resident excavator operator's recollection of locations of former structures.

Test pits were excavated to refusal, groundwater, or to the furthest extent of the backhoe reach. Soil samples were collected from the test pits and analyzed for diesel range organics (DRO), gasoline range organics (GRO), residual range organics (RRO), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs/pesticides, and Resource Conservation and Recovery Act (RCRA) metals.



NORTH RIVER

NORTH RIVER RRS

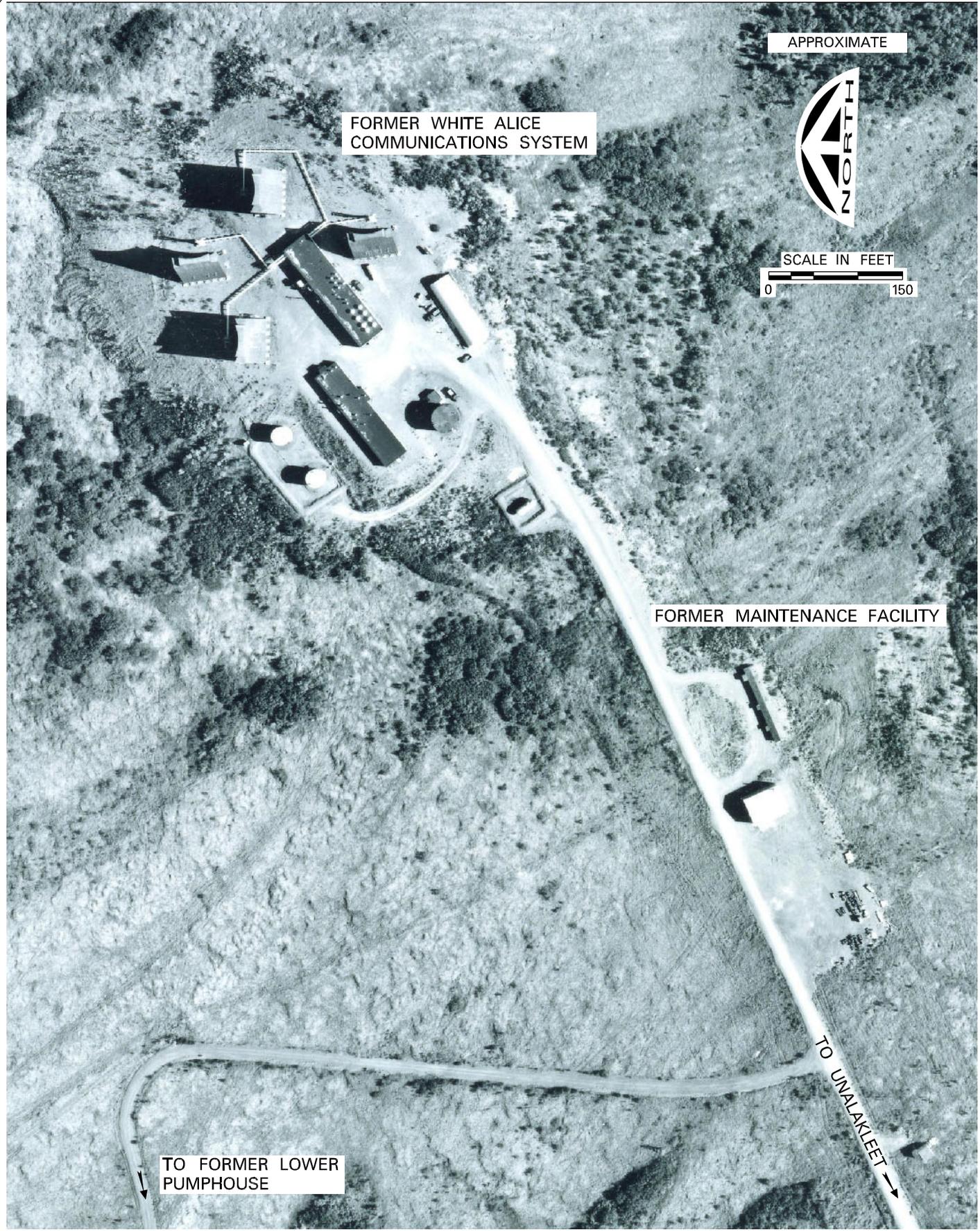
UNALAKLEET RIVER

UNALAKLEET

REFERENCE:
USGS QUADRANGLE MAP
UNALAKLEET (D-4), 1950

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FORMER WHITE ALICE COMMUNICATIONS SYSTEM

APPROXIMATE



SCALE IN FEET
0 150

FORMER MAINTENANCE FACILITY

TO FORMER LOWER PUMPHOUSE

TO UNALAKLEET



FIGURE 1-2
U. S. AIR FORCE
NORTH RIVER RADIO RELAY STATION – SITE INVESTIGATION REPORT
SITE MAP

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2.0 SITE DESCRIPTION AND BACKGROUND

This section contains information on site characteristics and previous investigations conducted at North River RRS.

2.1 INSTALLATION LOCATION AND DESCRIPTION

North River RRS sits on top of a bluff on the north side of the Unalakleet River, approximately 12 road miles from the City of Unalakleet (Figure 1-1). Site OT01 is the designation for the entire installation, which consisted of two main areas: a former WACS and former Maintenance Facility (Figure 1-2).

Former WACS. These facilities are shown on Figure 2-1 and consisted of:

- A Barracks
- A Generator/Equipment Building
- A Quonset garage
- A water tank with pumphouse
- Four WACS antennae
- Two 2,000-barrel ASTs
- A fuel pumphouse with piping that connected the ASTs to each antennae
- A sewer vault and outfall

A demolition debris landfill with an asbestos cell was constructed in 1995. The demolition debris landfill was permitted by ADEC, Permit Number 9432-BA001.

The only things remaining at the WACS are the landfill, which is covered by soil, and a mounded area suggesting a buried concrete pad at the former Generator/Equipment Building.

Former Maintenance Facility. This site is located approximately ¼ mile west of the WACS. This was the location of the Auto Maintenance Building (removed from the site in 1995) and a 500-gallon UST used to supply fuel to heat the building (also removed in 1995). These facilities are shown on Figure 2-2. A mounded area remains at the location of the former Auto Maintenance Building, suggesting a buried concrete pad.

2.2 INVESTIGATION HISTORY

Investigations have been conducted at the North River RRS since 1985, including the following:

- Site visits and sampling conducted in 1985 (WC, 1986) and 1989 (JMM, 1990) indicated that soil in the area was contaminated with fuel and, to a lesser degree, with PCBs and dichlorodiphenyltrichloroethane.
- In 1991, a site inventory report prepared by the Alaska District of the U.S. Army Corps of Engineers (USACE) described an estimated 6,700 cubic yards of PCB and petroleum-contaminated soil, 1,830 gallons of liquid waste, and scattered asbestos debris that

remained at the site (USACE, 1991). Subsequent investigations could not confirm these totals.

- A 1993 report concluded that, based on samples collected in 1993, further investigation and cleanup was necessary at North River RRS (Martech, 1993).
- A Preliminary Assessment was performed in 1994, reviewing historical data and information pertinent to the installation and compiling the information (CH2M Hill, 1994).
- Aman Environmental Consulting Inc. (AECI) was hired to complete the site work, but no final report was issued (AECI, 1997).

The USACE compiled the available data and information, and issued a Final Remedial Action Report, which summarized the work performed by the previous contractors (USACE, 1996).

Site specific results of previous investigations can be found in Sections 3.1.1 and 3.2.1.

2.3 REVIEW OF HISTORICAL DOCUMENTS

A review of as-built drawings and pre-demolition aerial photographs from 1974 revealed several areas of concern that had not previously been investigated, including:

- Former Motor Vehicle Gasoline (MOGAS) AST – As-built drawings and aerial photographs confirm the existence of an AST labeled “16,000-gallon MOGAS Tank” at the former WACS. The 1986 Site Inventory Report (WC, 1986) identified this AST as a “12,000-gallon vehicle fuel tank [which] is located at the entrance to the site near the road. This tank was also empty but had fuel spilled in the containment pit.” Subsequent documents do not mention this AST and its final disposition is unknown.
- Former Drum Storage Area – As-built drawings and aerial photographs confirm the existence of an area southeast of the former Maintenance Building that was used as a drum storage area. Subsequent documents do not mention this area and it is believed that no investigation had occurred here.
- Former Auto Maintenance Building Drain Outfall – As-built drawings confirm the presence of a floor drain that originated at the former Maintenance Building and daylighted across the access road from the building. Subsequent documents do not mention this area and it is believed that no investigation had occurred here.

2.4 LAND USE

All site structures, including the WACS antennae, have been demolished and the non-hazardous debris disposed of in the on-site landfill at the former WACS. The Unalakleet Native Corporation currently owns the land.

2.5 PHYSICAL CHARACTERISTICS

This section describes the North River RRS environmental setting. It includes a discussion of the climate, geology, hydrology, and wildlife of the area.

2.5.1 Climate

Unalakleet has a sub-arctic climate with considerable maritime influence when Norton Sound is ice-free, typically from May to October. The freezing of the Sound causes a change to a colder, more continental climate. Winter temperatures average between -4 degrees Fahrenheit (°F) (-20 degrees Celsius [°C]) and 11°F (-12°C), with an extreme low of -50°F (-46°C). During summer, temperatures average between 47°F (8°C) and 62°F (31°C), with a record high of 87°F (31°C).

Winters are cold and relatively dry, with an average of 41 inches of snowfall. Summers are cool with most rainfall occurring July through September. Average precipitation is 14.2 inches. Winds predominate from the east, with an average velocity of 11 knots. The maximum wind speed recorded was 56 knots, although residents have reported higher gusts.

2.5.2 Geology

The Unalakleet area is located in the Lower Yukon Subregion. Cenozoic gravel, silts, and basalt underlie this coastal area; the northern area might be underlain by granodiorite. The Nulato Hills consist of folded cretaceous greywacke and slate, with Mesozoic and Paleozoic volcanics at the east and south ends. These rocks are locally intruded by stocks and dikes ranging in composition from monzonite to diabase. The Kaiyuh and Kuskokwim Mountains bordering the Innoko River are underlain chiefly by Paleozoic schists and Mesozoic sediments intruded by Tertiary granitic plutons. The subregion is transected by the Kaltag fault, a major structural feature that trends north-northwest between Unalakleet and Kaltag. Most of the rocks are intensely folded and faulted.

Permafrost is present in most of the area, but its extent and thickness are unknown. Permafrost was not encountered to a depth of 15 feet bgs in 2004.

2.5.3 Hydrology

Surface Water. The North River RRS was constructed on a topographic high point. Surface drainage is generally undeveloped, with precipitation infiltrating into the ground or draining radially through sheet flow. Surface runoff that flows to the north or west enters Little North River, a small tributary of the North River, approximately 1 mile north of the site. Surface runoff to the south and east enters the Unalakleet River, approximately ½-mile south of the facility. The Unalakleet River flows in a broad alluvial valley, is characterized by a low gradient and meandering course, and is subject to seasonal flooding. Winter flow is maintained through discharge from unfrozen zones in the alluvium.

Groundwater. Groundwater resources within the North River RRS area are not generally used for water supply. A well near a tributary to the Unalakleet River was used to supply water to the installation during the active years, but has since been removed. Well points driven into the alluvium are used for water supply at several cabins in the area, but their use is not widespread. Recent investigations found no groundwater at a depth of 15 feet below ground surface (bgs) at the former WACS, but did encounter groundwater at a depth of approximately 6 feet bgs at the former Maintenance Facility.

2.5.4 Wildlife and Subsistence Resources

Brown bears, caribou, and occasional moose inhabit the area. Common terrestrial birds of the area include: spruce grouse; rock and willow ptarmigan; raven; jaeger; Savannah sparrow; Lapland songspur; snow bunting; and raptors such as the gyrfalcon, marsh hawk, merlin, snowy owl, rough-legged hawk, and golden eagle

The Unalakleet River has been identified as an Important Use Area under the *Bering Straits Coastal Management Plan* (ADNR, 1989). Subsistence resources harvested include, but are not limited to: fish (salmon, grayling, whitefish, Arctic Char, smelt, and tomcod), mammals (moose, bear, caribou, and beaver), waterfowl, berries, plants, and timber. Subsistence fishing accounts for approximately 20,000 salmon per year taken from the Unalakleet River by the residents of Unalakleet (ADF&G, 2002)

Subsistence is legally defined in Alaska to include the customary and traditional uses of fish and game in all of Alaska's rural areas. If a person moves into a rural area and adopts that standard of living for their own, then that person, whether Alaska Native or non-Native, may legally fish and hunt for subsistence.

2.6 REGULATORY CRITERIA

Although North River RRS is not on the National Priorities List, investigations were conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The NCP states the lead agency may take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate or eliminate a release or threat of release.

The Air Force is the lead agency for decisions at North River RRS by Executive Order 12580 and, as such, has the authority to choose remedial actions (CERCLA, 1987), with approval from ADEC.

Analytical data for environmental media at North River RRS are compared to the following regulatory criteria:

- Soil – 18 Alaska Administrative Code 75.341, Method Two, Tables B1 and B2 Soil Cleanup Levels, under 40-inch zone, migration-to-groundwater, referred to herein as 'ADEC Method Two' (ADEC, 2003).

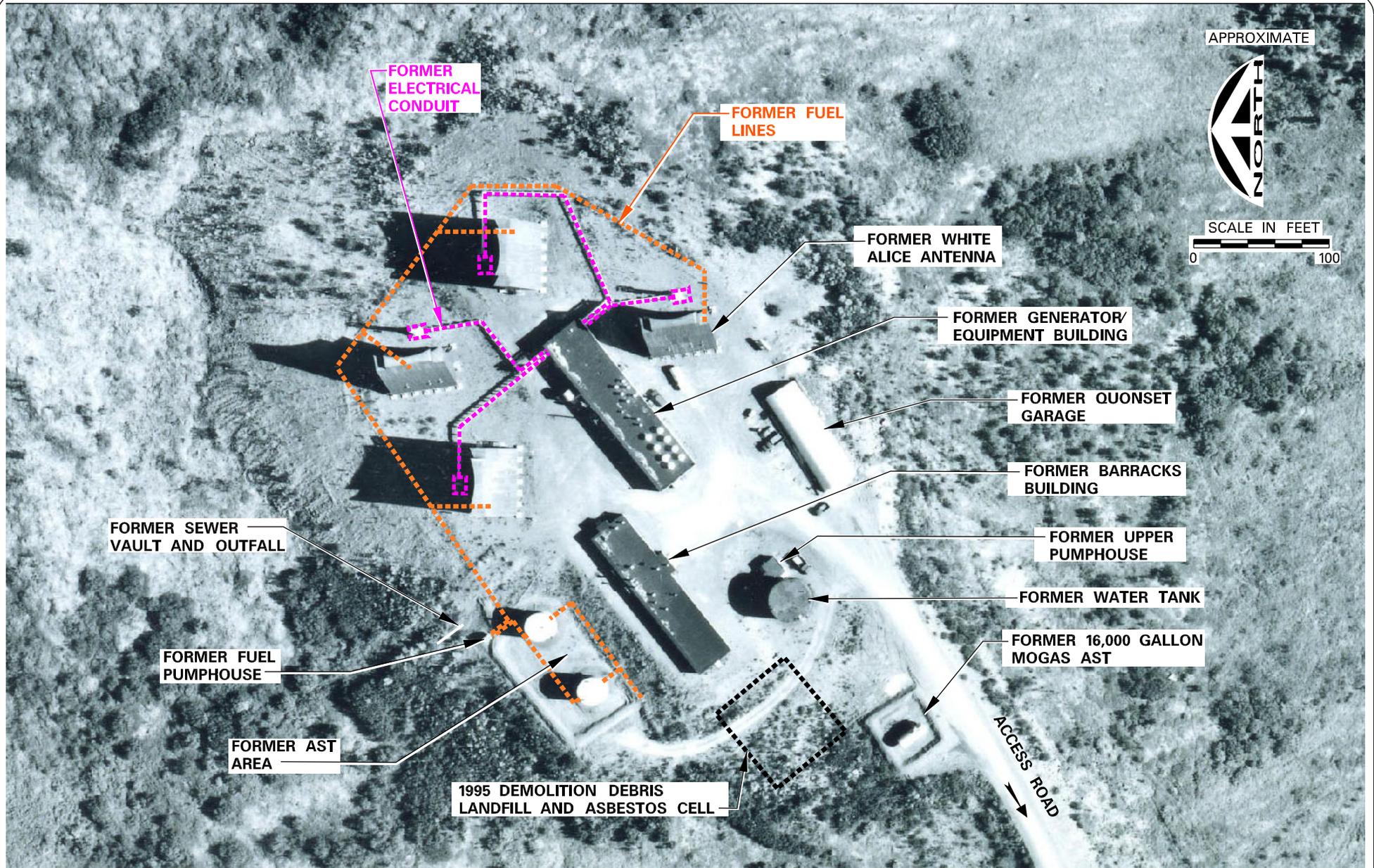


FIGURE 2-1
U. S. AIR FORCE
NORTH RIVER RADIO RELAY STATION – SITE INVESTIGATION REPORT
FORMER WACS

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FIGURE 2-2
U. S. AIR FORCE
NORTH RIVER RADIO RELAY STATION – SITE INVESTIGATION REPORT
FORMER MAINTENANCE FACILITY

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3.0 SITE INSPECTIONS

Site inspection activities were conducted at North River RRS from 27 June to 1 July 2004 in accordance with the Air Force- and ADEC-approved SI Work Plan (USAF, 2004). Brief descriptions of field sampling procedures, departures from the Work Plan, and investigative-derived waste handling are provided below.

Field notes and field forms are presented in Appendix A and site photographs are presented in Appendix B. Copies of the chains-of-custody are presented in Appendix C, and laboratory analytical results are presented in Appendix D. A quality assurance/quality control review of the laboratory data is presented in Appendix E.

3.1 FORMER WACS

Details on previous investigations, SI activities, and the results of samples collected at the former WACS are presented in this section.

3.1.1 Previous Investigations

Preliminary site-specific results and details of previous investigations at the former WACS included:

- Former Fuel Pumphouse Area – PCBs were not detected in three soil samples collected by Martech in 1993; however, DRO was detected at concentrations up to 1,420 milligrams per kilogram (mg/Kg).
- Former Sewer Outfall – Martech removed 40 cubic yards of PCB-contaminated soil in 1993. Neither PCBs nor DRO were detected in confirmation samples.
- Former AST Area – Following removal of the ASTs and pads, AECI removed approximately 3,000 cubic yards of DRO-contaminated soil in 1995. Confirmation samples detected DRO below 2,000 mg/Kg.
- Former Quonset Garage – Martech collected one soil sample with a DRO concentration of 73 mg/Kg in 1993. The structure was demolished by AECI in 1995.
- Former Lower Pumphouse (not shown on figures) – AECI removed ½-cubic yard of DRO-contaminated soil in 1995 from a hot spot identified by Martech. DRO was not detected in confirmation samples.
- Former Water Tank – AECI demolished the tank in 1995 and disposed of PCB capacitors, transformers, and ballasts that had been stored in the tank. Soil sampling performed by AECI did not detect PCBs or DRO.
- Former Barracks Building – Martech and AECI removed asbestos from the building prior to demolition in 1995.
- Former Generator/Equipment Building – Martech removed asbestos from the building, and AECI drained oil and removed generators prior to demolition in 1995.
- Former Radio Antennae – AECI felled and removed the four antennae in 1995.

- Landfill – AECI relocated the landfill to the west side of the site because the original landfill footprint was located over the former fuel storage area, which had DRO contamination exceeding ADEC cleanup criteria.

3.1.2 Site Activities

Details on activities conducted at the former WACS are provided in this section.

3.1.2.1 Surface Soil

To evaluate the presence of PCBs in surface soil at the former WACS, a grid comprised of cells measuring 50-foot square was used to collect 52 surface soil samples over an area of approximately 130,000 square feet (or 2.98 acres). Samples were collected from approximately 0.5 feet bgs and analyzed for PCBs.

Surface soil samples were also collected from each of the test pits at the former WACS and analyzed for DRO, GRO, RRO, VOCs, SVOCs, PCBs/pesticides, and RCRA metals

3.1.2.2 Subsurface Soil

To evaluate the presence of POL in subsurface soil, 5 test pits were excavated to refusal or extent of backhoe reach at the former WACS. Soil samples were collected from a backhoe bucket at 2-foot depth intervals, from the surface to refusal at bedrock or groundwater, or the extent of backhoe reach (approximately 15 feet bgs).

Soil samples were screened in the field using a photoionization detector (PID). The sample from the surface, the sample from the bottom of the test pit, and the sample with the highest PID reading of the remaining samples were submitted for laboratory analysis. Volatile and GRO samples were preserved with methanol. The samples were delivered in accordance with standard chain-of-custody procedures and the Air Force- and ADEC-approved SI Work Plan. Laboratory analysis consisted of: DRO, GRO, RRO, VOCs, SVOCs, PCBs/pesticides, and RCRA metals.

3.1.3 Results

Results of SI activities conducted at the former WACS are presented in this section.

3.1.3.1 Surface Soil

Surface soil samples collected from the grid at the WACS contained PCBs ranging from 0.027 mg/Kg to 37.3 mg/Kg, with 9 of 52 samples containing PCBs above the ADEC Method Two cleanup level of 1 mg/Kg (Figure 3-1, Table 3-1). PCBs above 1 mg/Kg were concentrated in two areas as shown on Figure 3-1. Other discreet areas were also identified, while the eastern section of the pad did not contain any PCBs above 1 mg/Kg. Areas with PCBs above 1 mg/Kg do not appear associated with former structures at the site and were likely the result of post-demolition soil grading activities.

One surface soil sample collected from a test pit at the former WACS contained DRO above the ADEC Method Two cleanup level of 250 mg/Kg (Figure 3-2 and Table 3-2). Surface soil in Test Pit 1 had 5,110 mg/Kg DRO at approximately 0.5 feet bgs. The test pit was excavated near the former Generator/Equipment Building and reached refusal at approximately 2 feet bgs.

3.1.3.2 Subsurface Soil

Subsurface soil samples contained DRO above the ADEC Method Two cleanup level of 250 mg/Kg in four samples collected from three test pits at the WACS (Figure 3-2, Table 3-2). DRO concentrations above the cleanup level ranged from 266 mg/Kg to 782 mg/Kg at depths ranging from 4 feet bgs in Test Pit 2 to 15 feet bgs in Test Pit 3. Residual POL appears concentrated near the location of the former ASTs (Test Pits 3 and 4) and at the location of Test Pit 2 along the fuel pipeline that delivered fuel to heat the former antennae.

Arsenic and chromium were detected in nearly every WACS test pit soil sample at levels above their respective ADEC Method Two cleanup levels. However, the similarity of these results to those from the former Maintenance Facility, and the mineralized nature of the area, suggest that these levels are naturally occurring and not attributable to Air Force activity.

3.1.4 Departures From the Work Plan

The Work Plan initially stated that three samples would be collected from each test pit. However, due to the shallow nature of Test Pit 1, only 2 samples were collected from this test pit.

3.2 FORMER MAINTENANCE FACILITY

Details on previous investigations, SI activities, and the results of samples collected at the former Maintenance Facility are presented in this section.

3.2.1 Previous Investigations

Preliminary site-specific results of previous investigations at the former Maintenance Facility included:

- Former Auto Maintenance Building and UST – AECI removed a 500-gallon UST, associated piping, and approximately 125 cubic yards of POL-contaminated soil in 1995. Confirmation samples indicated that not all contamination had been removed, with DRO detected at up to 11,900 mg/Kg in a sample collected at 7 feet bgs.

In a pre-draft report, AECI indicated that the only remaining waste of which they were aware of was the POL-contaminated soil at the former Auto Maintenance Building UST (AECI, 1997).

In June 2002, a reconnaissance by the USACE identified three drums of unknown product at the former Maintenance Facility and reported the existence of these drums to the Air Force. In September 2002, 611th CES/CEVO personnel removed the drums and visibly contaminated soil. Analysis of confirmation soil samples from the excavated areas indicated that PCB-contaminated soil remained at the site. The contaminated soil was located near the head of a trail leading to a resident's cabin, in the vicinity of the former Maintenance Facility.

Additional soil sampling in August 2003 indicated a larger area of PCB contamination. In September 2003, the 611th CES/CEVO removed approximately 25 cubic yards of PCB-contaminated soil. During a September 2003 site visit, the remaining 270 feet of trail to the cabin and an additional 300 feet (150 feet in each direction from the trail intersection) on the main road were sampled. Sample results indicated that the contamination on the trail reached to within about 25 feet of the cabin and extended sporadically along the main road.

The 611th CES/CEVO performed a Time Critical Removal operation during summer 2004. Approximately 750 tons of PCB-contaminated soil were excavated and transported off-site for disposal. Confirmation samples were collected and analyzed, and the results will be presented under separate cover by the 611th CES/CEVO.

3.2.2 Site Activities

Details on activities conducted at the former Maintenance Facility are provided in this section.

3.2.2.1 Surface Soil

Surface soil samples were collected from each of the test pits at the former Maintenance Facility and analyzed for DRO, GRO, RRO, VOCs, SVOCs, PCBs/pesticides, and RCRA metals

3.2.2.2 Subsurface Soil

To evaluate the presence of POL in subsurface soil, 5 test pits were excavated to refusal or extent of backhoe reach at the former Maintenance Facility. Soil samples were collected from a backhoe bucket at 2-foot depth intervals, from the surface to refusal at bedrock or groundwater, or the extent of backhoe reach (approximately 15 feet bgs).

Soil samples were screened in the field using a PID. The sample from the surface, the sample from the bottom of the test pit, and the sample with the highest PID reading of the remaining samples were submitted for laboratory analysis. Volatile and GRO samples were preserved with methanol. The samples were delivered in accordance with standard chain-of-custody procedures and the Air Force- and ADEC-approved SI Work Plan. Laboratory analysis consisted of: DRO, GRO, RRO, VOCs, SVOCs, PCBs/pesticides, and RCRA metals.

3.2.3 Results

The results of SI activities conducted at the former Maintenance Facility are presented in this section.

3.2.3.1 Surface Soil

One test pit surface soil sample collected at the former Maintenance Facility contained DRO above the ADEC Method Two cleanup level of 250 mg/Kg (Figure 3-3, Table 3-3). Surface soil in Test Pit 8 had 4,650 mg/Kg DRO at approximately 0.5 feet bgs. The test pit was excavated near the former Drum Storage Area and reached refusal at approximately 8 feet bgs.

3.2.3.2 Subsurface Soil

Subsurface soil samples contained DRO above the ADEC Method Two cleanup level of 250 mg/Kg in six samples (including two duplicates) collected from Test Pits 7, 9, and 10 (Figure 3-3, Table 3-3) at the former Maintenance Facility. DRO concentrations above the cleanup level ranged from 813 mg/Kg to 7,010 mg/Kg at depths of 4 to 6 feet bgs.

The following analytes were also detected above their ADEC Method Two cleanup levels in Test Pit 7 (Table 3-3) at the former Maintenance Facility:

- GRO – detected above the ADEC Method Two cleanup level of 300 mg/Kg, ranging from 319 mg/Kg to 662 mg/Kg, in two primary and duplicate test pit soil samples collected at 4 and 6 feet bgs.
- Benzene – detected above the ADEC Method Two cleanup level of 0.02 mg/Kg in two primary and one duplicate soil sample, with a maximum of 0.401 mg/Kg in the duplicate sample from 4 feet bgs.
- Ethylbenzene – detected above the ADEC Method Two cleanup level of 5.5 mg/Kg at 6.24 mg/Kg, in the duplicate sample from 4 feet bgs.
- Bis(2-chloroethethyl)ether – detected above the ADEC Method Two cleanup level of 0.002 mg/Kg at 0.0886 mg/Kg in the primary sample from 4 feet bgs.

Two other SVOCs (2,6-dinitrotoluene and n-nitrosodi-n-propylamine) were detected at 1.58 mg/Kg and 0.344 mg/Kg, respectively, above their respective ADEC Method Two cleanup levels (0.0044 mg/Kg and 0.00036 mg/Kg) in Test Pit 6. The source of the SVOCs in Test Pits 6 and 7 is not known.

Arsenic and chromium were detected in nearly every test pit soil sample at the former Maintenance Facility at levels above their respective ADEC Method Two cleanup levels. However, the similarity of the results to those from the WACS, and the mineralized nature of the area, suggest that these levels are naturally occurring and not attributable to Air Force activity.

3.2.3.3 Groundwater

Groundwater was encountered at approximately 6 feet bgs at the Maintenance Facility. The groundwater surface was in contact with POL contaminated soil and exhibited a sheen where it was encountered in Test Pits 7, 9, and 10. No groundwater samples were collected.

3.2.4 Departures From the Work Plan

The SI Work Plan originally indicated that three test pits would be excavated at the former Maintenance Facility; however, because of available time and the shallow depth of some of the test pits, two additional test pits were excavated to further delineate potential POL in soil near the former Maintenance Building UST.

3.3 DECONTAMINATION AND INVESTIGATIVE-DERIVED WASTE

The backhoe bucket was decontaminated after excavating each test pit by removing loose dirt, scrubbing the bucket with a stiff brush and warm, soapy water, rinsing with potable water, and a final rinse using deionized water. Decontamination was conducted over the test pit.

Personal protective gear and incidental materials (e.g., gloves) were bagged, transported back to Anchorage, and disposed of as solid waste at a permitted landfill.

Table 3-1 Analytical Results for Grid Surface Soil Samples Collected at the WACS

Sample Identification	Aroclor 1242 (mg/Kg)	Aroclor 1260 (mg/Kg)	Sample Identification	Aroclor 1242 (mg/Kg)	Aroclor 1260 (mg/Kg)
04UNK001SS03OT01	ND (0.025)	0.0397	04UNK201SS30OT01 (Duplicate)	ND (0.025)	0.0349
04UNK001SS04OT01	ND (0.025)	0.0436	04UNK001SS31OT01	ND (0.025)	4.450 D
04UNK001SS05OT01	ND (0.025)	0.108	04UNK001SS32OT01	ND (0.025)	7.810 D
04UNK001SS06OT01	ND (0.025)	2.520 D	04UNK001SS33OT011	ND (0.025)	0.0397
04UNK001SS07OT01	ND (0.025)	1.420 D	04UNK001SS34OT01	ND (0.025)	0.110
04UNK001SS08OT01	ND (0.025)	0.0534	04UNK001SS35OT01	ND (0.025)	0.0592
04UNK001SS09OT01	ND (0.025)	0.218	04UNK001SS36OT01	ND (0.025)	1.9 D
04UNK001SS10OT01	ND (0.025)	0.169	04UNK001SS37OT01	ND (0.025)	37.3 D
04UNK201SS10OT01 (Duplicate)	ND (0.025)	0.298	04UNK001SS38OT01	ND (0.025)	0.676 D
04UNK001SS12OT01	ND (0.025)	0.247	04UNK001SS39OT01	1.47 D	0.301
04UNK001SS13OT01	ND (0.025)	0.283	04UNK001SS40OT01	ND (0.025)	0.279
04UNK001SS14OT01	ND (0.025)	2.270 D	04UNK201SS40OT01 (Duplicate)	ND (0.025)	0.353
04UNK001SS15OT01	ND (0.025)	0.200 J	04UNK001SS41OT01	ND (0.025)	0.0459
04UNK001SS16OT01	ND (0.025)	0.147	04UNK001SS42OT01	ND (0.025)	0.0587
04UNK001SS17OT01	ND (0.025)	0.113	04UNK001SS43OT01	ND (0.025)	0.249
04UNK001SS19OT01	ND (0.025)	0.238	04UNK001SS44OT01	ND (0.025)	0.423 D
04UNK001SS20OT01	ND (0.025)	0.538 D	04UNK001SS45OT01	ND (0.025)	0.340
04UNK201SS20OT01 (Duplicate)	ND (0.025)	0.777 D	04UNK001SS46OT01	ND (0.025)	0.0764
04UNK001SS21OT01	ND (0.025)	2.510 D	04UNK001SS47OT01	ND (0.025)	0.089
04UNK001SS22OT01	ND (0.025)	0.601 D	04UNK001SS48OT01	ND (0.025)	0.117 D
04UNK001SS24OT01	ND (0.025)	0.114	04UNK001SS49OT01	ND (0.025)	0.203
04UNK001SS25OT01	ND (0.025)	0.163	04UNK001SS50OT01	ND (0.025)	0.282
04UNK001SS26OT01	ND (0.025)	0.234	04UNK201SS50OT01 (Duplicate)	ND (0.025)	0.288
04UNK001SS27OT01	ND (0.025)	0.0371	04UNK001SS51OT01	ND (0.025)	0.0678
04UNK001SS28OT01	ND (0.025)	0.0275	04UNK001SS52OT01	ND (0.025)	0.190
04UNK001SS30OT01	ND (0.025)	0.0491	04UNK201SS52OT01 (Duplicate)	ND (0.025)	0.165
ADEC Method Two Cleanup Level	1.0	1.0	ADEC Method Two Cleanup Level	1.0	1.0

Key:

ADEC – Alaska Department of Environmental Conservation

mg/Kg – milligrams per kilogram

ND – Not detected above practical quantitation limits shown in parentheses.

Bold indicates exceedence of applicable clean up level.

Table 3-2 Analytical Results Above Cleanup Levels for Test Pit Soil Samples Collected at the WACS

Location	Sample ID (04UNK-)	Depth (feet bgs)	DRO (mg/Kg)	GRO (mg/Kg)	Arsenic (mg/Kg)	Chromium (mg/Kg)
Test Pit 1	001TP01OT01	0.5	5,110 DB	5.52 B	9.5	35.1 B
	002TP01OT01	2.0	9.79 UB	1.99 UB	9.82	22.9 B
Test Pit 2	001TP02OT01	0.5	49.7 B	1.81 UB	12.0	35.8 B
	002TP02OT01	4.0	782 DB	3.39 UB	15.0	34.2 B
	003TP02OT01	8.0	197 DJB	1.84 UB	11.2	34.8 B
Test Pit 3	001TP03OT01	0.5	22.3 B	0.413 UB	10.5	33.6 B
	002TP03OT01	12	156 B	42.8 B	4.22	28.3 B
	003TP03OT01	15	329 DB	64.8 B	8.99	33.8 B
Test Pit 4	001TP04OT01	0.5	34.2 B	1.91 UB	8.28	34.6 B
	002TP04OT01	10	518 DB	119 B	4.07	37.6 B
	003TP04OT01	13.5	266 DB	73.4 B	2.56	34.5 B
Test Pit 5	001TP05OT01	0.5	16 UB	1.23 UB	6.74	34.8 B
	002TP05OT01	8.0	12 UB	0.843 UB	6.95	38.7 B
	003TP05OT01	13.0	ND (2.1)	1.02 UB	4.99	49.1 B
ADEC Method Two Cleanup Level			250	300	2.0	26.0

Key:

ADEC – Alaska Department of Environmental Conservation

B – Analyte was detected in associated method blank.

bgs – below ground surface

DB – Sample dilution required for analysis, analyte was detected in associated method blank.

DJB – Sample dilution required for analysis, estimated, analyte was detected in associated method blank.

DRO – diesel range organics

GRO – gasoline range organics

ID – identification

mg/Kg – milligrams per kilogram

ND – not detected

UB – Analyte considered not detected based on associated blank data.

WACS – White Alice Communication System

Bold – Indicates exceedence of applicable cleanup levels.

Table 3-3 Analytical Results Above Cleanup Levels for Test Pit Soil Samples Collected at the Maintenance Facility

Location	Sample ID (04UNK-)	Depth (feet bgs)	DRO (mg/Kg)	GRO (mg/Kg)	Benzene (mg/Kg)	Ethylbenzene (mg/Kg)	2,6-Dinitrotoluene (mg/Kg)	N-nitroso-di-n-propylamine (mg/Kg)	Bis(2-chloroethyl) ether (mg/Kg)	Arsenic (mg/Kg)	Chromium (mg/Kg)
Test Pit 6	001TP06OT01	0.5 ¹	108 B	0.537 UB	ND (0.002)	ND (0.005)	1.58	0.344	ND (0.042)	5.31	32.2 B
	002TP06OT01	3.0	9.32 UB	0.758 UB	ND (0.0015)	ND (0.0037)	ND (0.03)	ND (0.041)	ND (0.042)	9.38	33.0 B
Test Pit 7	001TP07OT01	0.5 ¹	82.5 B	1.55 UB	ND (0.0011)	ND (0.0027)	ND (0.03)	ND (0.041)	ND (0.042)	7.64	28.4 B
	002TP07OT01	4.0	4,510 D,B	402 D,B	0.313 D	5.02 D	ND (0.03)	ND (0.041)	0.0886	11.7	35.7 B
	202TP07OT01 (Duplicate)	4.0	6,330 D,J	662 D,B	0.401 D	6.24 D	ND (0.15)	ND (0.205)	ND (0.042)	14.4 B	34.2
	003TP07OT01	6.0	6,860 D,J,B	370 D,J,B	0.173 D	4.27 D,J	ND (0.03)	ND (0.041)	ND (0.042)	31.4	34.8 B
	203TP07OT01 (Duplicate)	6.0	3,640 D	319 D,B	ND (0.0144) D	4.91 D	ND (0.0796)	ND (0.109)	ND (0.042)	27.3 B	34.2
Test Pit 8	001TP08OT01	0.5 ¹	4,650 D,B	0.579 UB	ND (0.0005)	ND (0.0012)	ND (0.03)	ND (0.041)	ND (0.042)	9.35 B	38.5
	002TP08OT01	4.0	12.3 J	0.353 UB	ND (0.0007)	ND (0.0019)	ND (0.03)	ND (0.041)	ND (0.042)	9.64 B	31.5
	202TP08OT01 (Duplicate)	4.0	15.2	1.2 UB	ND (0.0004)	ND (0.0011)	ND (0.03)	ND (0.041)	ND (0.042)	10.2 B	37.3
	003TP08OT01	6.0	16.2 J	0.426 J,U,B	ND (0.0005)	ND (0.0014)	ND (0.03)	ND (0.041)	ND (0.042)	4.82 B	33.1
Test Pit 9	001TP09OT01	6.0	7,010 D,J	54.1 D,B	ND (0.0095) D	0.77 D	ND (0.03)	ND (0.041)	ND (0.042)	4.18 B	33.5
Test Pit 10	001TP10OT01	6.0	813 D,J	166 B	ND (0.0111) D	1.07 D	ND (0.03)	ND (0.041)	ND (0.042)	7.12 B	25.2
ADEC Method Two Cleanup Level			250	300	0.02	5.5	0.0044	0.00036	0.002	2.0	26.0

Key:

1 – Surface soil sample

ADEC – Alaska Department of Environmental Conservation

B – Analyte was detected in associated method blank.

bgs – below ground surface

D – Sample dilution required for analysis.

DRO – diesel range organics

GRO – gasoline range organics

ID – identification

J – estimated

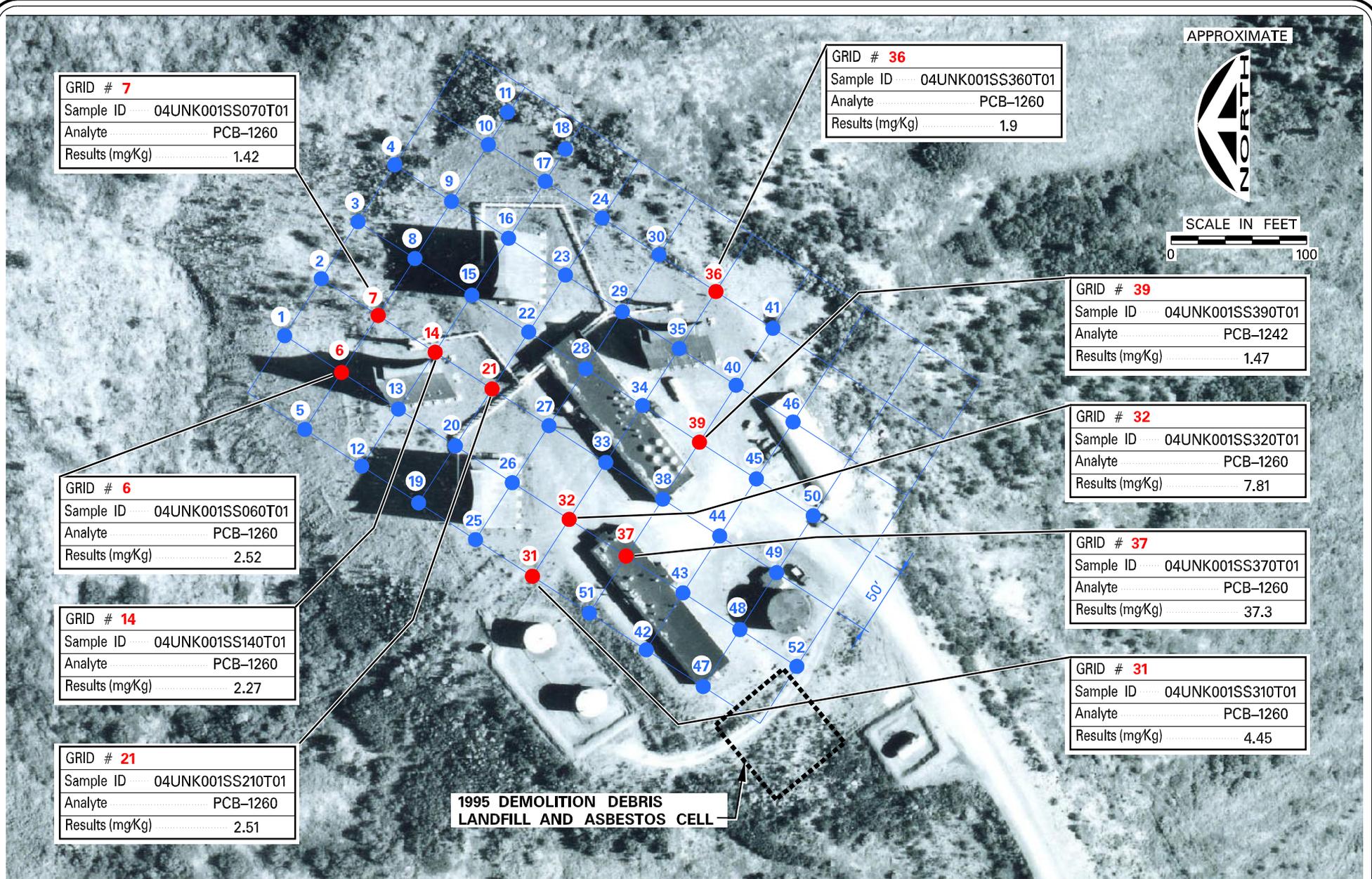
mg/Kg – milligrams per kilogram

ND – not detected

UB – Analyte considered not detected based on associated blank data.

Bold – Indicates exceedence of applicable cleanup levels.

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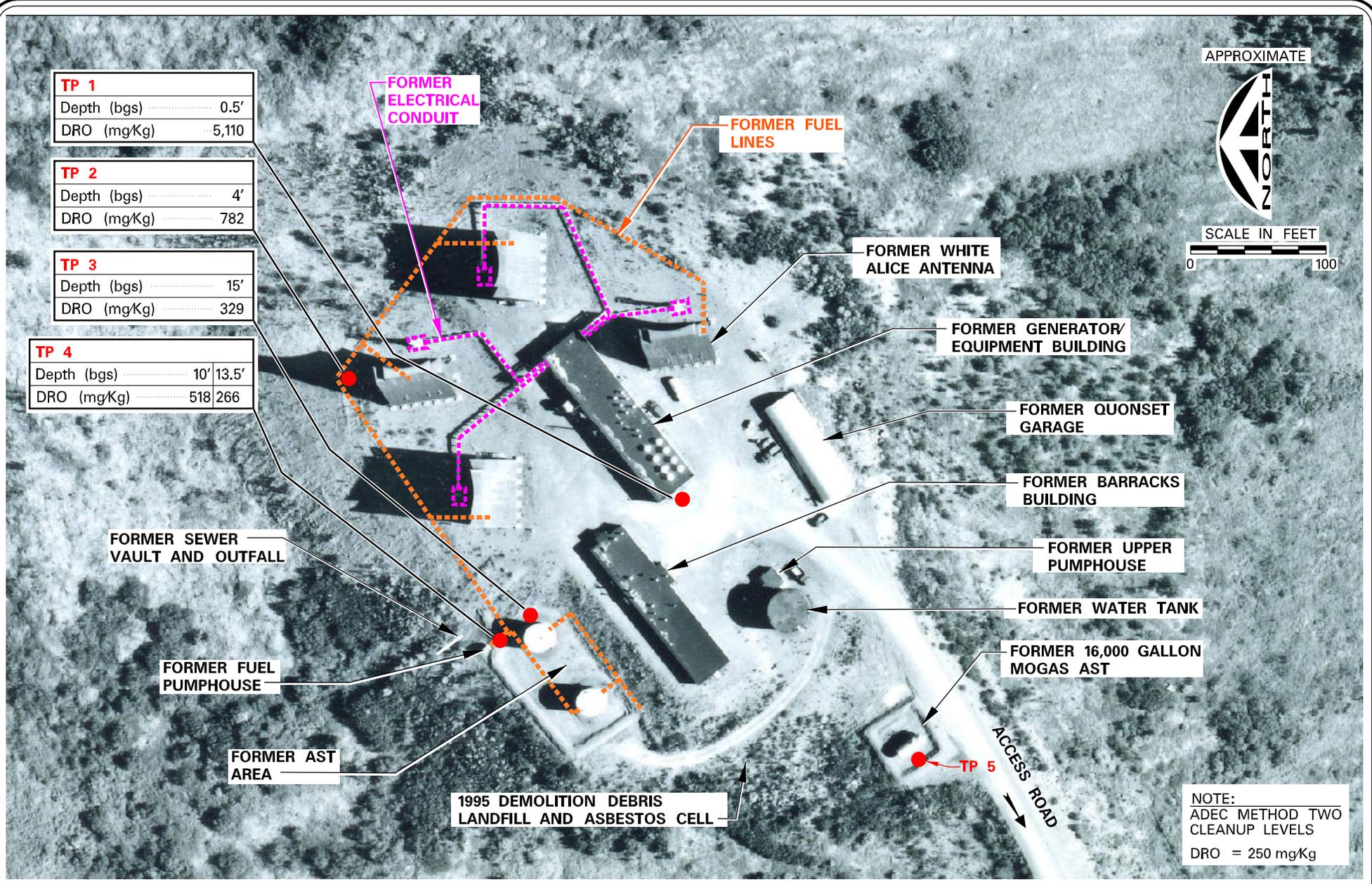
LEGEND:

- PCB SAMPLE LOCATIONS
- PCB SAMPLE LOCATIONS WITH RESULT ABOVE ADEC METHOD TWO CLEANUP LEVEL OF 1.0 mg/Kg

mg/Kg MILLIGRAMS PER KILOGRAM
 PCB POLYCHLORINATED BIPHENYL

FIGURE 3-1
 U. S. AIR FORCE
 NORTH RIVER RADIO RELAY STATION – SITE INVESTIGATION REPORT
FORMER WACS – PCB SAMPLING GRID LOCATIONS WITH RESULTS ABOVE 1.0 mg/Kg

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LEGEND:

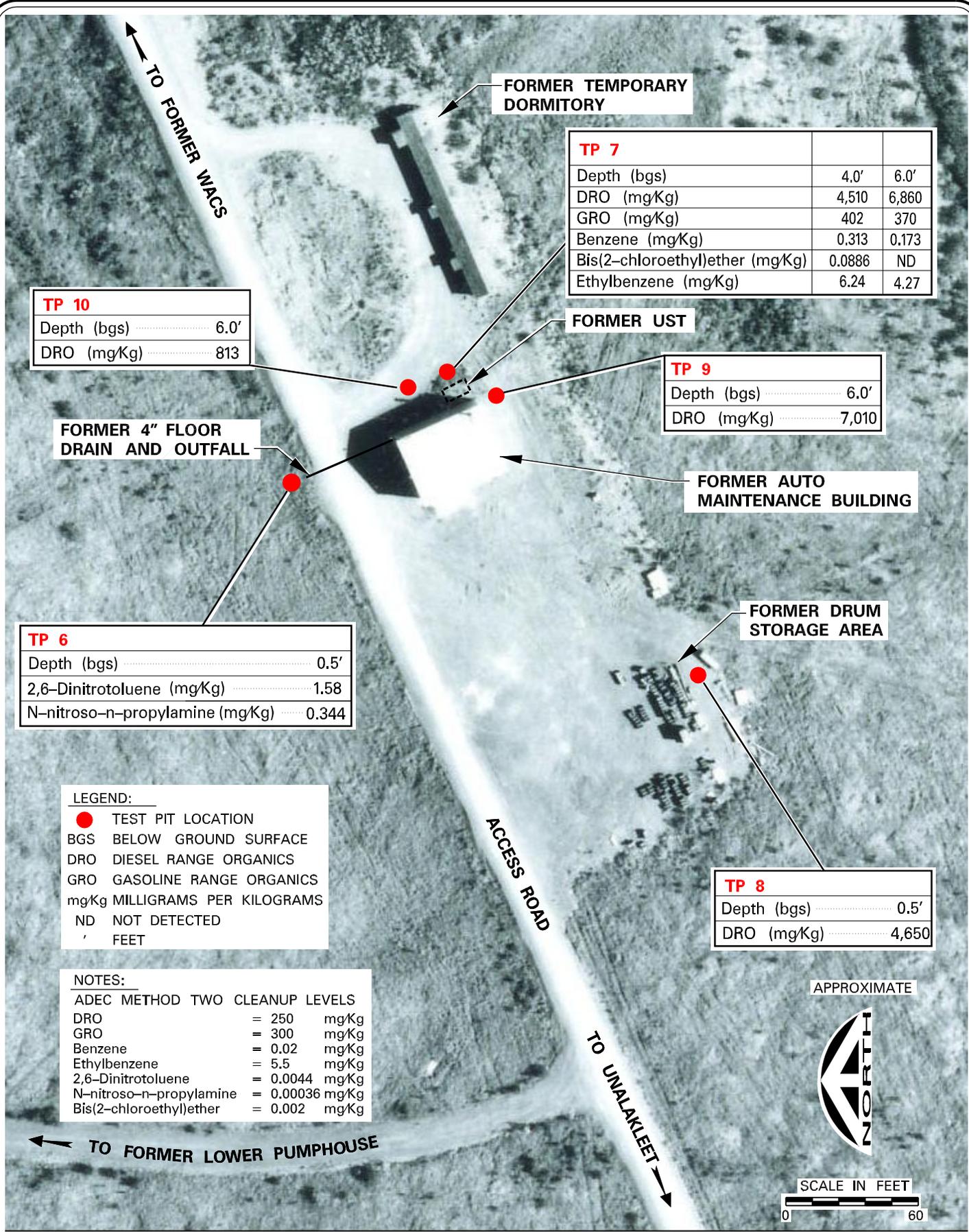
- TEST PIT LOCATION
- bgs BELOW GROUND SURFACE
- DRO DIESEL RANGE ORGANICS
- mg/Kg MILLIGRAMS PER KILOGRAM
- ' FEET

FIGURE 3-2

U. S. AIR FORCE
 NORTH RIVER RADIO RELAY STATION – SITE INVESTIGATION REPORT

FORMER WACS TEST PIT LOCATIONS

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TP 10

Depth (bgs)	6.0'
DRO (mg/Kg)	813

TP 7

Depth (bgs)	4.0'	6.0'
DRO (mg/Kg)	4,510	6,860
GRO (mg/Kg)	402	370
Benzene (mg/Kg)	0.313	0.173
Bis(2-chloroethyl)ether (mg/Kg)	0.0886	ND
Ethylbenzene (mg/Kg)	6.24	4.27

TP 9

Depth (bgs)	6.0'
DRO (mg/Kg)	7,010

TP 6

Depth (bgs)	0.5'
2,6-Dinitrotoluene (mg/Kg)	1.58
N-nitroso-n-propylamine (mg/Kg)	0.344

TP 8

Depth (bgs)	0.5'
DRO (mg/Kg)	4,650

LEGEND:

- TEST PIT LOCATION
- BGS BELOW GROUND SURFACE
- DRO DIESEL RANGE ORGANICS
- GRO GASOLINE RANGE ORGANICS
- mg/Kg MILLIGRAMS PER KILOGRAMS
- ND NOT DETECTED
- ' FEET

NOTES:

ADEC METHOD TWO CLEANUP LEVELS

DRO	= 250	mg/Kg
GRO	= 300	mg/Kg
Benzene	= 0.02	mg/Kg
Ethylbenzene	= 5.5	mg/Kg
2,6-Dinitrotoluene	= 0.0044	mg/Kg
N-nitroso-n-propylamine	= 0.00036	mg/Kg
Bis(2-chloroethyl)ether	= 0.002	mg/Kg



FIGURE 3-3
 U. S. AIR FORCE
 NORTH RIVER RADIO RELAY STATION – SITE INVESTIGATION REPORT
**FORMER MAINTENANCE FACILITY
 TEST PIT LOCATIONS**

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4.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions based on sample results from the 2004 SI at North River RRS include:

- Soil with PCB concentrations exceeding the ADEC Method Two soil cleanup level was found in nine of the 52 soil sample locations at the former WACS. The vertical and horizontal extent of PCB contaminated soil at these locations is unknown at this time. The 611th CES/CEVO completed additional surface soil sampling in the vicinity of the former WACS Grid Sample ID #37; these additional sample locations and results are presented in Appendix F.
- Soil with DRO concentrations exceeding the ADEC Method Two soil cleanup level was found at the former WACS in four of the five test pits. The soil locations correspond with known locations of the former fuel system tanks and piping, with the exception of Test Pit 1.
- Soil with DRO concentrations exceeding the ADEC Method Two soil cleanup level was found in Test Pits 7, 8, 9, and 10 at the former Maintenance Facility.
- Test Pit 7 at the former Maintenance Facility was the only sample location with benzene, ethylbenzene, and GRO concentrations in soil exceeding the ADEC Method Two soil cleanup levels.

Based on the findings of the 2004 SI, further investigation is recommended at the former WACS and Maintenance Facility.

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