1 of 1

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**Preliminary Assessment Report for
Camp Carroll Training Center,
Installation 02045,
Anchorage, Alaska**

Prepared for

National Guard Bureau, Army Directorate
Aberdeen, Maryland

August 1993

Prepared by

Applied Geosciences and Environmental Management Section
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**Preliminary Assessment Report for
Camp Carroll Training Center,
Installation 02045,
Anchorage, Alaska**

Summary

This report presents the results of the preliminary assessment (PA) conducted by Argonne National Laboratory at the Alaska Army National Guard property known as Camp Carroll Training Center, located on the Fort Richardson Army facility near Anchorage, Alaska. Preliminary assessments of federal facilities are being conducted to compile the information necessary for the completion of preresidential activities and to provide a basis for establishing corrective actions in response to releases of hazardous substances. The principal objective of the PA is to characterize the site accurately and determine the need for further action by examining site activities, types and quantities of hazardous substances used, the nature and amounts of wastes generated or stored at the facility, and potential pathways by which contamination could affect public health and the environment. This PA satisfies, for the Camp Carroll property, phase I of the Department of Defense Installation Restoration Program. The scope of this assessment is limited to the facilities and past activities contained within the area now occupied by Camp Carroll.

Camp Carroll is a 136-acre site located on the Fort Richardson Army facility 10 mi west of Anchorage, Alaska. The facilities included in this PA are within the confines of the cantonment, which consists of approximately 40 acres. Initial construction of the facilities began in 1942 as part of the Fort Richardson cantonment. On December 16, 1979, the site was licensed to the state of Alaska for the development of a year-round training facility for the Alaska Army National Guard and included the use of approximately 60 buildings.

The primary ESOs associated with the property are (1) the Alaska Air National Guard storage area behind Building S57112 (Organizational Maintenance Shop [OMS] 6); (2) the state of Alaska maintenance facility and the soil/tar-type spill north of the state of Alaska maintenance facility; (3) the waste storage area adjacent to OMS 6; (4) the contaminated area from leaking underground storage tanks (USTs) and the oil-water separator; and (5) soil staining in the parking area at the Camp Carroll Headquarters Building. Camp Carroll appears to be in excellent condition from an environmental standpoint, and current practices are satisfactory.

The available information indicates that Camp Carroll presents a low potential risk to human health and the environment; however, on the basis of the information made available to Argonne, several areas deserve further consideration to ensure protection for the local community and the environment. Argonne recommends that the Alaska Department of Military Affairs consider remediation of soil contamination associated with all storage areas, as well as reviewing the practices of other residents of the facility. Argonne also recommends that the current methods of storing waste material behind Building S57112 (OMS 6) be reviewed for alternatives.

1 Introduction

This document is a report of the preliminary assessment (PA) conducted by Argonne National Laboratory at the Alaska Army National Guard (AKARNG) property known as Camp Carroll Training Center, located near Anchorage, Alaska.

1.1 Authority for the Preliminary Assessment

The National Guard Bureau, Army Directorate, has engaged Argonne to perform PAs of selected National Guard properties. These assessments are being done in a manner consistent with both the Department of Defense Installation Restoration Program (IRP) and the U.S. Environmental Protection Agency's (EPA's) Potential Hazardous Waste Site Preliminary Assessment Guidance. Preliminary assessments of National Guard properties are conducted under the authority and direction of the IRP; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or, more commonly, Superfund); and the Superfund Amendments and Reauthorization Act of 1986 (P.L. 99-499).

1.2 Objectives

This PA report is based on existing information from the National Guard records that were made available to Argonne investigators and from other sources. Although this PA effort did not extend to the generation of new data, it nonetheless identifies areas where existing data are incomplete, unreliable, or ambiguous and recommends ways to address such shortcomings.

The objectives of the PA are to satisfy phase I of the IRP and to

- Identify and characterize the environmentally significant operations (ESOs),
- Identify property areas or ESOs that may require a site investigation,
- Identify ESOs or areas of environmental contamination that may require immediate removal,
- Identify properties for which no further action is needed, and

- Provide information sufficient to prescore the site with the EPA's PA Scoresheets (September 1991).

1.3 Procedures

The PA began with a review of files located at the Facilities Management Office, National Guard Headquarters, Fort Richardson, Alaska, on June 21, 1993. A site visit was conducted during the week of June 21-25, 1993, to obtain additional information through direct observation and interviews with personnel familiar with the property and its operations. Other relevant information was obtained on June 26, 1993, from the Department of Natural Resources, Anchorage, Alaska.

1.4 Report Format

This PA report presents a summary and evaluation of the data relevant to the PA for this property. Section 2 describes the property and its surrounding environment and land use. Section 3 identifies and characterizes the ESOs at the site. Section 4 discusses known and suspected releases to the environment, and Section 5 discusses potential human and environmental receptors for such releases. Section 6 summarizes the findings and conclusions, discusses the quality and reliability of the supporting information, identifies areas requiring further action, and suggests how such actions can be accomplished. Section 7 lists pertinent materials reviewed. Appendix A gives interview information and lists the Argonne investigators. Appendix B lists endangered, threatened, and candidate species in Alaska.

2 Property Characterization

2.1 General Property Information

Camp Carroll Training Center is a 136-acre parcel operated by the AKARNG. The entire training center is located within the boundaries of Fort Richardson, a U.S. Army facility currently under command of the 6th Infantry Division (Light) and the U.S. Army Garrison, Alaska. Fort Richardson is located in the south central part of Alaska on the northeast outskirts of Anchorage. A general map for Fort Richardson is provided in Figure 1. Camp Carroll is located in the northeast portion of Fort Richardson's main cantonment area.

Camp Carroll Training Center is licensed under agreement DACA 85-3-81-3, which was first granted for 5 years on December 16, 1979. The license was issued for the training and support of the Alaska National Guard. The facilities, lands, and certain improvements are bounded by Davis Highway, Roosevelt Road, and Stevens Road. Several buildings around the perimeter of Roosevelt and Stevens roads, as well as all permanent improvements, were included in the lease. On March 15, 1985, the 5-year license was extended for an additional 5 years. In June of 1992, the license was extended for an additional 1 year. The original license included the transfer of 121 buildings. Additionally, approximately 27 replacement buildings have been constructed. Also occupying the National Guard facilities are the state of Alaska's light maintenance shop, which occupies AKARNG Building S57428; the Alaska Institute of Military Science (AIMS) in Building 60600; and Drug Eradication and Interdiction in Building 60802. In addition to permanent structures, the camp also contains 64 metal movable storage containers, each measuring 8 ft × 10 ft × 20 ft, and four metal storage railroad cars. As a provision of the license, all permanent additional improvements become the property of the government. Figure 1 shows the general location of the property, and Table 1 lists pertinent information about it.

2.2 Description of Facilities

The facilities at Camp Carroll consist of approximately 23 brick and 33 permanent metal buildings, which function as billets, storage, classrooms, and offices. The site also contains a wooden chapel building, a log-cabin-type Headquarters Building, a wooden infirmary, and two mobile-home-type storage/office buildings. No environmental impacts are associated with these structures. Table 2 lists those buildings considered environmentally benign, as well as their current uses.

FIGURE 1 General Location of Camp Carroll Training Center (Source: DMA 1986)

TABLE 1 Identifying Information for Camp Carroll Training Center

Property address	P.O. Box 5800 Fort Richardson, Alaska 99505-5800
Property location	
Latitude	61° 15' 00" N
Longitude	14° 94' 00" W
FISP ^a installation number	02045
Installation commander	LTC Richard A. Weigel
Type of facility	Training center
License information	DACA 85-3-81-3
Principal contact	Pamela M. Grefsrud P.O. Box 5800 Fort Richardson, Alaska 99505-5800

^a Facility Inventory and Stationing Plan.

Under terms of the license, the National Guard must pay the cost of utilities and its pro rata share of services and maintenance. Currently, all utilities services are connected to and provided by Fort Richardson. These services include electricity, telephone, power, sewer, water, and solid waste disposal. Heating is provided through a commercial natural gas distribution system. The gas lines on the site are owned by the AKARNG and are connected to a meter located at Davis Highway.

In 1980, a statewide survey of Alaska government facilities indicated that no friable asbestos was present at Camp Carroll Training Center. In 1986, a polychlorinated biphenyl (PCB) initiative removed all PCB transformers used in light ballasts. No other PCB transformers are known to exist at Camp Carroll.

Nonhazardous solid wastes generated at Camp Carroll are presently collected by a commercial service for disposal at the city of Anchorage landfill. Previously, solid wastes from the facility were delivered to Fort Richardson's on-post sanitary landfill, located west of Camp Carroll, which was operational until 1991.

TABLE 2 Environmentally Benign Buildings at Camp Carroll Training Center

Building No.	Building Use
S57024	Offices
S57033	Warm storage; linens; blankets
S57035	Museum
S57036	Recruit supplies
S57037	Cold storage; returnable material
S57039	Cold storage; returnable material
S57040	Office
S57112	OMS 6; motor vehicle storage; office
S57226	Transient field-grade officers' quarters
S57409	Paint locker (latex only)
S57427	NCOIC billet ^a
S57428	State of Alaska maintenance
S57432	Recreation Club
S57433	Historical building
S57434	Theater
S57438	Chapel
S57451	Cold storage; unit equipment; blankets; tents; tools; medical supplies (bivouac)
S57452	Cold storage; unit equipment; blankets; tents; tools; medical supplies (bivouac)
S57453	Cold storage; unit equipment; blankets; tents; tools; medical supplies (bivouac)
S57454	Cold storage; unit equipment; blankets; tents; tools; medical supplies (bivouac)
S57455	Cold storage; unit equipment; blankets; tents; tools; medical supplies (bivouac)
S57456	Cold storage; unit equipment; blankets; tents; tools; medical supplies (bivouac)
S57457	Cold storage; unit equipment; blankets; tents; tools; medical supplies (bivouac)
S57458	Cold storage; unit equipment; blankets; tents; tools; medical supplies (bivouac)
S57501	40-person classroom
S57503	3 divided classrooms
S57528	Unused
60600	AIMS
60606	Infirmery
60620	Mess hall
60700	Headquarters
60702	Headquarters
60710	Transient military quarters
60718	40-man billet
60719	40-man billet
60720	40-man billet
60722	40-man billet

TABLE 2 (Cont.)

Building No.	Building Use
60724	40-man billet
60726	40-man billet
60728	40-man billet
60730	40-man billet
60732	40-man billet
60734	40-man billet
60736	40-man billet
60738	40-man billet
60740	40-man billet
60802	Drug Eradication and Interdiction; offices
60806	Storage; supply
60820	Classrooms/billets

^a NCOIC, Noncommissioned officer in charge.

Although Camp Carroll does not generate its own waste oils and fluids, it currently accumulates waste in 55-gal drums and 1,000-gal containers behind Building S57112 (Organizational Maintenance Shop [OMS] 6). These containers are subsequently transported to Fort Richardson for disposal. Materials and fluids deemed hazardous are disposed of under Fort Richardson's large-quantity generator's license.

Four underground storage tanks (USTs) were located within the AKARNG facility. These USTs will be discussed in a succeeding section of this report. With the exceptions of a 500-gal tank at the Fort Richardson Communication Building near Camp Carroll's main entrance and a 1,000-gal gas tank at the state maintenance yard, no other building has a dedicated aboveground tank.

Currently, all maintenance on facility vehicles, including lubrication, is provided by off-site commercial establishments. No vehicle washing facilities are located on the site.

2.2.1 Outdoor Aviation Materials and Supply Yard

The facility is a native-soil- and gravel-based open area containing a variety of aircraft equipment, parts, and military supplies. Located behind Building S57112 (OMS 6), this fenced compound is approximately 0.75 acre in size and is accessible through either of two locked gates.

The majority of the stores are in an arrangement with larger items at the interior periphery of the site. Typical items included are dry materials related to military personnel needs and military machinery-related parts and supplies. Included are twelve 250-gal rubberized fuel storage bladders, three of which are partially filled. Also included are eight 500-gal empty mobile fuel truck tanks. Eight palletted 55-gal drums, two of which have obscure labels, are placed unsegregated adjacent to the fuel bladders.

Current storage practices of generally locating large items at the periphery include the interspersing of other materials with the flammable-liquid containers. Although no significant spillage is reported to have occurred in this area, surface soil staining is apparent at various locations in the storage yard.

2.2.2 State of Alaska Maintenance Facility

A 0.5-acre open and unpaved parking and storage area surrounds the state maintenance multicraft shop. The purpose of the facility is to provide site maintenance for the AKARNG. The state of Alaska maintains a 1,000-gal aboveground gasoline fuel tank for its maintenance vehicles. One additional 55-gal drum and a parts-cleaning tank are located in the shop on the concrete floor against the south wall.

Personnel at the site indicated that the parts-cleaning tank is only used for occasional cleaning of tools. In the past 10 years, the 2 qt of solvent has never been disposed of or replaced. The facility does no vehicle repairs or maintenance. All vehicle-related services, other than fuel, are provided by off-site vendors (Michaud 1993).

Although no significant spills appear to have occurred, the yard contains several areas of soil staining. Soil staining occurs between the office and the maintenance shop, adjacent to the walkway. Additional areas are associated with the soils beneath the car storage port attached to the west side of the maintenance shop.

The open storage yard contains a variety of construction-related materials. The majority consists of wood, metal, and composite materials. Included are one 55-gal drum labeled heating fuel and an open half-full 55-gal drum labeled antifreeze. No other liquid storage containers are present in the maintenance yard.

The state of Alaska maintenance facility retains the use of Building S57409 located in the Conex yard. Building S57409 is a concrete-floored, metal Quonset hut used as storage for latex paints. Also located in the building are three unlabeled and inaccessible 55-gal drums.

In an unenclosed area approximately 300 ft north of the maintenance yard are piles of construction debris. Associated with the debris is a 6-ft × 6-ft soil stain and spill of organic material resembling roofing tar.

2.2.3 Waste Storage Area

The Camp Carroll facility maintains a liquid-waste storage area adjacent to the exterior south wall of Building S57112 (OMS 6). The area contains four 1,000-gal steel tanks and eight 55-gal drums in the fenced storage area. All of the tanks and drums are placed on native soil without spill containment. Handwritten notes and labels on the drums and tanks indicate the contents to be waste oils and oily rags.

2.2.4 Building S57112 (OMS 6)

This facility is an 11,406-ft² Quonset-hut style building on a concrete floor, with a single 100-ft × 40-ft bay. The function of the facility was to provide maintenance on 2.5-ton, 5-ton, and tracked vehicles. Typical routine maintenance included light welding, lubrication, antifreeze, and light repairs.

Contaminated soils occupying areas 200 ft north and 200 ft west of Building S57112 were generated during the extraction of one 4,000-gal diesel fuel UST, one 5,000-gal gasoline UST, one 1,000-gal gasoline UST, and one 1,000-gal abandoned gasoline UST. Contaminated soils were produced by the excavation of a failed oil-water separator and its associated disposal crib. The site is presently under remedial investigation to determine the extent of the

contamination. All existing floor drains in Building S57112 have been plugged with concrete, and the building is used for the storage of a front-end loader, backhoe, and road grader.

2.2.5 Camp Carroll Headquarters Building

The Camp Carroll Headquarters Building is a log-cabin-type facaded structure with an asphalt entrance parking area and with a native soil/gravel parking and storage area to the north. A 6-ft × 6-ft area of soil staining exists in the parking/storage area north of the Headquarters Building at Camp Carroll. The staining coincides with the occasional parking of military vehicles.

2.2.6 Buildings in 57000 and 60000 Series

The buildings in the 57000 series are Quonset-hut style structures constructed in the 1940s and 1950s. Typically, the buildings are metal-framed steel-skinned units with a painted exterior covering of insulating foam. The structures are built either on concrete pads or on wood piles and are supplied with individual natural gas heating. The buildings are used for barracks, storage, classrooms, chapel, latrine, and offices on an as-needed basis. The AKARNG considers these facilities to be inadequate and replaceable.

The initial construction of the buildings in the 60000 series was the little latrine in 1970. Subsequent buildings included a mess hall, Headquarters Building, bachelor officers' quarters (BOQ), latrines, barracks, administration, classrooms, a Drug Eradication and Interdiction facility, and the AIMS building. All of the buildings in the 60000 series are cement-block structures located on concrete pads. All of these facilities were inspected during the 1980 asbestos and 1986 PCB surveys and either were found to be free of contaminants or were retrofitted.

2.3 Property History

The AKARNG facility at Camp Carroll encompasses approximately 136 acres of the Fort Richardson Military Reservation. The reservation is the result of the withdrawal from public lands of approximately 30,257 acres by Executive Order 8102 signed on April 29, 1939, by Franklin D. Roosevelt (Roosevelt 1939). Subsequent to the initial withdrawal, several amendments and revocations have reduced the size of the original land withdrawal. Presently, Fort Richardson is contained on 1,643 acres of land. On December 16, 1979, the state of Alaska was granted a

license to use and occupy 136 acres of Fort Richardson land as a year-round training facility for the support of the Alaska National Guard. Included in the license was the use of those buildings occupying the acreage.

In October of 1990, construction workers installing a sewer line encountered contamination of soils in the vicinity of a dry well that was connected to an oil-water separator for Building S57112 (OMS 6). Prior to its use as an OMS, the building housed a motor repair facility. During the assessment and subsequent investigation of the oil-water separator contamination, one dysfunctional 1,000-gal gasoline UST, one 5,000-gal gasoline UST, one 4,000-gal diesel fuel UST, and one 1,000-gal abandoned gasoline UST were found to be associated with soil and alluvial contamination. All of the tanks were removed, along with approximately 400 yd³ of contaminated soils and alluvial material. The site is presently undergoing remedial investigation.

2.4 Permitting Status

Currently, only one environmental permit has been issued for activities associated with Camp Carroll. On September 9, 1992, the EPA issued a National Pollutant Discharge Elimination System (NPDES) permit for all facilities (with few exceptions) engaged in discharging storm water associated with industrial activities. Camp Carroll does, however, have access to Fort Richardson's large-quantity hazardous-waste generator's permit. No other permits are presently required for the activities associated with Camp Carroll.

2.5 Surrounding Environment and Land Use

2.5.1 Demographics and Land Use

The current on-post population of Camp Carroll consists of approximately 41 individuals. Of this number, one is a resident and 40 are nonresident military or civilian workers. According to the Directorate of Resource Management, 6th Infantry Division (Light) and U.S. Army Garrison, Alaska, the population of Fort Richardson as of September 30, 1992, consists of 9,824 authorized military personnel, 12,956 family members, 2,165 retirees, 1,786 civilian employees, and 1,704 miscellaneous civilian employees. According to the 1990 census, the Anchorage (Alaska) metropolitan area had a population of 230,185. A 4-mi radius of Camp Carroll encompasses only

minor portions of nonpost residences in the extreme northeastern limits of Anchorage, with a population of 2,093. Based on the 1990 census of metropolitan Anchorage, as well as the 1992 military census, the total population within a 4-mi radius of Camp Carroll is estimated to be 30,528 individuals.

2.5.2 Climate

Camp Carroll lies in a transitional zone between the continental climate of interior Alaska and the maritime climate of coastal Alaska. Extremely cold winter weather, associated with high-pressure systems over interior Alaska, often leads to a succession of clear days in Anchorage, where temperatures may drop to -35°F. Snowfall first occurs in mid-October and lasts until mid-April, with yearly snowfall averaging 65-75 in. During this period, the shortest day of the year occurs on December 21st, with only 5.5 hours of possible light.

The total annual precipitation averages 17 in., with the heaviest precipitation occurring in July and August, when the wind direction is often from the southwest. Winds in the Anchorage area are generally not severe, with an average velocity of 6 mi/h. Localized channeling brought about by mountainous orographic features can, however, result in higher velocities.

2.5.3 Surface Water and Physiography

2.5.3.1 Physiography

Camp Carroll is located within the Cook Inlet-Susitana Lowland section of the Coastal Trough physiographic province of Alaska. The Cook Inlet-Susitana Lowland is bounded on the south by the Kenai Mountains, on the east by the Chugach Mountains, on the north by the Talkeetna Mountains, and on the west and northwest by the Aleutian and Alaska ranges. The Cook Inlet-Susitana Lowland is approximately 200 mi across in the north-south direction and 50 mi across in the east-west direction. Land surface elevations at the Camp Carroll site are generally in the 345- to 365-ft range, and the topography is generally flat to gently undulating, with a slope toward Cook Inlet.

2.5.3.2 Soils

The *Anchorage Area Soil Survey* prepared by the U.S Department of Agriculture (USDA) Soil Conservation Service and the U.S Army Corps of Engineers (COE) (USDA 1979) covers the northern two-thirds of Camp Carroll Training Center. The survey at Camp Carroll identifies one principal soil type, Kasilof silt loam. Kasilof silt loam is an excessively drained soil found on outwash plains and stream terraces. The soil formed in a thin mantle of loess over very gravelly alluvium. Permeability is moderate in the upper 7 in. and rapid below. Runoff is slow, and the hazard of erosion is slight.

2.5.3.3 Surface Water

Regional surface drainage in the Camp Carroll area is generally toward the west into Knik Arm. Knik Arm empties into Cook Inlet at Point Woronzof, approximately 4 mi west of downtown Anchorage.

Camp Carroll is situated midway between Eagle River and Ship Creek. Eagle River is located approximately 2 mi north of Camp Carroll, and Ship Creek is located approximately 2 mi to the south. There are no water bodies or streams located within Camp Carroll. With the exception of the far northeast corner of Camp Carroll, which drains toward the northwest, virtually all surface drainage from Camp Carroll is channeled toward the southwest corner of the facility through a system of storm drainage ditches. The Camp Carroll drainage ditch system connects to the drainage ditch system on the main developed portion of Fort Richardson, which subsequently empties into the North Fork of Ship Creek. Contaminants could be transported into the creek by water draining across the surface of the training center and through the drainage ditches. Surface drainage from Camp Carroll apparently does not reach Eagle River because of the presence of the Elmendorf Moraine to the north of the site. Overland runoff is generally greatest during peak runoff from snowmelt during June and July and during the peak rainfall months of August and September.

Ship Creek and Knik Arm are the only major surface water bodies within a 15-mi radius of Camp Carroll that could be affected by contamination at the site. The public water supply intake on Ship Creek is located upstream of the site. The use of Ship Creek and Knik Arm, located downstream of the site, is limited to occasional fishing.

2.5.4 Groundwater and Hydrogeology

2.5.4.1 Regional Geology

The geology of south-central Alaska is highly varied and dynamic. Subduction zone tectonics, volcanism, alpine glaciation, marine coastal processes, and a rigorous climate have all played a part in forming the very complex geologic environment of the region.

The Cook Inlet basin, in which Anchorage is situated, is surrounded by relatively young mountain ranges. The Chugach Mountains, which rise to over 5,000 ft directly east of Anchorage, are comprised of Mesozoic flysch and *mélange* named, respectively, the Valdez Group and the McHugh Complex. Rock types vary from metavolcanic tuffs to graywacke, chert, marble, schist, and amphibolite. To the north of Anchorage, Cretaceous plutons intrude the Chugach terrane, and ultramafic rocks lie in fault contact with the terrane. The west side of the Cook Inlet basin is bounded by the Aleutian and Alaska ranges, wherein several active, composite volcanoes occur.

The Cook Inlet basin contains a thick sequence of unconsolidated clastic Quaternary deposits underlain by the moderately consolidated Tertiary clastics of the Kenai Group. The Quaternary deposits are a complex mixture of unstratified gravel, sand, silt, and clay that has accumulated primarily as a result of glacial and marine sedimentation. The Tertiary deposits consist of conglomerate, sandstone, mudstone, and coal that extend as a wedge to the west from the Chugach Mountains.

2.5.4.2 Local Geology

The Camp Carroll Training Center is located entirely on the Quaternary glaciofluvial outwash deposits consisting of poorly graded sand and gravel with varying amounts of silt. Approximately 1,500 ft beyond the northern boundary of Camp Carroll is the southern edge of the massive Elmendorf Moraine, a northeast-southwest trending terminal moraine representing the Naptowne glaciation. The estimated depth to bedrock at the training center is 300 ft, based on the log from a test well located 1 mi west of Camp Carroll (Cederstrom et al. 1964).

2.5.4.3 Regional Groundwater

Groundwater in the Anchorage area occurs chiefly in unconsolidated sediments that extend from the foot of the Chugach Mountains westward to and below Cook Inlet. These sediments thicken progressively away from the mountains and are as much as 1,300 ft thick. The unconsolidated sediments overlie metamorphic bedrock near the mountains and low-permeability sedimentary bedrock of the Tertiary Kenai Formation throughout the rest of the area.

The regional geohydrologic system is composed of an unconfined aquifer, a confining layer (Bootlegger Cove clay) that is nearly continuous except near the mountains, and a series of hydrologically connected units that are collectively termed the confined aquifer. Regional groundwater flow is from east to west (Patrick et al. 1989).

2.5.4.4 Local Groundwater

There are no wells at Camp Carroll, and except for Boring B-1 at the OMS 6 maintenance area, all documented drilling at the site has been shallow, and groundwater was not encountered. The following description of groundwater conditions at Camp Carroll is based on observations made in Boring B-1 and on information describing groundwater conditions in adjacent areas of Fort Richardson.

Groundwater was encountered at a depth of 80 ft in Boring B-1. After two hours, the water level stabilized at 42 ft below ground surface. The rising water level suggests that the aquifer encountered at 80 ft was confined and under considerable pressure. The apparent confining layer was described in the log as a sandy gravel with clay, containing 10-15% sand, 85-90% gravel, and a trace of fines. How this material was able to confine an aquifer under such high confining pressure is not clear.

In adjacent areas of Fort Richardson, groundwater from an unconfined aquifer is readily obtained at depths of less than 50 ft. The confined aquifer is found at depths of approximately 100 ft (Gossweiler 1984). The unconfined aquifer found in many areas of Fort Richardson appears to be absent at Camp Carroll, at least in Boring B-1. The direction of local groundwater flow probably follows the regional flow toward the west; however, variations may be found on a local scale because of complex geologic conditions.

At least 41 registered wells are located within a 4-mi radius of the training center, with most located more than 3.5 mi southwest of the site in the subdivision of Homesite Park (Prokosh 1993; see Figure 2 for well locations). In addition to the 41 registered wells, some wells may be unregistered, mostly outside of a 3-mi radius of the site, because the area inside a 3-mi radius is entirely within Fort Richardson, where access and use have been controlled for more than 50 years. On the basis of the current understanding of groundwater flow and surface runoff, none of the wells appear to be situated in areas where they are imminently threatened by possible contamination from the training center. Surface runoff could conceivably transport contaminants to the wells at locations 5, 6, and 7; however, these wells are more than 2 mi from the site, and considerable dilution and infiltration would take place before contaminants reached the vicinity of the wells. Table 3 provides information concerning the Alaska Department of Environmental Resources (ADER) file number, the location, and the depth for each of the wells identified in Figure 2.

2.5.5 Sensitive Environments

Approximately 1,566 acres of wetland is within a 4-mi radius of Camp Carroll. The closest designated wetland is a 2-acre parcel 1,000 ft north of the Conex storage yard. Surface water runoff originating at Camp Carroll is captured by open perimeter ditches before discharge to both the surrounding area, where the runoff eventually drains into wetlands, and to drainage ditches that discharge into the Fort Richardson storm runoff system.

A number of federally listed threatened and state-listed endangered species and threatened species are known to be transient in the Camp Carroll area. A list of the endangered, threatened, and candidate species is provided in Appendix B. Richard C. Borsetti, Environmental Protection Specialist, notes in the *Environmental Assessment for the Continued Licensing and Development of Camp Carroll, Alaska, September, 1991* (Borsetti 1991) that at least two species of peregrine falcon, *Falco peregrinus anatum* and *Falco peregrinus tundrius*, are within the historical range of Camp Carroll. The bald eagle is also recognized to have a habitat range that includes the Camp Carroll area; however, none of the listed or noted species are known to be natural residents.

FIGURE 2 Water Wells within 4-mi Radius of Camp Carroll Training Center (See Table 3 for well information.)

TABLE 3 Summary of Water Wells within 4-mi Radius of Camp Carroll Training Center

Map Location No. ^a	ADER File No.	Location			Ownership	Depth (ft) ^b
		Section	Township	Range		
1	6376	12	14N	3W	Unknown	NG
2	45837	24	14N	3W	City of Anchorage	NG
3	5826	7	14N	2W	City of Anchorage	NG
4	13394	23	14N	2W	Alaska Fish and Game	197
5	12263	6	13N	2W	Alaska Fish and Game	144
	53292	6	13N	2W	Alaska Fish and Game	NG
	80511 (8 wells)	6	13N	2W	Alaska Fish and Game	24-44
	206780	6	13N	2W	Alaska Fish and Game	NG
	11327	6	13N	2W	Unknown	NG
6	6361	7	13N	2W	Alaska Light and Power	NG
7	45841	1	13N	3W	COE	162
	45842	1	13N	3W	COE	145
	45840	1	13N	3W	COE	166
8	67201	12	13N	3W	City of Anchorage	298
	7971	13	13N	3W	Private	NG
	7556	13	13N	3W	Private	100
	8658	13	13N	3W	Private	NG
	3482	13	13N	3W	Private	144
	45404	13	13N	3W	Private	NG
	62694	13	13N	3W	Private	122
	67775	13	13N	3W	Private	105
	75652	13	13N	3W	Private	103
	75733	13	13N	3W	Private	95
	75839 (2 wells)	12	13N	3W	Private	104; 116
	44677	13	13N	3W	Private	106
	44723	13	13N	3W	Private	NG
	44746	13	13N	3W	Private	58
	44952	13	13N	3W	Private	NG
	45179	13	13N	3W	Private	84
	45189	13	13N	3W	Private	NG
	45196	13	13N	3W	Private	128
	45216	13	13N	3W	Private	150
	45217	13	13N	3W	Private	150

^a See Figure 2.^b NG, not given.

3 Environmentally Significant Operations

The PA team from Argonne has identified five ESOs at the Camp Carroll facility: (1) the outdoor Alaska Army Air National Guard (AKANG) storage area behind Building S57112 (OMS 6); (2) the state of Alaska maintenance facility and the soil/tar-type spill north of the state of Alaska maintenance facility; (3) the waste storage area adjacent to OMS 6; (4) the contaminated area from leaking USTs and the oil-water separator; and (5) soil staining in the parking area at the Camp Carroll Headquarters Building. Figure 3 shows the general locations of the ESOs.

3.1 Alaska Army Air National Guard Storage

The AKANG storage area is located in a locked fenced yard immediately south of Building S57112 (OMS 6). The building and adjacent area were originally developed in 1942 as part of the World War II effort and were transferred with the licensing of Camp Carroll. A fenced storage yard adjacent to Building S57112 (OMS 6) is presently used, in part, by the AKANG and houses a variety of supplies, material, and miscellaneous equipment. Included are twelve 250-gal rubberized fuel bladders, three of which contain liquid. The area also has eight 55-gal drums and eight empty, portable, metal 500-gal fuel tanks. None of the vessels containing liquid are enclosed by secondary containment or are fit with surface liners. The entire surface area of the fenced storage yard consists of a natural soil and gravel mixture. Staining of the soil was observed in the storage compound but was not associated with the immediate location of the fuel containers. Because of the lack of labeling or the obscure labeling of the eight 55-gal drums, whether they contain waste material is not known.

3.2 State of Alaska Maintenance Facility

The state of Alaska maintenance facility is located in a fenced storage yard approximately 2,000 ft north of the Camp Carroll Headquarters Building. The facility consists of a 50-year-old fabrication shop building, two 14-ft × 40-ft trailers, and a 20-ft × 100-ft shed. Building S57409 is the shop's 50-year-old paint storage building, which is located in the Conex storage yard approximately 400 ft northeast of Building S57428.

FIGURE 3 Locations of ESOs at Camp Carroll Training Center

The rectangular surface area surrounding the Building S57428 complex is composed of unpaved soil and gravel media. The fenced facility covers approximately 0.75 acre, the majority of which is composed of open storage. Both the shop and ancillary buildings are used to fabricate and store materials relating to multipurpose construction activities.

Although material safety data sheet (MSDS) records of supplies are kept, no known records exist of the generation or storage of hazardous wastes at the state facility (Michaud 1993); however, evidence suggests that at least small quantities exist in a parts-cleaning tray in the main shop. Although the material and storage area located north of the fenced compound is currently used by the maintenance facility, this area likely has been used by previous occupants to store or discard materials.

Except for minor soil staining within the material and waste storage area and a "tar-type" spill to the north of the maintenance area, probably from previous occupants, no evidence of other contaminant releases from the maintenance area is apparent.

The MSDS sheets are available and appear complete. Most of the liquids stored are small hand-held containers of aerosols, paints, and miscellaneous cleaners in minor quantities. All of these containers appear to be confined to the shelves, bins, or concrete floored areas.

Stored in the yard is a 1,000-gal aboveground fuel tank with a dispenser, as well as various small gas-powered pieces of equipment. The enclosed yard is also used to park the maintenance personnel transport vehicles.

Located approximately 300 ft north of the state of Alaska maintenance facility is the unenclosed construction refuse site. Associated with the site is a 6-ft × 6-ft area of soil/tar-type staining on native soil and gravel.

3.3 Waste Storage Area (AKARNG)

Liquid wastes currently stored by the AKARNG in the outside storage area consist of waste lubricating oils and fluids in aboveground tanks and drums. This storage area is located behind Building S57112 (OMS 6) in an unlined area surfaced with native soil and gravel. No soil staining was observed.

3.4 Building S57112 (OMS 6)

This facility is currently used as a motor vehicle storage building and was formerly an OMS; however, because of the presence of hydrocarbon contamination in soils associated with an oil-water separator and because of four hydrocarbon fuel USTs, the OMS services were curtailed. The site is presently undergoing remedial investigation to determine the extent of the contamination.

3.5 Camp Carroll Headquarters

The Camp Carroll Headquarters area is located at the southwestern corner of the cantonment near the intersection of Davis Highway and Roosevelt Road. The facility consists of log-cabin-facaded Quonset buildings and adjacent parking and storage lot. Soil staining was observed in the storage lot north of the Headquarters Building and appeared to be associated with vehicle staging.

4 Known and Suspected Releases

4.1 Releases to Groundwater

No releases of contaminants to groundwater are documented to have occurred. However, impacts to shallow aquifers are especially possible when soils are highly porous and permeable, as at Camp Carroll. Consequently, impacts to shallow groundwater aquifers are possible from surface soil contamination observed in storage areas and at organizational maintenance sites.

4.2 Releases to Surface Water

No releases to surface waters from Camp Carroll have been documented. Although surface soil contamination is apparent at both the state of Alaska maintenance yard and the AKANG and adjacent storage areas, the contamination appears to be limited. Except during periods of extreme flooding, the possibility of migration of surface soil contamination to nearby surface waters is remote. No such incidents of extreme flooding in these storage areas have been documented; however, impacts on the surficial aquifer may have occurred at the oil-water separator and the leaking USTs west of and adjacent to Building S57112 (OMS 6). Because the surficial aquifer may be connected to surface water, the possibility of an indirect impact on surface water exists. No impacts to surface water from the waste lubricant storage area behind Building S57112 have been documented.

4.3 Releases to Soil

Although surface soil contamination is apparent at both the state of Alaska maintenance yard and the AKANG and adjacent storage areas, the contamination appears to be limited. Except during periods of extreme flooding, the possibility of migration of surface soil contamination to nearby surface waters is remote. No such incidents of extreme flooding in these storage areas have been documented; however, impacts on the surficial aquifer may have occurred at the oil-water separator and the leaking USTs west of and adjacent to Building S57112 (OMS 6).

4.4 Releases to Air

No releases to air from the Camp Carroll site have been demonstrated. Volatile materials from stored wastes or suspected stored wastes include petroleum-based lubricants, paints, and cleaning fluids. Storage of any listed hazardous waste at Camp Carroll has not been documented. All known hazardous waste is disposed of through Fort Richardson's large-quantity generator's permit guidelines. Although a pathway for air releases has been established on the basis of observed soil contamination, the present-day impacts on the air are considered negligible.

4.5 Other Releases

No other significant releases of contamination to the environment have been identified for Camp Carroll.

5 Human and Environmental Receptors

5.1 Groundwater

Releases of contaminants to surface water or to the land surface could affect the shallow groundwater aquifer, which is probably hydraulically connected to surface water. Impacts to shallow groundwater are especially possible when heavy precipitation results in increased infiltration. Consequently, impacts to the shallow groundwater aquifer are possible from surface soil and alluvial contamination observed near building S57112 (OMS 6).

5.2 Surface Water

Surface water is moderately abundant in the area surrounding Camp Carroll, primarily in the form of rivers, streams, and marshes. Surface water is the primary source for potable water in this region, with groundwater restricted to rural and alternate supplies. Almost all of the surface water runoff from the base is directed by open ditches to dry sumps or open infiltration areas or into the Fort Richardson storm drainage system. Although the latter is tributary to Eagle River, no surface water intakes exist on Eagle River within a 4-mi radius upstream or within a 15-mi distance downstream of Camp Carroll.

Potentially contaminated surface water originating from Camp Carroll would be captured by the cantonment area's peripheral open drainage ditch system. Storm water would then be directed to dry sumps located between Davis Highway and the entrances to Camp Carroll or into an open ditch that discharges to the Fort Richardson storm drainage system. Storm water that accumulates at the interior is discharged to the area between Stamborne Road and Davis Highway. Storm water accumulating in the southwestern cantonment area between Stamborne Road and Davis Highway, adjacent to Roosevelt Road, can also discharge to an open area to the west. Potential receptors of contaminated surface water include (1) fauna living in or having direct contact with contaminated waters and (2) humans having direct contact with or ingesting contaminated aquatic species. Because localized flooding along the drainage ditches is possible after significant precipitation, overflows from the ditches would also provide on-site personnel with potential contact with contaminated waters.

5.3 Soil

Contaminated soils have been observed in the AKANG storage yard area, the state of Alaska maintenance yard, the areas north of the state of Alaska maintenance yard, the parking lot behind the Camp Carroll Headquarters Building, and areas adjacent to Building S57112 (OMS 6). No occurrences have been reported of contaminated soils being transported by air. As a result, only those personnel and workers whose job responsibilities require their entrance into these areas are expected to have potential for direct contact with contaminated soils. The number of individuals who may experience such contact on a routine basis is 41.

5.4 Air

Because of Camp Carroll's restricted task, the impacts on air are considered negligible or nonexistent. Impacts on air are possible as a result of either wind blowing off contaminated soils or volatilization of contaminants from contaminated surface soils. Since the winds at Camp Carroll are normally light and variable, the potential for wind blowing off contaminants is minor.

If releases to air as a result of volatilization were to occur, the expected impacts would be very minimal and localized. Only those Camp Carroll personnel and workers whose job responsibilities place them in the immediate vicinity of the volatilizing material are expected to be impacted. The affected population, therefore, is limited to resident and nonresident military and nonmilitary personnel. The total number of individuals who are expected to be impacted by air releases on a routine basis is estimated to be approximately 41.

5.5 Other Receptors

No other receptors were identified for Camp Carroll.

6 Preliminary Assessment Findings and Conclusions

6.1 Summary of Preliminary Assessment Findings

The Camp Carroll Training Center is located at Fort Richardson Military Reservation approximately 10 mi west of Anchorage, Alaska. The primary ESOs associated with the property are (1) the AKANG storage area behind Building S57112 (OMS 6); (2) the state of Alaska maintenance facility and the soil/tar-type spill north of the state of Alaska maintenance facility; (3) the waste storage area adjacent to OMS 6; (4) the contaminated area from leaking USTs and the oil-water separator; and (5) soil staining in the parking area at the Camp Carroll Headquarters Building. This PA found no significant threats to the human and natural environment at Camp Carroll. The facility appears to be in excellent condition from an environmental standpoint, and current practices are satisfactory.

A review of both historical and current practices at the property indicates that Camp Carroll poses a very minimal risk to human health or the environment and represents no imminent or substantial threat. Releases of contaminants are known to have occurred in the areas of the oil-water separator and of the USTs, areas that are adjacent to Building S57112 (OMS 6). Because of the distance from the site to the nearest wells (more than 2 mi), potential contaminants in the aquifer at the site would probably not present an imminent danger. After an initial investigation, the contaminant sources were removed, and the site is currently under evaluation for further environmental remediation. Although migration of contaminants released at Camp Carroll can be defined for both surface water and groundwater, the current extent of such migration has yet to be determined.

6.2 Recommendations for Further Action

The primary objective of the PA is to identify and evaluate ESOs that would result in (1) immediate action, (2) site investigation, or (3) no further PA/IRP action. Upon completion of the remediation of the contamination resulting from the dysfunction of the oil-water separator and the USTs, the available information indicates that Camp Carroll presents a low potential risk to human health and the environment; however, on the basis of the information made available to Argonne, several areas deserve further consideration to ensure protection for the local community and the environment. Argonne recommends that the Alaska Department of Military Affairs should consider remediation of the soil contamination associated with all storage areas, as well as

reviewing the practices of other residents of the facility. Argonne also recommends that consideration be given to determining whether contamination from spills has extended beyond their surface expression.

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Appendix A:
Interview Information

Appendix A:
Interview Information

Individuals Interviewed

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Appendix B:

**Endangered, Threatened, and Candidate Species in Alaska:
U.S. Fish and Wildlife Service, June 1993**

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Appendix B:

Endangered, Threatened, and Candidate Species in Alaska:
U.S. Fish and Wildlife Service, June 1993^a

Species ^b	Common Name	Status ^c
<i>Listed Species</i>		
Birds		
<i>Diomedea albatrus</i>	Short-tailed albatross	E
<i>Numerius borealis</i>	Eskimo curlew	E
<i>Falco peregrinus anatum</i>	American peregrine falcon	T
<i>Falco peregrinus tundrius</i>	Arctic peregrine falcon	T
<i>Branta canadensis leucopareia</i>	Aleutian Canada goose	T
<i>Somateria fischeri</i>	Spectacled eider	T
Reptiles		
<i>Chelonia mydas</i> (including <i>agassizi</i>)	Green sea turtle	T
<i>Dermochelys coriacea</i>	Leatherback sea turtle	E
<i>Caretta caretta</i>	Loggerhead sea turtle	T
Plants		
<i>Polystichum aleuticum</i>	Aleutian shield fern	E
<i>Candidate Species</i>		
Category 1		
Bird		
<i>Polysticta stelleri</i>	Steller's eider ^d	C1
Category 2		
Mammals		
<i>Microtus oeconomus amakensis</i>	Amak tundra vole	C2
<i>Sorex alaskanus</i>	Glacier Bay water shrew	C2
<i>Microtus oeconomus elymocetes</i>	Montague tundra vole	C2
<i>Sorex hydrodromus</i>	Pribilof Islands shrew	C2
Birds		
<i>Numerius tahitiensis</i>	Bristle-thighed curlew	C2
<i>Histrionicus histrionicus</i>	Harlequin duck	C2
<i>Brachyramphus marmoratus</i>	Marbled murrelet (Alaska population)	C2
<i>Brachyramphus brevirostris</i>	Kittlitz's murrelet	C2
<i>Accipiter gentilis</i>	Northern goshawk	C2
<i>Rissa brevirostris</i>	Red-legged kittiwake	C2

Species ^b	Common Name	Status ^c
Category 2 (Cont.)		
Birds (Cont.)		
<i>Lagopus mutus yunakensis</i>	Yunaska rock ptarmigan	C2
<i>Lagopus mutus evermanni</i>	Evermann's rock ptarmigan	C2
<i>Contopus borealis</i>	Olive-sided flycatcher	C2
Amphibian		
<i>Rana pretiosa</i>	Spotted frog	C2
Plants		
<i>Artemisia aleutica</i>	NA ^e	C2
<i>Artemisia globularia</i> , var. <i>lutea</i>	NA ^e	C2
<i>Artemisia glomerata</i> , var. <i>subglabra</i>	NA ^e	C2
<i>Aster yukonensis</i>	NA ^e	C2
<i>Calamagrotis crassiglumis</i>	NA ^e	C2
<i>Carex lenticularis</i> , var. <i>aquilinum</i>	NA ^e	C2
<i>Cryptantha shackletteana</i>	NA ^e	C2
<i>Draba murrayi</i>	NA ^e	C2
<i>Draba yukonensis</i>	NA ^e	C2
<i>Eriogonum flavum</i> , var. <i>aquilinum</i>	NA ^e	C2
<i>Mertensia drummondii</i>	NA ^e	C2
<i>Oxytropis arctica</i> , var. <i>barnebyana</i>	NA ^e	C2
<i>Podistera yukonensis</i>	NA ^e	C2
<i>Primula tschuktschorum</i>	NA ^e	C2
<i>Rumex krausei</i>	NA ^e	C2
<i>Smelowskia pyriformis</i>	NA ^e	C2
<i>Taraxacum carneocoloratum</i>	NA ^e	C2

^a Region 7 Field Offices: Jan Cochrane, Endangered Species Specialist; Fish and Wildlife Service, Ecological Services; 605 W. 4th Ave., Room G-62; Anchorage, AK 99501 (telephone: 907-271-2888).

^b Definitions: endangered: a species that is in danger of extinction throughout all or a significant portion of its range; threatened: a species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range; category 1: a species is designated as a category 1 species when the U.S. Fish and Wildlife Service has on file sufficient data to warrant listing as threatened or endangered; and category 2: a species is designated as a category 2 species when the best available scientific and commercial information indicates that the species might qualify for protection under the Act, but *the U.S. Fish and Wildlife Service needs further status survey information, evaluation of threats, or taxonomic clarification* before the need for listing can be determined.

^c Status categories: E, endangered; T, threatened; C1, Category 1 candidate species; and C2, Category 2 candidate species.

^d Listing of Steller's eider is warranted but precluded because of higher listing priorities nationwide (FR 57:90 19852).

^e NA, Not available.

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