



Location:

Eielson Air Force Base is located in the Tanana River Valley within the Tanana and Tanacross Native language groups region, approximately 24 miles southeast of Fairbanks, 10 miles southeast of the city of North Pole, and immediately adjacent to the community of Moose Creek on the northern border of the base, and the Salcha area on the southern border.

Primary Contaminants:

- **Petroleum, Oils and Lubricants (POLs):** benzene, toluene, ethylbenzene, xylene (these four are also referred to BTEX, as a group), diesel fuels, gasoline
- **Volatile Organic Chemicals (VOCs):** benzene, trichloroethane (TCE), vinyl chloride, chlorinated solvents (acetophenone and chlorobenzene)
- **Semi-Volatile Organic Chemicals (SVOCs):** chlorinated solvents (1-methylphenol, 4-methylphenol and 2-methylnaphthalene)
- **Persistent Organic Pollutants (POPs):** pesticides (including chlordane and dieldrin), PCBs
- **Heavy Metals:** lead
- **Others:** chlorinated solvents (trans-1,2,-dichloroethylene, tetrachloroethene, and chloromethane)

Note: The categories used here are those used by the Environmental Protection Agency for Superfund sites. Other methods of categorizing do exist. See www.epa.gov/reg3hwmd/bfs/regional/analytical. Chemicals listed as "Others" were those not found on the EPA's list.

History:

Eielson Air Force Base is located in the Tanana River Valley within the Tanana and Tanacross Native language groups. The Alaska Native villages of Minto, Rampart and Manley Hot Springs are within 100 miles of Eielson, and all are downstream of the Chena or Tanana Rivers or their tributaries. Nenana and Healy Lake are within 50 miles of the base.

The base encompasses 19,700 acres, most of which is forest, wetlands, lakes, and ponds beyond the approximately 3,650 acres which have been improved or partially improved, and are used for the bulk of base activities. An additional two-acre facility called the Blair Lakes Target Range has also been included in the Eielson Air Force Base **Operable Unit One Superfund*** site. The Blair Lakes site is approximately 25 miles southwest of the main base, but is included in the cleanup activities because of its proximity to the base and the similarity of the contaminants.

* Words in **bold** signify terms used in the world of Superfund. For a comprehensive discussion of Superfund law and how it works, please see the accompanying document, *An Overview of Key Issues at Alaska Military Superfund Sites*.

Several thousand people frequent Eielson, which is one of the major employers in the Fairbanks area. According to the most recent figures, the base employs approximately 3,400 military personnel and an additional 500 civilians. The total residential population of the base is 5,132, and an additional 1,600 people live 10 miles away in North Pole. The total population of people living and working on the base is over 9,000 people. Related to the residential and work populations at the base and nearby, there is a child care center, three elementary schools and one junior-senior high school. "The area is active with ongoing base functions, including work, school, and recreational activities," according to the administrative record which notes that "significant wildlife frequents Eielson AFB, and the base supports a variety of recreational and hunting opportunities."¹

Originally constructed in 1944, Eielson began as a satellite installation of Fort Wainwright. Until designated as Eielson Air Force Base in 1948, the Army and the Air Force used it jointly. The mission of the base is "to train and equip personnel for close air support of ground troops in an arctic environment."² Over the years this has included a variety of industrial, maintenance, operational, and other waste-generating activities, including landfilling for waste disposal and an active aircraft runway.

Geography & Geology:

All of the Eielson AFB Records Of Decision contain descriptive geography locating the base in central Alaska, on the Richardson Highway, in the Fairbanks North Star Borough, approximately 10 miles southeast of the city of North Pole and 24 to 26 miles (depending on the report) southeast of the city of Fairbanks. The site is located in the Tanana River Valley, in the floodplain of the Tanana River.³ The **National Priorities List** narrative states: "Surface water within 3 miles downslope of hazardous substances at the base is used for fishing."⁴

The approximate population of the area according to the OU-1 ROD is 115,600, which includes the Fairbanks North Star Borough, Fairbanks, and the community of Moose Creek. It is important to point out, however, that this is a narrow and limited description of the geography. Geography has important implications relative to the reach and impact of the contamination from the site, particularly with regard to the issue of environmental justice and the impacts of this site on populations other than those described by the EPA's analysis.

Several small sloughs or creeks pass through the Base and discharge to the Tanana River. Moose Creek is the main receiving stream for small local drainages around the Base. Both French Creek, along the eastern edge of the Base, and Piledriver Slough, along the western side, discharge to Moose Creek just above its confluence with the Tanana River. Garrison Slough, which is a surface drainage, also discharges to Moose Creek. Prior to 1979, effluent from the Base sewage treatment plant was discharged to Garrison Slough.⁵

Groundwater is the only source of potable (drinking) water at Eielson AFB and the surrounding communities. An extensive regional aquifer system occurs within the unconsolidated alluvial/glaciofluvial (aquifer) deposits in the broad valley of the Tanana River. This aquifer is about 45 to 50 miles wide at Eielson AFB and is approximately 200 to 300 feet thick. The aquifer consists primarily of interbedded layers or lenses of unconsolidated sand and gravel. The water table at Eielson AFB lies only approximately 8-10 ft below the surface with seasonal fluctuations bringing it up to 1.5 ft during spring snow melts and rain.⁶

Drinking water at Eielson is supplied by three large-capacity wells, which extend to depths averaging 100 ft., presumably below the reach of current contamination, although as noted later, the groundwater down gradient has not been able to be measured. Only the upper 60 to 90 ft of the aquifer were characterized by the Superfund investigation. Seven additional wells on the base provide water for fire fighting and other emergency uses.

Forty-one private wells are located within a 3-mile radius of the base, downstream and down gradient, mostly in the community of Moose Creek, and in neighboring areas. The city of North Pole has both a small public

water supply system and private wells, but both North Pole and Moose Creek rely primarily on wells for their drinking water.

Eielson AFB contains 13 lakes totaling 313 acres, 54 ponds totaling 265 acres, and ten designated wetlands totaling about 252 acres. One of the lakes and six of the ponds are natural; the remaining 12 lakes and 48 ponds are old borrow pits or gravel pits.⁷

According to the **record of decision (ROD)** for Operable Unit 1B, although almost 70% of Eielson and virtually all of the Blair Lakes Target Range are wetlands, all **remediation** activities occurred in areas previously filled, and none, according to the ROD, had "adverse environmental impacts on wetlands". In addition to the wetlands, several surface water bodies, including lakes, ponds, creeks, and sloughs, are near the operable units. These include Hardfill Lake, Garrison Slough (which runs through the developed portion of the base and empties into Moose Creek), French Creek, Pile Driver Slough, and the Tanana River.⁸

Due to the shallowness of the water table, and to the seasonal variations in water level in both surface and groundwater, a high level of exchange between the two is probable in many areas, although the Eielson 1998 Five-Year Review states that "little is known about the interaction between the groundwater system and local ponds, lakes, and wetlands because of the lack of synchronous groundwater and surface-water elevation measurements."⁹ Still, the same document points out that different streams on the base are either influent (that is, lose water to the subsurface groundwater system) or effluent (gains water from the subsurface). Interaction between surface and groundwater facilitates the migration of contaminants that have entered the groundwater or surface water areas from spills, drainage, or percolating water through the surface and subsurface soils.

This exchange also creates a higher likelihood of contamination of sediments in surface waters, which in turn increases the availability of some persistent organic chemicals to fish and wildlife. Fish and wildlife that are attracted to wetland areas may be exposed to contaminants available in adjacent wetland areas.

Contamination Background:

The diversity of industrial, maintenance, operational, and other waste-generating activities at Eielson, including landfilling for waste disposal and an active aircraft runway, has produced a wide variety of pollution. The ROD for Operable Unit 1B (the ROD for interim selected remedial actions at the base) notes, "Industrial operations and related wastes were insignificant prior to 1950."¹⁰ From the period between 1950 and 1982, however, an estimated 25,000 to 40,000 gallons *per year* of industrial waste were generated.¹¹ This waste falls into three categories: waste oils, contaminated fuels and sludges, and spent solvents and cleansers. Many similar industrial activities are the primary activities at the base today, and many of the sites continue to be used as industrial areas.

Contamination at Eielson was first evaluated in 1982 under the auspices of the U.S. Air Force Installation Restoration Program, a four-phase project that carried out several initial or interim cleanup actions at sites throughout the base. Eielson was added to the National Priorities List (NPL) for Superfund cleanup in November of 1989. Though it was not until May 1991 that the U.S. Air Force, the EPA, and the Alaska Department of Environmental Conservation (ADEC) signed a **Federal Facility Agreement**, initiating the cleanup process. Eielson was divided into six operable units (OUs) for investigation under **CERCLA (the Comprehensive Environmental Response, Compensation, and Liability Act)**, which governs Superfund actions. A seventh, sitewide, operable unit was added after PCBs were discovered in Garrison Slough.

The first **five-year review** at Eielson was held in 1998 and is evaluated in this report. The next five-year review is scheduled for early fall 2003.

Sources of Contamination:

A total of 66 **source areas** were initially identified as sources of possible contamination, although as of 1998 34 had been eliminated from further investigation "because they did not appear to present a significant **risk to human health or the environment**".¹² The seven operable units at the base include the remaining source areas.

In addition to the source areas described above, 44 other "Areas of Concern (AOC)" have been identified by the Air Force, according to an Eielson Environmental Restoration Program report.¹³ An AOC is a potential or suspected area of contamination based largely on limited historical or circumstantial information. These sites mostly consist of abandoned drums. The Air Force estimates that there are thousands of drums in these areas, with hundreds found in surface waters such as ponds and lakes. According to this report, "No sampling or analysis data exists for the sites and the contents or conditions of the drums are largely unknown."¹⁴ Five of the sites have been closed (no further details are provided), and seven are reported as being "programmed for removal actions." Removal and disposal of the remaining drums is planned, and the site indicates that a future report will provide documentation for the disposition of the remaining 32 sites.¹⁵

Also mentioned in the report is a source area called the Chena River Annex, which was originally used as a control center for the Atomic Energy Detection System to monitor nuclear detonations. Low levels of fuel and PCBs have been found on this site in previous investigations, and the reports states that the "potential also exists for some contamination resulting from photochemical processing." Clean up at this site was supposed to have been completed in 1998, after which the site was to be demolished. We found no further mention of this site.¹⁶

Superfund Source Areas:

The major source areas at Operable Units 1 through 4 at Eielson are related to petroleum and fuel contamination. Contamination at OU5 is related to landfilling activities, and OU6 is separate because the geology is fractured bedrock in contrast to the sand and silt of the other sites. Contamination in the sitewide OU7 focuses on polychlorinated biphenyls (PCBs) found in the Garrison Slough. The operable units are briefly described below, then reviewed as a whole within the framework laid out by the 1998 Five-Year Review.

Operable Unit One

OU1 addresses the eight sites that have caused petroleum contamination through leaks and spills of fuels. They are: ST20E-7, E-8, and E-9 Complexes (Refueling Loop), Power Plant (ST48); Alert Hanger (ST49); Blair Lakes Vehicle Maintenance (SS50); Blair Lakes Ditch (SS51); Blair Lakes Diesel Spill (SS52); Blair Leaks Fuel Spill (SS53); Blair Lakes Drum Disposal Site (DP54). Most of the contamination is in subsurface soils and the shallow groundwater.

In order to minimize the spread of contamination from floating product at OU1 source areas, the Air Force recommended an Interim **Remedial Action** to remove the major source of contamination through recovery of petroleum product floating on the water table. A ROD implementing the interim action was signed in 1992 and a ROD specifying a final Remedial Action (RA) for the OU1 source areas was signed in 1994. The final RA included the upgrading and operation of **bioventing** systems at source areas ST20 and ST48 and continued operation of a **product recovery system** at SS50-52 (Blair Lakes). These systems are in full operation and a **monitoring** program is in place. Bioventing involves the injection of relatively small amounts of air into the ground to provide an oxygen rich environment for the bacteria that degrade POL contaminants.

Operable Unit Two

OU2 consisted of seven source areas that were combined because of commonalty in contamination, caused

mainly by leaks and spills of fuels. These areas are: the E-2 petroleum oil and lubricant storage area and Hardfill Lake (ST10); the E-2 Railroad JP-4 Spill Area (SS14); Building 3224 subsurface diesel fuel contamination (ST11); ST13 and DP26, located close to each other, have similar types of contaminants, and the individual releases to groundwater have created an overlapping groundwater contaminant plume; an oil boiler fuel saturated area (ST18); and the JP-4 Fuel Spill Area (ST19). Soils, subsurface soils, and groundwater were contaminated with petroleum products. Contaminant plumes on the top of the shallow groundwater table fluctuate seasonally. Remedial actions consisted of passive skimming to remove fuels floating on surface waters, bioventing/**soil vapor extraction**, monitoring, and **institutional controls**.

Operable Unit Three

OU3 includes the following source areas: Disposal Pit (DP)44, Waste Pond (WP)45/SS57, ST56, and SS61. The Disposal Pit is located near the Large Aircraft Maintenance Hangar and included a wastewater disposal leach field from the Battery Shop and the surrounding area between the runway, taxiway, and Flightline Avenue west of the North Street intersection. An additional Source Area (WP45) was designated for the photo laboratory and dry well at the Battery Shop. Source Area SS57 is the area surrounding the fire station, Building 1206. Engineer Hill Spill Site (ST56) is an active munitions storage and maintenance compound about 3 miles north-northeast of the main part of the base. SS61 is in the center of the developed portion of the base, just north of the water treatment plant pond on Garrison Slough, and is on the east and south sides of the Vehicle Maintenance Shop (Building 3213). Only the Battery Shop was deemed to pose an **unacceptable risk** to human health and the environment, and was remedied with soil vapor extraction, groundwater monitoring, and institutional controls. All other sites were designated **no further action**.

Operable Unit Four

OU4 includes the source areas DP25, ST27, WP33, SS35, SS36, SS37, SS39/SS63, ST58, and SS64. DP25, the E-6 Fuel Storage Tank Area, is located north of Quarry Road, adjacent to the E-11 Fuel Storage Tank Area, ST27. ST27, the E-11 Fuel Storage Tank Area, is a fence-enclosed complex of five fuel tanks on the south side of Quarry Road approximately 600 m southeast of Hardfill Lake. WP33, the effluent infiltration pond, is a 7.7 hectare unlined pond into which treated liquid effluent from the wastewater treatment plant is discharged.

SS35, the Asphalt Mixing and Drum Burial Area, is located in the central part of the base adjacent to Central Avenue, just south of the Water Treatment Plant. SS36, a drum storage site, is located in the central portion of the base, east of Industrial Drive and south of the base power plant. SS37, the Drum Storage/Asphalt Mixing Area, is located just east of Building 4333, just east of Flightline Avenue, between Quarry Road and Chena Street. Asphalt Lake (SS39) and the adjacent Asphalt Lake Spill Site (SS63) are located approximately 1.3 miles south of the Eielson AFB main gate. ST58, site of the old Quartermaster service station, is located on the northwest corner at the intersection of Division Street and Wabash Avenue. The service station covered approximately 400 sq. meters. SS64, the Transportation Maintenance Drum Storage Area, is located in the center of the developed portion of the base, just north of the Water Treatment Plant pond on Garrison Slough, on the west side of the Vehicle Maintenance Shop.

Only two sites received remediation. The Asphalt Mixing and Drum Burial Area (SS35) remedy was **capping** (placement of a soil cover over the source area) and monitoring, with removal of the contaminated drums if they were found to be leaching into groundwater. The Quartermaster service station (ST58) remedy included bioventing, monitoring and institutional controls.

In 1998, the ROD was amended for the Asphalt Mixing and Drum Burial Area and even the capping found unnecessary. "The maximum concentration found for pesticides did indicate a potential human health risk if this

area were developed for residential use in the future. However, these maximum concentrations were isolated and were not consistent over the area. In addition, the potential for residential development in this area is very low. Therefore, additional soil cover is not necessary for protectiveness; the current soil cover is protective of both human and ecological receptors.”¹⁷

Operable Unit Five

OU5 is primarily the landfill and waste areas. It includes source areas LF02, LF03, LF04, LF06, and Fire Training Area (FT)09. LF02 is an abandoned, approximately 6-acre landfill located about .5 miles northwest of Manchu Road and Gravel Haul Road on the banks of French Creek, a tributary of Moose Creek. LF03 is located east of the south end of the runway and north of the refueling loop. FT09, a former fire-training area, is located within the west-central part of LF03. LF04 is located approximately 3 miles east-northeast of the south end of the runway and covers an area of greater than 100,000 sq. meters. LF04 received general refuse, small quantities of waste oil spent solvents, and possibly small amounts of munitions and spent cartridges. LF06, the old landfill, is located near the central power plant just south of the power plant cooling pond on the eastern side of the main developed portion of Eielson AFB.

The **selected remedy** for the former landfill (LF02) and fire-training area (FT09) was capping, groundwater monitoring, and institutional controls.

OUs 3-5 were dealt with in a single record of decision. Of the 23 contaminated source sites, thirteen did “not pose an unacceptable risk to human health and the environment”¹⁸ according to EPA and received no further action. Groundwater monitoring at or close to the sites was initiated as part of the sitewide monitoring program. An additional five sites received “limited action”, which included institutional controls to “prevent exposure to contaminated groundwater”.¹⁹ Only five of the original 23 had any remedial action, and of those, two included capping.

Operable Unit Six

Operable Unit 6 is a single contaminated source area, also referred to as WP38, located in the southeastern area of the base. It includes approximately 200 acres of southwest-facing hillside near the Eielson AFB Ski Lodge. The ski hill is used primarily for recreational and military training purposes. Groundwater contamination was detected in 1986, when routine sampling revealed the presence of benzene in the water supply well in the basement of the ski lodge and then in a second well installed slightly uphill of the lodge. Subsequent sampling in 1988, 1989, and 1993 has confirmed the presence of petroleum-related contaminants in the groundwater near the ski lodge. In 1987, all three water supply wells were removed from service. According to the ROD, the potential contribution of the bedrock aquifer to groundwater in the vicinity, and the amount and direction of flow in the bedrock aquifer are difficult to determine.

The selected remedy included monitoring the groundwater, **natural attenuation**, institutional controls that restrict access to groundwater and signs warning of the contamination, and provision of an alternate water supply of potable water.

Operable Unit Seven

OU-7 addressed PCB contamination found in Garrison Slough. A shallow drainage channel which entered the slough from its west bank was determined to be the likely source of the PCBs, although no specific source was identified. The PCBs were found in the soil of the channel, and in both fish tissue and sediment as far as 1,000 feet downstream of the channel. The original source of the PCBs is believed to be past dumping or spills of transformer oils used at the base, but no records were discovered to confirm this. PCBs were found in fish in several surface

water bodies on the base, according to the Environmental Restoration web page,²⁰ yet only in Garrison Slough were the levels "significantly above background levels." Subsequent investigation also revealed that PCBs were found in fish tissue in Moose Creek due to an unknown source, but these are not mentioned in the 5-year review.²¹ There were no other references in the documents available for review for this report regarding the source of the background PCB contamination in fish. One possibility that can be inferred from the general description of the area is that over the years when transformer oils with PCBs were in widespread use at many military and industrial sites, a significant amount of PCB contamination entered the environment through spills and unregulated disposal.

The selected remedy included excavation of contaminated soils and sediments; on-site and off-site disposal or treatment of; and environmental monitoring of soils, sediments, surface water, fish, and groundwater. Institutional controls were put in place to prevent fishing in Garrison Slough until it is confirmed that levels in fish tissue are protective.

Discussion of the Five-Year Review

The major **chemicals of concern** throughout Eielson are POLs (petroleum, oils, and lubricants). They present a significant threat to groundwater in the area. POLs encompass all the major constituents of fuel and gasoline contaminants such as lead, benzene, volatile and semi-volatile organics, and solvents. Four of these, referred to with the acronym BTEX, are responsible for virtually all the contamination, both in the soil and in the groundwater, at Operable Unit 1, for example. BTEX stands for benzene, toluene, ethylbenzene, and xylenes, all of which are constituents of fuels and petroleum. Chlorinated solvents are a major source of contamination at Operable Unit 3, and lead is a significant contaminant at Operable Unit 4. All of these contaminants can remain in the groundwater for some time as a source of contamination to users exposed through drinking the water or breathing the vapors. Certain chemicals, such as pesticides and PCBs, are known as persistent organic pollutants (POPs). Persistent organic pollutants do not degrade for many years and accumulate in higher concentrations in animals and humans at the top of the food chain.

Several additional contaminants are present at various sites. Vinyl chloride was found in one soil sample, and several chlorinated solvents were also found in the groundwater. Chlordane and dieldrin, both pesticides, were found in what were characterized as residual amounts in some areas, but were attributed to historical spraying for insect control and were considered unrelated to the source areas under remediation. All of these chemicals were found in small concentrations where they were detected. They were determined to be present at levels too low to adversely affect human health and the environment, and therefore were determined not to require remediation.

The human health risk assessments land-use scenarios for both were based on ongoing industrial use and for future land-use scenarios of residential use, based on the assumptions of a small family farm scenario with adults and children. Assumptions of how much exposure will be received differ with different types of land use determinations. Residential exposures are higher than other uses. The purpose for doing the risk assessment in this way is to produce what is considered the most conservative, that is, protective, predictions possible.

The land use scenario is also very important in determining whether a *completed exposure pathway* exists. This means that even though a contaminant may exist in the environment, if the agencies determine that there is no way for humans to be exposed to that contaminant, then no exposure pathway exists. If, for example, a person lived next door to a garage that was storing extremely hazardous chemicals in well-sealed barrels, which were well-maintained and carefully monitored inside a concrete building, the assumption is that even though there is *potential* exposure, under the current conditions there is no *completed* exposure pathway between the contaminant and the person. Exposure only occurs if there is some means by which a person either breathes (inhalation), eats or swallows (ingestion), or has skin contact (dermal absorption) with the contaminant of concern, also called the COC.

The risk assessment also makes assumptions about how much exposure individuals will receive, how long that exposure lasted, and how concentrated the exposure was. In the case of all the risk assessments at Eielson, the standards regarding exposure duration to soil and sediments were adjusted to reflect the subarctic climate which assumes that individuals would only be exposed for the mean number of days without snow cover, using Fairbanks as the model (146 days). The maximum number of days is also assumed; in this case it was 180 days. For each contaminant, therefore, exposure was calculated based on 180 days/year for nine years at whatever the RME was. This is then translated into a risk prediction.²²

These elements are important to understanding the basis on which risk is assigned to contaminants at a Superfund site. At Eielson, although several chemicals were detected in either the soil or groundwater, not all are determined to pose equal risk. Many contaminants were determined to be present in concentrations so low that they were below the levels which trigger cleanup activities. At Eielson in many cases, the assumption was made that some chemicals were either at such low levels that they did not present a risk to human health or the environment, or that as they were detected in small amounts in only one or two samples they did not represent a significant enough source of contamination to justify the cost of a clean up.

If contaminant levels are below what CERCLA considers a risk to human health or the environment, action is not warranted from the EPA's perspective. Many of the contaminated areas within operable units have not been remediated because the agencies determine that leaving the contamination is an "acceptable risk." A more comprehensive discussion of risk assessment is presented in the accompanying document *An Overview of Key Issues at Alaska Military Superfund Sites*.

The 5-year review reports that at Operable Unit 2, as of February 1998, approximately 380 gallons of floating petroleum product had been recovered. OU2 was also a source of significant lead contamination that was initially slated to have groundwater extraction and treatment facilities installed in areas where groundwater lead levels were highest at source areas ST13/DP26, sites of diesel fuel spills and fuel tank sludge burials. After field studies to evaluate the feasibility of using pump and treat technologies to clean up the lead, however, the conclusion was that "the lead is apparently immobile and that remediation of the aquifer for lead contamination by pump and treat technology would require decades."¹⁴ As a result, the selected remedy was changed to what is called a "Technical Impracticability Waiver" and institutional controls and monitoring were substituted in ROD amendments made in 1998. Three other source areas, all sites of fuel spills or fuel saturation (ST11, ST18, and ST19), were also designated as needing no further remedial action based on a determination that they did not pose an unacceptable risk to human health or the environment.

At the same time, however, the 5-year review indicates that the groundwater will continue to be monitored as part of the Sitewide Monitoring Program (SWMP), and that institutional controls will be in effect to prevent exposure to contaminated groundwater and soil. It is precisely these types of actions, which seem extremely contradictory and raise concerns as to what the true status of the sites are. Unacceptable risk in this context should apparently not be mistaken for no risk, because the contamination is significant enough to warrant institutional controls to prevent access to the groundwater and the soil. Although not explicitly stated, it also seems apparent that natural attenuation is being relied upon at these sites and in the meantime, they are off-limits. These controls may not be adequate to protect wildlife visiting the area or humans who consume these animals. These areas may not be used as anything other than waste sites for decades to come.

Several source areas in Operable Units 3,4,5 are old landfills with a variety of contaminants. Remediation for these sites includes soil vapor extraction at both DP44 and ST58 to cleanup soil contamination which represents a leaching threat to the groundwater. Ongoing groundwater monitoring at the landfill site will also continue "as appropriate, to verify that the contaminant concentrations remain within acceptable screening levels." Also at the

landfill site, a soil cover will be used to address what is described as the "direct contact threat" to areas where disposal occurred prior to 1980. A soil cover is nothing more than a layer of soil and usually vegetation placed over the surface soil or top of a landfill to protect the contents from contact with water runoff, animals, and humans. The 5-year review, however, states:

The final cover will be constructed to: (1) provide long-term minimization of migration of liquids, (2) function with minimum maintenance, (3) promote drainage and minimize erosion, (4) accommodate settling and subsidence, and (5) have a permeability less than or equal to the natural subsoil present.²³

Monitoring of soil covers is essential, as the integrity of such covers is variable, particularly under severe weather conditions and animal activity. Finally, the use of institutional controls and groundwater monitoring are considered key aspects of the "remediation." Yet, none of these activities represent actual permanent remediation of the sites involved, other than the soil cleansing.

The lead contamination from Operable Unit 2, and at ST58, an old service station site, will be monitored in the groundwater to assure that it is not migrating. At ST58, the 5-year review reports, "regulatory requirements for lead contamination in groundwater would be waived within the established containment area."²⁴ The review continues, stating that ongoing "monitoring at SS35 of surface water, sediment, and aquatic organisms in Garrison Slough confirm that concentrations remain at levels that are protective of human health and the environment." As noted earlier, however, fish in both Garrison Slough and Moose Creek continue to show PCBs from unknown sources.²⁵ Decisions leave room for doubt regarding how protective the chosen remedies will be.

Conclusions:

Overall, the 1998 Five-Year Review found all remedies to be protective of human health and the environment. With the next Five-Year Review, due out in early fall 2003, the public has the opportunity to comment on the effectiveness of remedial actions.

Conversations with the EPA reveal the Agency considers Eielson mostly remediated.²⁶ It is the opinion of the authors that the absolute minimum has been done at Eielson. In entirely too many instances, no action was deemed necessary for contaminated source areas. Of those where action was taken, far too many included the minimum: capping, groundwater monitoring, natural attenuation, and institutional controls. If the majority of contamination was present in soils alone, these approaches may be adequate. However, the predominant contaminated media at Eielson is groundwater. As stated earlier, groundwater is the only source of potable water at Eielson and the surrounding communities. The water table at Eielson lies only approximately 8-10 ft below the surface with seasonal fluctuations bringing it up to 1.5 ft during spring snow melts and rain. The authors are concerned that cumulative effects to the groundwater have not been taken into account. Given the extent of groundwater contamination at Eielson and at the adjacent Fort Wainwright Army Base, both of which sit atop the Tanana alluvium, remedies at the air Force base ought to be much more protective.

A glossary of terms and laws, commonly found contaminants, and a comprehensive discussion of environmental justice issues can be found in the accompanying document, *Overview of Key Issues at Alaska Military Superfund Sites*.

Eielson Site Contacts

U.S. Environmental Protection Agency
Mary Jane Nearman
Phone: (800) 424-4372 or (206) 553-6642
E-mail: nearman.maryjane@epa.gov

U.S. Air Force
Mike Raabe
Phone: (907) 377-1164
E-mail: michael.raabe@eielson.af.mil

State of Alaska, Department of Environmental Conservation
Ann Farris
Phone: (907) 451-2156
E-mail: ann_farris@dec.state.ak.us

Limited documentation is available online at:
<http://www.eielson.af.mil/news/envr/main.htm> and

<http://www.state.ak.us/dec/dspar/csites/dod/rabs.htm>

Site where Eielson Superfund documents are located:

Elmer E. Rasmusen Library, Archives Section (Administrative Records)
Alaska & Polar Regions Department
University of Alaska Fairbanks
Fairbanks, Alaska 99775
(907) 474-6594

Footnotes:

- ¹ *Eielson Air Force Base, Record of Decision, OU-1*, U.S. EPA, September 1992.
- ² *Eielson Air Force Base, Record of Decision, OU-1B* [Interim Remedial Actions], U.S. EPA, September 1992.
- ³ Eielson Air Force Base, NPL Site Narrative, www.epa.gov/oerrpage/superfund/sites/npl/nar1237.htm
- ⁴ Eielson Air Force Base, NPL Site Narrative, www.epa.gov/oerrpage/superfund/sites/npl/nar1237.htm
- ⁵ *Eielson Air Force Base 5-Year Review*, September 1998
- ⁶ *Eielson Air Force Base, Record of Decision, OU-1B* [Interim Remedial Actions], U.S. EPA, September 1992.
- ⁷ *Eielson Air Force Base 5-Year Review*, September 1998
- ⁸ *Eielson Air Force Base, Record of Decision, OU-1B*
- ⁹ *Eielson Air Force Base 5-Year Review*, September 1998
- ¹⁰ *Eielson Air Force Base, Record of Decision, OU-1B* [Interim Remedial Actions], U.S. EPA, September 1992.
- ¹¹ Ibid
- ¹² *Eielson Air Force Base Final Community Relations Plan*, U.S. Air Force, April 2000.
- ¹³ <http://www.eielson.af.mil/news/envr/main.htm>
- ¹⁴ Ibid
- ¹⁵ Ibid

¹⁶ Ibid

¹⁷ *Eielson Air Force Base, Amendment to the Record of Decision, OU- 3, 4, 5*, U.S. EPA, September 1998

¹⁸ *Eielson Air Force Base, Record of Decision, OU- 3, 4, 5*, U.S. EPA, September 1995.

¹⁹ Ibid

²⁰ *Eielson Air Force Base Restoration Program* web page, <http://www.eielson.af.mil/new/envr/>

²¹ *Eielson Air Force Base 5-Year Review*, September 1998.

²² *Eielson Air Force Base, Record of Decision, OU-1*, U.S. EPA, September 1992

²³ *Eielson Air Force Base 5-Year Review*, September 1998.

²⁴ Ibid

²⁵ Ibid

²⁶ personal communication, November 2002, Mary Jane Nearman, Project Manager, EPA

Prepared by Karen Button for Alaska Community Action on Toxics, 505 West Northern Lights Blvd, #205, Anchorage, AK 99503, (907) 222-7714, www.akaction.net. Based on a previous report by Dr. Lin Kaatz Chary, Lydia Darby, Dr. Lorraine Eckstein, Sharon Rudolph, Susan C. Klein, Pamela K. Miller, Elizabeth Movius, Felicien Poncelet, Dr. Ron Scrudato, and Sir Darby Muldoon. Funded by the Environmental Protection Agency, through an environmental justice grant. March 2003.

