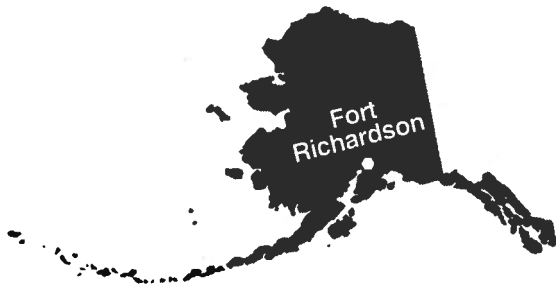
Fort Richardson Army Base



Environmental Justice at Alaska Military Superfund Sites
Fact Sheet

Location:

Fort Richardson is located within traditional Athabaskan lands and the Tanaina language region on the northern boundary of the Municipality of Anchorage on Cook Inlet.

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): trichloroethane, (TCE), tetrachloroethene, benzene, vinyl chloride, carbon tetrachloride, ethylbenzene
- **Semi-Volatile Organic Chemicals:** (SVOCs): polycyclic aromatic hydrocarbons (PAHs), such as fluoranthene, pyrene
- **Persistent Organic Pollutants** (POPs): pesticides (including DDT and DDD), PCBs
- **Heavy Metals**: lead
- **Munitions:** white phosphorus & other unexploded ordnance (UXO)
- **Others:** chlorinated solvents (trans-1,2,-dichloroethylene, 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. Chemicals listed as munitions are of particular concern and are discussed in more detail under the Eagle River Flats Source Area.

History:

Ft. Richardson is located within the traditional lands of the Athabaskan peoples and within the Tanaina Alaska Native language region.

In a 1939 executive order, President Franklin Roosevelt designated public lands in Southcentral Alaska for military use. By 1940, 168,000 acres were occupied by military personnel and Fort Richardson was established under the jurisdiction of the U.S. Army. Fort Richardson now occupies 56,000 acres of land adjacent the Municipality of Anchorage, Alaska's largest city.

Although Ft. Richardson is within an urban area, it borders areas that continue to be important to Alaska Native peoples. Elmendorf's location is relevant regarding concerns about contamination of fishing and hunting areas that may be used to provide some portion of the yearly diet of affected Alaska Native communities. Several Native Alaskan villages on both sides of the Cook Inlet, including Knik, Eklutna, Chickaloon, Alexander Creek, Tyonek, Pt. Possession, Kenai, Salamatof, and Ninilchik could potentially be affected by contamination migrating from the site by air or water. Given the diverse number and character of the activities at Fort Richardson, significant hazardous waste was generated on the base, including contaminants of concern to communities that rely on wide-ranging wildlife species for subsistence foods. In addition, the base includes lands through which salmon-bearing creeks feed urban residents, and host hatcheries important to local fisheries.

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

Fort Richardson was added to the U.S. **Environmental Protection Agency** (EPA) **National Priorities List** (NPL) in June 1994. On December 5,1994, the Army, Alaska Department of Environmental Conservation, and the EPA signed a **Federal Facility Agreement** that outlines the procedures and schedules required for a thorough investigation of suspected hazardous substances at Fort Richardson. Under the agreements, all **remedial response** (cleanup) activities will be conducted to protect public health and welfare and the environment, in accordance with **CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act)**, the National Contingency Plan (NCP), the Resource Conservation and Recovery Act (RCRA), and applicable state laws. CERCLA is the law that governs investigation, risk assessment, and cleanup activities for designated **Superfund** sites.

None of these agreements include tribal governments nor is there acknowledgement of the status of tribal governments as equal partners in the process. The agencies involved insist their invitations of local tribes to the **RAB (Resource Advisory Board)** meetings are adequate. A tribal liaison has never been assigned to the project. This omission and other issues related to environmental justice are discussed in more detail in the *Overview of Key Issues at Alaska Military Superfund Sites.*

Activities that caused contamination are described within each specific site further on in this document.

Geography & Geology:

Fort Richardson Army Base is bounded to the west by Elmendorf Air Force Base, along the southern and eastern boundaries by the Chugach Mountains and State Park, to the north by Knik Arm of Cook Inlet, and to the south by the Municipality of Anchorage. The Glenn Highway bisects the base.

Topographical features include flat to rolling wooded terrain. Upland areas near the adjacent Chugach Mountain Range rise to approximately 5,000 feet above mean sea level. Vegetation is made up of stands of mixed coniferous and deciduous forest of varying ages. Diversity in plant communities provides habitats for a large wildlife population including moose, bear, Dahl sheep, swans, and waterfowl.

Fort Richardson is believed to overlie a major portion of the recharge area for the confined aquifer that serves Anchorage. Groundwater recharge originates in the Chugach Mountains and probably involves the entire glacial outwash underlying the landfill and major portions of Fort Richardson south of the Elmendorf moraine (Cederstrom et al. 1964).

The primary source of raw water for the central water supply system that serves the city of Anchorage and Fort Richardson is a permanent 2.5 million-gallon underground reservoir located along Ship Creek approximately 7 miles upstream of the Fort Richardson Landfill. Logs from the Fort Richardson fish hatchery, located about two miles south of the landfill, show aquifers ranging in depth from 38 to 144 feet deep. These logs, coupled with the proximity of Ship Creek, suggest that a shallow aquifer is hydraulically connected to the creek.

Sources of Contamination:

Contaminated sites at Ft Richardson include landfills, disposal areas and spill sites, fire fighting training areas, storage tank areas, buildings, and the Eagle River Flats, for a total of nineteen source areas.

A Federal Facility Agreement between the State Department of Environmental Conservation, the Army, and the Environmental Protection Agency divided Fort Richardson into four **operable units** (OUs): OU-A, OU-B, OU-C, and OU-D. These include landfills, disposal areas and spill sites, fire fighting training areas, storage tank areas, buildings, and the Eagle River Flats, for a total of nineteen source (of contamination) areas. During clean-up activities in summer 2002, groundwater contamination in OU-D was sourced to a previously unknown location. With that discovery, OU-E was added.

Superfund Source Areas:

Operable Unit A

Operable Unit-A comprises three source areas. **Contaminants of concern** at this operable unit include heavy metals, petroleum, polychlorinated biphenyls (PCBs) and dioxin. Even though all these contaminants were present, the 1997 **record of decision (ROD)** determined the principal contamination was petroleum and would be the only contaminant addressed. Since CERCLA does not address petroleum, a **Two-Party Agreement** was developed between Alaska Department of Environmental Conservation and Fort Richardson for these sites.

Source Area One: The Roosevelt Road Transmitter Site Leachfield (Transmitter Site) is located north of the main Fort area near Otter Lake and includes an underground communications bunker used from World War II through the Korean War. In 1978, vandalism in this area resulted in a spill of dielectric fluids containing PCBs. The concrete foundation of the former transmitter annex building was then washed with diesel fuel in an effort to clean up the PCBs. In 1988, 150 tons of PCB-contaminated soil surrounding the concrete pad was excavated, and in 1992, at least 600 tons of PCB-contaminated soil was removed. It was determined the site required no further action, land use controls were put in place to prohibit unwarranted use of the site.

Source Area Two: The Ruff Road Fire Training Area (Fire Training Area) is located east of Bryant Airfield near the Glenn Highway. The site consists of an area used for fire-fighting exercises from the 1940s to 1980. These exercises involved applying fuels and other waste combustible liquids to an unlined earthen pit, igniting the fuels, and extinguishing the resulting fires with water. Between 1986 and 1992, three investigations of the site documented the presence of petroleum hydrocarbons; benzene, toluene, ethylbenzene, and total xylenes. Dioxins were found in surface and subsurface soils at the site. The highest levels of contamination were detected in the surface and near-surface soils in the immediate area of the fire training pit. This area later was regarded, and much of the original surface soil was spread and/or buried under three feet of fill or less. No further remediation was deemed necessary, and the risk assessment concluded the site presented no "unacceptable" risks of cancer or non-cancer hazards.

Source Area Three: The Building 986 Petroleum, Oil and Lubricant Laboratory Dry Well (Dry Well) is located at Building 986 near Loop Road and Warehouse Street. The well was used for the disposal of drain and sink water from the adjacent petroleum oil and lubricants laboratory. Numerous chemicals were used at the laboratory during quality testing of fuels used at Fort Richardson. The remedy for the POL lab was removal of a drywell (the source of contamination).

Exposure pathways for the **Human Health Risk Assessment** were evaluated in operable unit-A on the basis of recreational and industrial exposure. Two pathways were assessed: First, ingestion of soil and/or inhalation of vapors or dust; and, second, groundwater.

The **Ecological Risk Assessment** must address impacts and potential risks posed by to natural habitats, including plants and animals, in the absence of remedial action. For this risk assessment, the masked shrew, red fox, robin, and kestrel were the species selected to determine the impacts of contaminants on wildlife. Based on the risk analysis, the Army determined the potential for adverse effects negligible.

The two risk assessments concluded that only the petroleum derivatives found at the Fire Training Area were at levels high enough to pose a threat to human health or the environment. Therefore, no further remediation was necessary under Superfund requirements at any, but this site.

Operable Unit B

Operable Unit B consists of one source area: the Poleline Road Disposal Area (Poleline Road).

Poleline Road is located approximately one mile south of the Eagle River and 0.6 mile north of the Anchorage

Regional Landfill in a low-lying wooded area at Poleline Road and Barrs Boulevard. In 1990, Poleline Road was identified as having been used as a disposal area for chemicals, smoke bombs, and Japanese cluster bombs from 1950 to 1972. During this time, chemical agent identification sets and other military debris were burned and disposed of in trenches. The chemical sets were neutralized with a mixture of bleach or lime and chlorinated solvents before burial.

During soil excavation of the site, groundwater was discovered at 14 feet below the surface. Sampling indicated the presence of chlorinated solvents, including TCE, PCE; and 1,1,2,2- tetrachloroethane, in soil and groundwater within 20 feet of the surface. This soil was removed in 1997. Not all areas were sampled due to the potential presence of unexploded ordnance. However, geophysical surveys of these areas indicated that they contained lesser quantities of buried waste. Sampling of soil and groundwater surrounding the areas of concern did not detect any compounds or breakdown products associated with ordnance, but did detect relatively lower concentrations of chlorinated solvents.

The contaminants of concern at OU-B have contaminated the groundwater. The area with the greatest contamination at the site was referred to as the "*hot spot,*" which is approximately 150 feet by 300 feet. The results of the **Remedial Investigation** indicated the presence of chlorinated solvents in soil up to a maximum concentration of 2,030 mg/kg for 1,1,2,2-tetrachloroethene. These are extremely high levels.

Four separate groundwater zones were identified at Poleline Road, all of which show levels of contamination. Contaminants in all four zones suggest that they are interconnected. TCE concentrations in these zones exceeded the state and federal maximum.

Nevertheless, based on analytical results from surface and subsurface soil, the risk of cancer and non-cancer health effects from exposure to low concentrations of solvents in soil was determined to be negligible.

Federal and state regulations require protection and restoration of water resources. Contamination of OU-B groundwater if used as a drinking water source, presents an unacceptable risk to human health. But, groundwater at OU-B is not used, there are no known residents or wells down gradient of the site, and there are no current plans for commercial or residential development in the site area. Because the contaminated soils are 14 feet below ground surface, the likelihood of direct exposure to humans was considered unlikely and therefore not expected to pose a threat to human health, however they pose a potential for continuing contamination to groundwater.

In the end, it was determined that remedial action was appropriate to address actual or threatened releases of chlorinated solvents to the groundwater.

The remedial alternative chosen consists of **high-vacuum extraction** of the "hot spot" and **institutional controls** with long-term groundwater monitoring to assess the progress of **natural attenuation** and/or plume migration of the contaminants remaining after the extraction is completed. This alternative also includes enforcement of land use restrictions designed to prohibit extraction and use of the groundwater. Periodic **groundwater monitoring** will be conducted to track the progress of contaminant breakdown and provide an early indication of unforeseen environmental or human health risk.

The estimated time frame for cleanup goals to be achieved in the "hot spot" was seven to twelve years, but was greatly reduced due to use of a six-phase soil heating system. As of summer 2002, the Army reported soil contaminant levels in the "hot spot" areas were reduced by about 97 percent, and an approximate 70 percent decrease of contaminant levels in groundwater.[1] Unfortunately, even with the great success, the Army chose not to use the system for other contaminated soils due to cost. This is indicative of many of the chosen remedies where short-term costs override long-term protection.

The estimate for the remainder of the plume to remediate and for monitoring to be performed is 150 years, although the cost estimate includes only thirty years of annual operation costs. The practice of transferring contamination from one medium – the soil and/or groundwater – to another, the air, is not an environmentally positive approach. It simply transfers the risk from one pathway to another. It is important that monitoring and surveillance of the process be done carefully to assure that the air released to the atmosphere does not further contribute to the global transport of toxics.

The question of using institutional controls as a remediation alternative is a concern that EPA itself has voiced concerns about. In comments to the Directorate of Public Works at the U.S. Army Alaska Headquarters in

Anchorage on the OU-B Preliminary Remediation Design Plan, EPA Region 10 states,

> While future land use at the site may remain under DOD control, the future of many DOD installations is unclear in light of potential future BRAC legislation and the uncertain time frame for funding of such programs. The risk assessment section does adequately compare its findings to conservative residential standards; however, given the persistence and mobility of TCE, PCE, and 1,1,2,2-tetrachloroethene, the potential to impact ground and surface water resources for some time in the future should not be minimized.
>
> There is no reason to believe that people will stop inhabiting the Anchorage area. It is therefore appropriate to question the long-time reliance on institutional controls.

However, long-term monitoring is the current remedial action, being conducted on the deep aquifer to ensure that contamination in the groundwater is decreasing through natural attenuation.

Operable Unit C

Operable Unit-C comprises two source areas: the Eagle River Flats an ordnance impact area, and the former Open Burning/Open Detonation (OB/OD) Pad.

Source Area One: Eagle River Flats is a 2,160-acre estuarine salt marsh at the mouth of the Eagle River. Eagle River, which flows through the fort's land before it empties into Knik Arm, is used for recreational rafting and fishing. It supports king, silver, red, pink, and chum salmon; dolly varden; arctic char; rainbow trout; grayling; and whitefish, and maintains spawning runs of Chinook, Coho, and pink salmon. Stickleback inhabits salt marshes along the Knik Arm and is common within the shallow ponds and some impact craters within the Flats. The American peregrine falcon, a federally designated endangered species, and the federally designated threatened Arctic peregrine falcon, migrate through the area. The Flats are surrounded by forested uplands on the west, south, and east sides. Two creeks, the Clunie and Otter, drain into the Flats. Although the Flats are an active impact area, the area remains a productive wetland, serving as an important staging ground for migrating waterfowl during the spring and fall migrations. It also supports local populations of fish, birds, mammals, and macro invertebrates, and a series of ponds distributed throughout the Flats provides excellent habitat for dabbling ducks and other waterfowl.

Eagle River Flats is the only impact area for heavy artillery and mortars on Fort Richardson, and have been used for military training since 1949. This has created thousands of craters in the wetlands and associated mud Flats, and left an estimated 10,000 unexploded mortar and artillery shells buried in the shallow subsurface. Four types of munitions have been fired into the Flats: high explosives, white phosphorus smokes, illumination flares, and hexachloroethane-zinc mixture. In 1980, Army biologists noticed an unusually high number of waterfowl carcasses, including several dead swans, in the marshes of the Eagle River Flats. Subsequently, the Army, U.S. Fish and Wildlife Service, and Alaska Department of Fish and Game discovered abnormally high numbers of dead waterfowl. Ground searches conducted in September 1983 found 368 dead waterfowl, including about 35 fresh carcasses. In August and September 1984, about 175 carcasses were discovered. At that time, the Army estimated the number of waterfowl deaths to be between 1,500 and 2,000 per year. A 1988 series of aerial and ground surveys documented more than 900 waterfowl carcasses and feather piles in one area of the Flats. It was clear that there was a significant problem.

Field and laboratory studies conducted in 1990 provided evidence that white phosphorus was the likely cause of the mortality, although sediment and surface water samples collected from the Flats in August and October of 1989 and in 1991 also revealed elevated levels of heavy metals, copper, cadmium, nickel, zinc, and mercury in wetland surface waters. In 1990, the Army temporarily banned the firing of smokes containing white phosphorus into the Flats, but did not discontinue use of other ordnance. The high death rate, for ducks in particular, continued even after the ban was instituted. Eventually it was discovered that once white phosphorus submerged in the water and sediment, it remains in the environment and continues to be available to ducks and other wildlife. In January 1992, the Army permanently banned the firing of smokes containing white phosphorus into the Flats,

and into any areas nationwide that could have an impact on wetlands. In addition, a minimum of 6 inches of ice must cover the Flats before it can be used for firing.

Currently, there are no plans to resume warm-weather firing onto the Flats, however the Army has left open the possibility that future changes to the mission of Fort Richardson could necessitate the use of the training area during the summer months. There is no question that this would result in a significantly negative impact on the wetlands, and on the wildlife for which it provides habitat.

Although hundreds of pages have been dedicated to analyzing the problems and assessing solutions to remediating the contamination of the Eagle River Flats, the Army clearly states that white phosphorus is the only contaminant of interest, and is the only contaminant that will be addressed in the record of decision. Elevated levels of heavy metals, copper, cadmium, nickel, zinc, and mercury had also been described as contaminants in surface waters in the wetlands in the initial listing narrative for Operable Unit-C, yet there is no subsequent mention of these contaminants in later data reports. The human health risk and ecological risk assessments focus exclusively on the impacts of white phosphorus to the exclusion of any risks from other contaminants, including the risks of unexploded ordnances at the site. It must be understood that the risk assessments, remedial alternatives, and all cleanup criteria, thus directed narrowly at only one contaminant, are not reliable assessments of the actual situation at the site.

Secondary receptors include predators and scavengers such as the bald eagle, herring gull, raven, wolf, coyote, and fox. Studies of activities and potential risk related to scavengers and predators indicated a potential for indirect impacts from white phosphorus exposure through consumption of dead and moribund white phosphorus-contaminated waterfowl.

The chronic effects of white phosphorus in wildlife and waterfowl are not easily detected. Unlike significant acute exposure that results in death in humans, wildlife, and waterfowl; repeated chronic exposures are far more difficult to measure. Because white phosphorus has a short half-life (which means it leaves the body within a few days after exposure), it does not bioaccumulate. Behavioral changes or slow die-offs one at a time away from the site would not be noticed. The resulting hypothesis in the risk assessment is that if waterfowl survive their ingestion of white phosphorus, the levels in their bodies are low enough to preclude a significant risk to predators, including humans, who may later eat the exposed fowl. Also absent was any discussion of the potential impacts of exposure on small herbivores and omnivores could be exposed through ingestion of the same vegetation as the waterfowl, as well as through ingestion of scavenged prey. And, no data were presented discussing the dosage that would be required for an immediately fatal acute dose versus short-term chronic doses, the impacts of which may be less appreciable. These questions are important for understanding the implications for animals that may be part of a subsistence diet for humans and whose foraging range may include the Flats.

The remediation alternative chosen for this site is described as "Pumping with Capping and Filling." Wetland ponds where there is white phosphorus "hot spots" will be temporarily drained to allow the pond sediments to dry and allow white phosphorus to evaporate and mix with the atmosphere. Ponds are drained by pumping after flooding cycles and/or rain. After five years of drying periods and verification sampling, capping and filling will be performed in areas where white phosphorus remains.

This pumping technology was tested during the summer of 1997. Baseline and verification samplings showed an 80 percent decline in white phosphorus concentrations in the top 3.5 inches of sediments. Summer 2003 is the final of the five year pumping plan, after which those pond systems where white phosphorus exposure remains a concern would be capped and filled. A composite material would be applied to areas of the pond systems that do not dry and still contain white phosphorus. The cap-and-fill material is a manufactured gravel and bentonite mixture. This material expands in water, sealing spaces in gravel and creating a barrier to permeability. It will be applied only to small, deep portions of the pond bottoms. Therefore, despite its swelling characteristics, it is not expected to change feeding habitat or overall pond depths significantly. This material also supports vegetation growth. It provides a barrier between the dabbling waterfowl and the sediment contaminated with white phosphorus. Following application, restoration of the pond systems would occur naturally through precipitation and tidal flooding. Bird mortality studies will continue annually until 2008 and every 5 years thereafter until 2018.

Although this remediation alternative appears to be the best of the proposals, many aspects of it raise concerns that have not been adequately addressed by the Army in its response. While unexploded ordnance is a

major environmental hazard in the flats, neither the human health risks nor the potential risks to wildlife and waterfowl are addressed in either the risk assessment or the remediation proposals. No information is provided about the contents and toxicological makeup of these weapons used at the Flats. Are they susceptible to leaching? How does weather affect them, including freeze/thaw cycles and snow pack and melt activity? What are the ecological impacts (beyond the obvious) on the wetlands and river, if accidental detonation of unexploded ordinance occurred with regard to release of chemicals into the ecosystem? Coupled with the level of damage and alteration of the Eagle River Flats wetlands caused by past and present detonation and burning of munitions within and around the salt marsh and riparian habitat, it is clear that this is an issue that requires further consideration. The Eagle River riparian zone and delta are ecologically significant and sensitive areas that should not be subjected to further abuse, and the failure to address these questions is extremely problematic.

Not only white phosphorus, but unexploded ordnance and spent munitions threaten continuing and long-term damage to the environment, wildlife, human health and safety, regardless of the Army's unwillingness to acknowledge them or address them as risk factors. Hydrological and ecological restoration of the Eagle River wetlands (which also requires intense focus) was not addressed in the ecological or human health risk assessments; neither were the plans to resume explosives testing in the Flats. These activities will undeniably result in further environmental damage as well as represent a hazard to human health and safety. But these activities, too, were not addressed in favor of the narrow focus on white phosphorus. While the Army's assertion has some merit that the methods in the currently pursued remediation alternative are the least disruptive to the hydrology and ecology of the ecosystem, this alternative does not respond adequately to the larger questions posed here.

Instead of responding to these questions, the top military command at U.S. Army Alaska at Fort Richardson has repeatedly refused to address the environmental impacts of the military uses of the Eagle River Flats Impact Area. The Army has attempted to justify its lack of compliance under federal regulations and policy on the basis that its use of the Flats as an artillery range fulfills the Army's national security training mission, and is therefore neither related nor relevant to the remedial action for white phosphorus contamination. This assertion is disingenuous at best, and an affront to the efforts of the community to protect the Eagle River ecology. Virtually all activities at all military installations in Alaska and throughout the lower 48 states fulfill the military's mission and obligation to defend national security. The reality is that the failure to stop munitions and explosives testing in the Eagle River Flats will inevitably result in the failure to prevent additional damage and disruption of the hydrology and ecology of the Eagle River wetlands, and the result will be the need for yet further environmental restoration in years to come. The position taken by the command at Fort Richardson is particularly difficult to understand in light of the recent reiteration in June 2000, of the "Environmental Security Vision Statement" in the report on *Environment, Safety and Occupational Health in the Department of Defense*:

> To have fully incorporated environmental, health and safety values into the culture of the Department of Defense. These core values are recognized by the uniformed and civilian customers throughout the Department of Defense and its external stakeholders not only as key elements of national security policy, but as a necessary underpinning of sound business practices that allow the Department to maximize its financial and human resource potential. They are vital parts of all operational and business decisions whereby the safety and health of our people and protection of weapons systems, facilities, and the environment are integrated into all worldwide national defense activities.[2]

The position of the Fort Richardson command on this issue highlights the contradiction between the two directions to which the U.S. Army has committed itself, apparently with the acquiescence of the EPA, and involving millions of taxpayer dollars. On the one hand, the Army has devoted a tremendous amount of time and resources to cleaning the Eagle River Flats of white phosphorus in order to restore the habitat of dabbling waterfowl. On the other hand, the Army has stated its intention to continue using the Flats as an active heavy artillery range, which will inevitably result in the ongoing contribution of additional disruption and contaminants into the wetlands and estuarine ecology, including unexploded ordnance. The objectives of the Superfund cleanup process, stated repeatedly throughout all site documents, is to protect human health and the environment. It is impossible to understand how the continued and intentional contamination of the Eagle River Flats with both unexploded ordnance and live ammunition is consistent with these objectives.

As a result of the Army's failure to adequately address cleanup at the Flats, Alaska Community Action on Toxics, Military Toxics Project, Cook Inlet Keeper, Chickaloon Village Traditional Council, and two individual members of the Chickaloon Tribe filed a Notice of Intent to Sue on June 15, 2001.

Both defendants (the Army) and plaintiffs (those groups listed above) entered into negotiations that September in an attempt to reach an out-of-court settlement. The plaintiffs wanted the Army to comply with the federal Clean Water Act and to cleanup unexploded ordnance (UXO) as required under CERCLA. The Army's past and present training exercises at Eagle River Flats have resulted in the release of cancer-causing chemicals (such as RDX, 2,4-DNT and heavy metals).

Negotiations proceeded in good faith until April 2002; when the Army unexpectedly terminated discussion. They then requested of the Alaska State Legislature an exemption from state law regulating wastewater discharge. Arguing that compliance with environmental laws interfered with their ability to maintain a state of "military preparedness," the legislature, unfortunately, readily agreed. This tactic has been used by the Department of Defense for years, pitting the health of communities and the environment against national security. (For a more detailed discussion, see the accompanying document *Overview of Key Issues at Alaska Military Superfund Sites.*)

Despite state law, however, the Army must still comply with federal law. Plaintiffs continue to negotiate with the Army to determine whether an out-of-court settlement is possible or if further legal action is necessary.

Only because of these legal proceedings was it learned that Army biologists had sighted belugas on numerous occasions in the 1990s.[3] The whales were sighted as far as two kilometers up river. The Army did not bring this information forward during the CERCLA environmental risk assessment.*

The Army's failure to provide this information calls into question the legitimacy of the CERCLA ecological risk assessment. They Army may also be in serious violation of CERCLA for failing to provide accurate and complete information during the risk assessment process. Further, the Army's deliberate omission of critical information illustrates exactly why the public does not always trust what they're told by the military. In this instance, the Army has fostered additional public mistrust. Had local Tribes been included as equals during the CERCLA process, it is likely this information would have surfaced from their historical and traditional knowledge.

Source Area Two: The Open Burn/Open Detonation (OB/OD) Pad is also referred to as Demolition Area One or Demo 1. It is an 8.5-acre clearing with a 4-acre gravel pad constructed along the east side of Eagle River Flats. The pad contains remains of destroyed surplus and outdated munitions, along with assorted objects such as junked vehicles and rocket motor casings. The OB/OD Pad has restricted public access, which is controlled and monitored by the Range Control at Fort Richardson.

The Pad was used for burning and detonating explosives and other waste materials from at least 1956 until November 1988, at which time OB/OD activities ceased. Records and literature that specifically address the OB/OD Pad is limited, especially information about the types and quantities of wastes burned and disposed. The quantity of material disposed of at the site since its initial use in the 1950s is not known. OB/OD activities conducted in the 1980s were limited to a 2-acre area in the western portion of the pad. Occasionally, explosive materials from non-military sources were detonated on the pad. Many of the materials destroyed at the pad were originally reactive, ignitable, and toxic.

The OB/OD Pad was engineered in glacial till composed of sandy gravel and gravelly sand. The pad slopes toward the southwest, from the surrounding upland forest to the edge of Eagle River Flats. On its southern

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* In fact, the Army declined to bring this information forward even when the National Marine Fisheries Service (NMFS) was researching Cook Inlet belugas and reasons for their declining numbers. Beluga feeding and migration habits were studied, as well as tissue from the animals to determine if contaminants played a role. The Army's failure to provide critical information about the presence of belugas at Eagle River Flats is an egregious act of omission. NMFS's study of the causes of the beluga decline, which cites over-harvest as primary cause, is incomplete without this information. Belugas are known to be very habitual in their feeding behaviors, visiting the same sites year after year. The Army documents state the last beluga sighting was in the early 1990s. The question remains whether the cumulative effects of military bombing, associated contamination, and habitat alteration have so adversely affected the beluga population that they cannot use the Eagle River Flats.

side, OB/OD Pad contacts the wetlands of Eagle River Flats. The contact appears to consist of surface material pushed from the pad a short distance onto the wetlands. This edge now forms a bluff rising approximately 10 feet from the marsh.

Disposal through burning was performed either on the ground surface or in an excavated pit. Materials that were destroyed during OB/OD activities included fuses, high explosive (HE) projectiles, smoke pots, mortar rounds, star clusters, flares, mines, rocket motors, shape charges, detonation cord, dynamite, and some flammable solids. Existing records indicate that no liquids were disposed there. During the 1960s, smaller pieces of ordnance were ignited on the ground surface by using diesel fuel. Occasionally pits were excavated and small-arms ammunitions were disposed of by covering with other material soaked in a small volume of diesel fuel and igniting. The ordnance disposal by detonation spread shrapnel and explosives over adjacent areas on the pad surface.

The 1996 Remedial Investigation revealed a layer of gravel, generally 6 to 13 feet thick, overlies poorly graded sand throughout the depth of the wells. The coarse-grained material suggests that precipitation infiltrates freely through the pad surface to the groundwater table. Groundwater elevations range from 19 to 36 feet below the ground surface. It is believed that the groundwater movement patterns are strongly influenced by both the tides and by Eagle River. A 1991 study conducted at the Eagle River Flats analyzed 128 sediment samples collected along transects extending from the edge of OB/OD Pad into Eagle River Flats. Elevated concentrations (greater than 1 part per million) of 2,4-dinitrotoluene (2,4-DNT) were recorded in over half the samples, indicating that some migration of OB/OD Pad contaminants into the Flats had occurred in the past.

After extensive discussion in the record of decision regarding various agencies' responsibilities for the OB/OD pad, several conclusions were reached regarding how this source area will be handled. For example, neither the human health risk assessment nor the ecological risk assessments were deemed to have demonstrated sufficient risk to warrant remediation of the site.

Adequacy of the Army's analysis and the soundness of their conclusions are called into question given several factors. For example, the Army did not include some chemicals in their risk analyses (such as 2-amino-4,6-DNT and 4-amino-2,6-DNT) because the EPA 1996 Integrated Risk Information System (IRIS) database has no information for them, even though the Agency for Toxic Substances and Disease Registry (ATSDR) Public Health Statement states:

> Heart disease has been seen in workers exposed to 2,4- or 2,6-DNT. 2,4- and 2,6-DNT may also affect the nervous system and the blood of exposed workers.
>
> Exposure to high levels of these compounds in animals regularly show lowered numbers of sperm and reduced fertility. Studies of animals have also shown that a reduction in the numbers of red blood cells, nervous system disorders, and liver and kidney damage can occur. Both 2,4- and 2,6-DNT can cause liver cancer in laboratory rats, and may produce the same effect in humans. The U.S. Environmental Protection Agency has determined that the mixture of 2,4- and 2,6-DNT is a probable human carcinogen.[5]

Despite this, on the basis of the risk investigation results at the OB/OD Pad and evaluation of data collected during previous studies at this site, the Army selected, and the EPA approved, the no further action alternative for the hazardous chemicals at the OB/OD Pad, including the UXO. This means that EPA also approved an open-ended delay in the closure of the site, which is required by RCRA (Resource Conservation and Recovery Act)[4] under the Federal Facilities Agreement. Because a permanent remediation is not being effected, 5-year-reviews of the site will still be required under the Comprehensive Environmental Response, Compensation, and Liability (CERCLA). The Army must evaluate whether acceptable delay of closure by the EPA is still viable, which is the case unless any of the following has occurred.

The findings of the Army's evaluation must be submitted to EPA for review and approval. If either the EPA or the Army believes that delay of closure is no longer viable, the OB/OD Pad will be closed under RCRA closure requirements in effect at that time. Then, the Army will revise and resubmit the interim closure plan for the OB/OD Pad to the EPA for review and approval. The Army can decide to close the site at any earlier time.

The assertion in the *Record of Decision* that sampling during the RI "found that all contaminants identified at OB/OD Pad were at levels low enough that cleanup is not required" is certainly questionable. Bases such as the Massachusetts Military Reserve Camp Edwards, the Army Grafenwohr Training Area in Germany, and Fallon NAS have all demonstrated widespread contamination from munitions. Large quantities of heavy metals such as lead, copper, zinc, cadmium, as well as arsenic were deposited within and around the weapons ranges. At the Grafenwohr Training Area, surface soils contaminated with heavy metals had to be classified as hazardous waste (measured through toxic characterization leaching procedures). The vegetation was contaminated with heavy metals.[5]

At other sites, toxic components of the explosives/propellants contaminate ground and surface waters with such chemicals as RDX, nitrobenzene, nitrotoluene, and trinitrobenzene. It is widely known that detonation and burning may result in the formation of persistent and toxic chemicals such as dioxins and furans. None of the documents in the Administrative Record for OU-C were persuasive that an adequate sampling program has been undertaken which identifies the nature and extent of contamination and exposure pathways, and until this is done, a no action conclusion is unacceptable.

Operable Unit D

OU-D is comprised of the remainder of all other sites on the fort. It originally consisted of 12 sites. Three of the sites are petroleum-related and as such are being addressed under a separate agreement between the U.S. Army and the Alaska Department of Environmental Conservation. The remainder of the sites was addressed in a September 2000 ROD, in which "no further action" was declared necessary. However, during summer 2002 field work, TCE and PCB contamination was discovered. The source of contamination was new, so an additional operable unit – OU-E – was added.

Operable Unit E

OU-E, a former armored vehicle storage area and antenna farm, is the source of PCB contamination. Transformers were drained into a parking lot and the PCBs covered with dirt. Sampling was conducted, but the results have not yet been made public. However, because the source is a new one and the amount of contamination significant enough, a new ROD will be developed for this site. A Remedial Investigation/Feasibility Study was begun for OU-E in the fall 2000. The Remedial Investigation work for OU-E took place during summer of 2002. Data from these investigations was not available at the time of this report. The draft ROD ought to be available to the public summer 2003.

Conclusions:

The Army, although mandated by the Clinton Administration and through their own policy documents, has never included any Alaska Native Tribes as equal partners in investigations, decision-making, risk assessments, or remedial actions. Unfortunately, this has been the standard at Alaska military Superfund sites.

Ft. Richardson has been particularly obstinate in taking full responsibility for the environmental degradation of Alaska's lands at the fort. With the upcoming Five Year Review, due in late summer of 2003, the public has the opportunity to push for changes. We are particularly concerned about the implications of ongoing contamination of Eagle River Flats, the Army's lack of disclosure about the presence of belugas, and the lack of inclusion of local Tribes, especially those whose traditional diets include fish and wildlife from these areas. That Tribes were not included in any CERCLA decision-making is a concern throughout most military Superfund sites (Adak being the one exception). Fro a comprehensive discussion on environmental justice issues, see the accompanying report *An Overview of Key Issues at Alaska Military Superfund Sites.*

As stated earlier, the Eagle River riparian zone and delta are ecologically significant and sensitive areas that should not be subjected to further abuse. Unexploded ordnance presents a major environmental hazard in the Flats, whether or not the Army acknowledges such.

A primary source of raw water for the city of Anchorage and Fort Richardson is a permanent 2.5 million-gallon underground reservoir located along Ship Creek approximately 7 miles upstream of the Fort Richardson Landfill. Further downstream, 90 percent of the shallow aquifer flowing through Elmendorf flows through sites that

have been contaminated. At the mouth of Ship Creek, Alaska residents and visitors fish throughout the summer months for salmon they then consume. The Army ought to participate in more holistic approaches to ensure these important waterways are contaminant-free.

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

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Limited information is available online at:
http://www.state.ak.us/dec/dspar/csites/dod/rabs.htm

Sites where Fort Richardson Superfund documents are located:
Fort Richardson Post Library
Building 636, B Street
Fort Richardson, AK 99503
(907) 384-1648

Alaska Resource Library and Information Services (ARLIS)
3150 C Street
Anchorage, AK 99503
(907) 272-7547

University of Alaska Anchorage
Consortium Library (Reserve Desk)
3211 Providence Drive
Anchorage, AK 99508
(907) 786-1871

Footnotes:

[1]Environmental Restoration News, U.S. Army, Fort Richardson, June 2002.

[2] "Environmental Security Vision Statement", *Environment, Safety and Occupational Health in the Department of Defense,* June 2000.

[3]APVR-DE-PSE, Memorandum for Record: Beluga Whale Sightings in Eagle River Flats, December 1991, Bill Gossweiler, Fort Richardson Wildlife Biologist.

[4] RCRA is the Resource Conservation and Recovery Act of 1976, which is the legislation governing hazardous waste.

[5] Pamela Miller, on behalf of Alaska Community Action on Toxics: Comments submitted to the U.S. Army on the "Proposed Plan" for remediation of OU-3 and the Record of Decision, Fort Richardson, Anchorage, Alaska, 1998.

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