# Adak Naval Air Station

Environmental Justice at Alaska Military Superfund Sites
Fact Sheet


## Location:

Adak Naval Air Station is located within the traditional lands of Aleut peoples on Adak Island in the Aleutian Chain. The island, near the western end of the Chain, is within the Alaska Maritime National Wildlife Refuge.

## 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): fluoranthene, pyrene
- **Persistent Organic Pollutants** (POPs): pesticides (including dieldrin, DDT and DDD), PCBs
- **Heavy Metals**: lead
- **Others:** chlorinated solvents (trans-1,2,-dichloroethylene, and chloromethane)
- **Munitions:** unexploded ordnance (UXO), chemical warfare agents (mustard gas, lewisite)

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

## History:

The Aleutian Islands, including Adak are traditional lands of the Unangan ("the original people") or Aleut (a name introduced by Russians at early contact). Russians first visited the Aleutian Islands in the early 1740s and were trading with the Aleuts by the 1750s. As recently as 1827, Adak was a busy trading settlement with a population of 193 Aleuts. By 1830, Russian settlers had occupied Adak and relocated the Aleuts to Russian settlements in Kodiak, the Pribilof Islands, and Sitka.[1] Adak Island was designated part of the Aleutian Islands National Wildlife Refuge by Executive Order in 1913. Withdrawn lands were later included in the Alaska Maritime National Wildlife Refuge by the Alaska National Interest Lands Conservation Act on December 2, 1980.

The island was used seasonally for hunting and fishing, but uninhabited in the early 1940s when Adak became a key operations and supply location for United States military forces after the Japanese occupation of Kiska and Attu Islands during World War II. The World War II (WWII) military forces at Adak (both on island and

in support ships) numbered approximately 100,000 troops.[2] During this time the military housed chemical warfare agents and nuclear submarines amongst their arsenal at Adak.[3] In 1959 77,000 acres on the northern half of the Island was transferred to the Navy. By the early 1990s, the military facility at Adak Island included approximately 6,000 military personnel, civilian federal employees, and civilian support contractors.[4]

The base was officially closed in September 2000. At this time Navy operations consist solely for long-term maintenance of Superfund cleanups and final clearance of ordnance items. The U.S. intends to transfer the former Base from the U.S. Navy to U.S. Fish and Wildlife Service (FWS) who will then exchange the property with The Aleut Corporation for other lands in the Aleutian Islands. The island is being actively marketed to commercial fishing fleets and other businesses by the Adak Reuse Corporation, a subsidiary of The Aleut Corporation.[5]

Navy investigation of environmental issues related to military activities began in 1986 with oversight from the **Environmental Protection Agency*** (EPA) and the State of Alaska Department of Environmental Conservation (ADEC). In October 1992, the Adak naval site was proposed for addition to the **National Priorities List** under **CERCLA** and added to the list in May 1994.

Given that Adak was a site of great strategic importance during World War II, the number and variety of activities that took place at the installation left behind a legacy of extreme contamination. Issues at the site are complex; the military will neither confirm nor deny the earlier presence of nuclear weapons, a variety of chemical weapons were "lost" and the military cannot guarantee they are not still present somewhere on the island, the sheer volume of contamination and the remoteness of the site has resulted in the military's reluctance to remove contamination, opting, instead, for institutional controls at the majority of sites. A **Technical Assistance and Public Participation** (TAPP) grant was received for the **Restoration and Advisory Board (RAB)** for the Adak Naval site. Scientist Dr. Ron Scrudato of the State University of New York, Oswego provided independent technical interpretation and comment to the highly complex investigative data from the contaminated sites. The RAB chose not to renew the TAPP grant in 2002.[6]

With the imminent land transfer from the Navy to U.S. Fish & Wildlife Service, and then to The Aleut Corporation, Alaska Community Action on Toxics is concerned about liability issues taken on by the Corporation. Landfills that still contain toxic materials were "capped" (a thick cover of soils and vegetation) and fenced rather than having the contaminants removed, are being transferred to The Aleut Corporation. Understandably, the Corporation seeks to provide an economic base for the growing community of Adak, yet concerns remain about future human and ecological health from exposure to remaining chemicals.

# Geography & Geology:

Three steep, highly weathered volcanic peaks dominate Adak Island's topography. Streams have eroded deep valleys between the peaks and provide runoff to the coast. Tidal lagoons and deltas are interspersed along the coastline. Vegetation is mostly tussocks, grasses, lichen and mosses. Coastal cliffs in some areas rise to 2,500 feet; the tallest point on the island is Mt. Moffett at 3,875 feet. The island's maritime weather consists of periodic fog, high winds and frequent, often violent, storms. A wide variety of marine mammals and birds inhabit the near-shore areas.

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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.*

The terrain surrounding the former naval facility at Adak Island includes steep ridges, deep ravines, rolling hills, and some flatlands. The island is a federally designated wilderness area, and is part of the Alaska Maritime National Wildlife Refuge. Access to remote areas is allowed, but restrictions are in place (institutional controls) due to potential presence of unexploded ordnance.

Approximately 100 people currently reside on the island and the community is growing; residents use the area for hunting, fishing, and recreational purposes.

# Contamination Background:

Over a 40-year period, hazardous substances were disposed of in areas on the island, including landfills, storage areas, drum disposal areas, spill sites, and pits for waste oil and fire-fighting training. Petroleum, chlorinated solvents, batteries, and transformer oils containing polychlorinated biphenyls (PCBs) are some of the hazardous materials present at the site. Primary releases include: PCBs (over 2,000 gallons), unexploded ordnance (70,000 items located, not including ranges and offshore disposal), petroleum (1,000,000 gallons), solvents, and pesticides. Twenty, one-ton containers (40,000 pounds) of chemical weapons agents that included lewisite and mustard gas were transferred to Adak Island by the military and "lost." The Army states that documentation on their ultimate disposition has not been found.[7] During World War II and the cold war, nuclear submarines and nuclear bombs were housed at the Adak station. However, remedial investigation for site contaminants did not include radioactive contamination, effectively making the problem go away by not looking at it. At this time, there have been no studies conducted to determine levels of potential radiation contamination.

Health concerns related to mustard gas vary depending on the type of exposure. Effects include severe damage to the eyes, cancer (skin, lung, throat), and respiratory conditions.[8] No information was available for this report on environmental effects.

Lewisite is a blister agent, highly and immediately irritating to the eyes, skin, and airways (nose and throat). Contact with liquid or vapor can cause skin blistering, damage to the eyes, damage to the airway, and pulmonary edema (an excess of fluid in the heart).[9] It is a systemic (affects the whole body) poison that can have long-term health consequences. Chronic (on-going, low level) exposure can lead to arsenic poisoning, which results in skin disorders and nerve effects.[10]

Unexploded ordnance that deteriorates releases toxic heavy metals, such as cadmium, lead, chromium, nickel, copper, and barium, into the environment. These metals easily transport into and through groundwater, and are long-lasting in the environment.[11] Serious health effects can arise from exposure to each of these heavy metals. Current studies indicate there is no known safe level of exposure to lead.[12]

# Sources of Contamination:

All sites on Adak Island were divided into two **operable units** in 1998 for evaluating contamination and creating cleanup plans. OU B was further subdivided into OU B-1 and OU B-2 to facilitate expedited transfer of real estate within OU B-1. The Navy holds responsibility for cleanup and closure, while the EPA and the Alaska Department of Environmental Conservation have federal and state regulatory oversight.

**Operable Unit A**

OU-A covers all hazardous substance and petroleum related issues, as well as solid waste management. Many of the sites had underground storage tanks (USTs) that housed petroleum products. In October 1999, the Navy signed the final **record of decision** (ROD) for OU-A. EPA undertook formal government-to-government consultation with the Aleut Tribes in September 1999 on the OU-A ROD. These were completed in February 2000 and EPA signed the OU-A ROD on March 31, 2000. The **Five Year Review** for OU-A was completed in January 2002, and all **cleanup remedies** were found by the contractor to be protective of human health and the environment.

Overall, the Navy has relied entirely too much on **institutional controls** and **soil capping**, having chosen these remedies for a majority of the sites. Although the plan for cleanup identifies surface water as the likely future source of drinking water, this should not preclude the Navy implementing cleanup actions that effectively clean groundwater. For these petroleum sites, a greater level of remedial action, rather than a preponderance of "**monitored natural attenuation**" and **no action**, should take place.

The OU-A ROD represents remedial decisions at approximately 200 sites. The complexity of contamination and sheer number of these sites belies by the rather simplistic approach taken for remedial action.

Of the 66 sites contaminated by petroleum, the **remedial action** chosen for 40 of them is monitoring. Twelve sites had "limited" soils removed and fourteen sites had **free-product** recovery systems installed.

With regard to the soil removal sites, concerns arise from a reading of the Five Year Review. At three sites, Navy Exchange Building (UST 30027-A), Officer Hill and Amulet Housing (UST 31049-A), and Officer Hill and Amulet Housing (UST 31052-A) "limited soil removals were started, but terminated before cleanup levels were achieved *due to site obstructions* at three petroleum sites".[13] [emphasis added]

At another three sites, Finger Bay Quonset Hut (UST FBQH-1), Mount Moffett Power Plant 5 (USTs 10574 through 10577), and Yakutat Hangar (USTs T-2039-B and T-2039-C), limited soil removals were started, but terminated *due to larger than anticipated quantities of affected soil* at three petroleum sites."[14] [emphasis added] These include excavating PCB and petroleum-contaminated sediments in two surface water bodies, pumping and treating groundwater contaminated with petroleum, monitoring natural attenuation for petroleum-contaminated soils, and capping a solid waste landfill.

- Finger Bay Quonset Hut (UST FBQH-1): Soil removal was started but terminated due to larger than anticipated quantities of petroleum-affected soil. The Navy installed one additional well in 2001 and annual groundwater monitoring has been recommended for five consecutive years beginning in 2002. Additional soil removal was eliminated as an option because the removal of protective tundra (along with the petroleum-affected soil) from the steep hillside at the site would increase the potential for source erosion such that additional excavation activities would pose a greater risk to the environment than leaving the affected material in place.
- Mount Moffett Power Plant 5 (USTs 10574 through 10577): An agreement between the Navy and ADEC regarding further action at this site has not yet been completed. Groundwater monitoring is currently planned to continue at this site.
- Navy Exchange Building (UST 30027-A): A removal was started but terminated due to site obstructions. Subseque nt work included installation of one well; completion of one soil boring; quarterly sampling of the well for one year; and receipt of concurrence of no-further-action from ADEC comments dated August 30, 2001.
- Officer Hill and Amulet Housing (UST 31049-A): A removal was started but terminated due to site obstructions. A no further action designation was received from ADEC in comments dated August 30, 2001.

- Officer Hill and Amulet Housing (UST 31052-A): A removal was started but terminated due to site obstructions. One additional well was installed and annual groundwater monitoring is recommended for five consecutive years starting in 2002.
- Yakutat Hangar (USTs T-2039-B and T-2039-C): Soil removals at these two sites were started but terminated due to larger than anticipated quantities of petroleum affected soil. Subsequent work at both sites included quarterly groundwater monitoring in 1999-2000, and the Navy and ADEC have agreed that no further action is required per ADEC comments dated August 30, 2001.

Not surprisingly, according to the Adak Five-year Review, released in January 2002, all remedies at OU-A remain protective of human health and the environment. What *was* surprising, as noted above, was the number of sites that were deemed remediated with no further action necessary.

Institutional controls are used at many contaminated source areas to restrict land use and access, and signage to advise against subsistence fishing in two marine water bodies, Kuluk Bay and Sweeper Cove. A long-term monitoring program will determine when the fishing advisories can be removed, or whether further remedial actions are necessary in the two marine water bodies. Rock sole and blue mussels were chosen as the indicator species for human health. According to the Five-Year Review, the most recent samples from Sweeper Cove for rock sole continues to exceed acceptable levels of PCBs, while blue mussels hover close to or barely below acceptable levels. In Kuluk Bay PCB levels in rock sole dropped below acceptable levels in 2000, and have been below acceptable levels in blue mussels for the past 4 sampling seasons. Monitoring will continue through 2003.

Indeed, the Aleutian/Pribilof Islands Association (the non-profit arm of The Aleut Corporation) has voiced concern that "some sites on Adak have not been adequately addressed." They stated categorically that the "Tribes still maintains that the Navy has decided to implement an unacceptably high number of institutional controls rather than committing to more aggressive and effective cleanup methods. The outcome of the use of institutional controls is a long-term need for residents to protect themselves from dangers in their community. The Tribes are fundamentally opposed to any controls which would restrict traditional use of their lands."[15]

The letter from the Association reiterates that the EPA has remained silent on their previously stated concerns about reliance upon the natural attenuation process. "We are not convinced that natural attenuation is an appropriate restoration strategy at Adak or any cleanup sites."[16]

One of the problems associated with depending on institutional controls, rather than content removal, at the landfill sites was demonstrated in 2000. A severe winter storm cut away at the bluff where the metals landfill abuts Kuluk Bay. Several hundred feet of the landfill was exposed, where landfill contents and debris littered the area. After as much of the debris was recovered as possible, a new riprap barrier was placed along 95 percent of the edge of the landfill.[17] Hopefully, this will remedy another event, but in truth, the only guarantee would be removal of the contents.

Water quality is a major concern from military activities. According to the EPA: "Much of the downtown area drains into Sweeper creek and Sweeper Cove. Ecological chemicals of potential concern in sediment include semi volatiles and are distributed throughout the 450 acres of the cove. PCBs and semi volatile organics are the ecological chemicals of potential concern in fish and shellfish in Sweeper Cove and Creek include arsenic and PCBs."[18] Yet, after evaluating potential risks to environmental and human health, the proposed plan requires institutional controls prohibiting subsistence and commercial fishing in Sweeper Cove and Creek. The contamination has created unsafe conditions for harvest of fish and shellfish after conversion of the base to civilian use.

In a document prepared under a Techanical Assistance grant, Dr. Ron Scrudato addresses the complexity of the problem as follows:

- **The extent of groundwater contamination at Adak and proximity of a large number of the sites to surface water, including tidal waters, offers significant potential to impact down gradient surface water quality and associated aquatic and terrestrial biota.** The developing monitoring program should be expanded and designed to determine whether contaminated groundwater is migrating into Adak area surface waters. The extensive groundwater contamination is likely impacting area surface waters including near shore marine waters;

- **Landfill and SWMU cover designs should be an integral part of the ROD.** These designs should specify, in detail, the measures that are to be employed to reduce the amount of water infiltration and the anticipated leachate (a solution containing contaminants picked up through the leaching of soil) to be produced based on the cover design and materials to be used as cover. Additionally, the designs should also specify how surface water would be controlled as well as the procedures that will be used to maintain the integrity of the cover material.

- **Leachate quantity and quality projections should be developed for each of the SWMUs and landfills that will require monitoring including those sites mentioned above.** The amount of total precipitation at Adak indicates considerable quantities of leachate will potentially be produced at select SWMUs and landfills. For example, if the average rainfall at Adak is 60 inches per year, and 10 percent of the total precipitation infiltrates the cover of a two-acre landfill, more than 300,000 gallons of leachate per year will be produced. Depending on the character of the waste that the 300,000 gallons comes in contact with as it migrates into the waste material and down gradient, the composition of the contaminated liquid will vary from uncontaminated to highly contaminated. Contaminated leachate should not be allowed to migrate off of the landfill site and will therefore require some form of leachate collection and management. As long as there is water infiltration into the waste material, leachate will be produced. In order to keep the contaminated liquid from impacting down gradient water resources, it must be recovered and effectively managed. A comprehensive plan detailing the procedures and processes that will be used to characterize, monitor, collect and treat generated leachate should be included as part of the remedial plan being developed for the Adak containment sites including the SWMUs, landfills and any other waste containment facility.

- Additionally, a plan needs to be developed detailing how leachate will be distinguished from contaminated groundwater. Contaminated groundwater down gradient of a covered waste containment facility indicates the engineered site is producing leachate as precipitation has infiltrated the cover and is mixing with the contained contaminants. Since the designed landfill cover is inadequate to prevent liquid from infiltrating and mixing with the waste, leachate is being produced. In contrast to a uncontained waste site that is contributing contaminants to the environment, the engineered site is contributing leachate as a consequence of design failure. Leachate at engineered containment facilities should be collected and managed and the presence of contaminants down gradient of SWMUs and/or landfills is evidence that the containment facility has failed. The site is producing leachate as water has infiltrated the designed cover. The produced leachate should be collected and effectively managed and this needs to be fully integrated into a comprehensive remedial plan for Adak.

Dr. Scrudato discusses difficulties in the decision making process due to the lack of available information and general understanding on the part of those people involved in his draft responses of March 6, 2000:

> **Limited understanding by RAB members of the extent of contamination, site characterization and basis and/or rationale for site remedies.** Although the RAB has been working on the remediation of Adak for more than three years, specifically focused on the OU-A, there is little understanding by RAB members on the extent or degree of contamination. This can be attributed to the large number of petroleum and CERCLA sites incorporated in OU-A as well as a lack of effective communication employed by the Navy and agencies in informing interested citizens. Monthly meetings are not sufficient to keep interested citizens informed on the characterization and proposed remedies for the large number of sites located at Adak. In addition, a user-friendly GIS system available at a convenient public location such as the University of Alaska library would provide ready access to the enormous amount of data, information and effective depictions of individual sites and interrelationships to the surrounding environments as well as adjacent sites. Ineffective communication has led to a general mistrust of the proposed remedial measures being advocated for the Adak CERCLA and petroleum sites. I believe a great deal of anxiety shared by concerned citizens would dissipate if a more user friendly and effective public participation process were in place. The large number and diversity of the OU-A sites and manner in which they have been described and depicted, makes is very difficult for a lay audience to gain a comprehensive understanding of the processes and objectives being promoted by the Navy, the agencies, and contractors.

Dr. Scrudato recommends that additional coordination work be done prior to the signing of the Record of Decision by concurring regulatory agencies:

> **The monitoring program and Institutional Control plan should be fully developed and approved prior to the signing of the ROD, particularly for the No Further Action and Institutional Control sites and for those sites that will be managed and monitored for natural attenuation.** Because a significant number of the Adak sites will be managed as NFA and IC, effective monitoring is essential to ensure the sites are performing as projected. An effective monitoring plan is a critical element in determining whether the site remedies are effective in controlling the migration and exposure of contaminants to residents and natural systems. I reviewed a draft copy of the monitoring program and it appeared to be generically acceptable. However, site-specific monitoring programs are required to ensure individual sites are performing as projected. I also believe select NFA and IC sites should also be monitored to determine performance and gauge whether the sites are no longer impacting the local environment. At a minimum, a rationale should be more fully presented for the IC and NFA sites that will not be monitored. The IC plan should be developed and fully implemented as soon as is practicable since contractors and an increasing number of visitors will be travelling to Adak during the time the range of sites are being remediated. The draft of the IC plan I reviewed requires a great deal of work and expansion to provide the safeguards needed to protect against exposure to contaminants.

It should be noted that none of Dr. Scrudato's comments resulted in changes by the Navy or the EPA.

**Operable Unit B**
Because vast areas of Adak were used for military training including artillery ranges, an ordnance, explosives, and unexploded ordnance operable unit was created. This has been designated as Operable Unit B (OU-B). To facilitate transfer of lands 47,000 acres from USFWS to The Aleut Corporation the unit was further divided. OU B-1 contains mostly those lands identified for transfer. The remaining lands are contained within OU B-2. The Navy, EPA, ADEC, the Aleut Corporation, and the Aleut/Pribilof Island Association undertook investigation and remedy evaluation jointly for OU B-1. The Navy, EPA and ADEC signed the final record of decision for OU B-1 in December 2001.

Most disturbing are the institutional controls (fencing and signs) at sites where UXO may present a significant danger, especially to children who may disregard the controls.

**Operable Unit B-1**
Of the 131 sites in OU B-1, 104 were designated as needing no further action. The remaining 27 have not yet had remedies selected.

**Operable Unit B-2**
Site investigation and feasibility studies conducted for the 62 OU B-2 sites are in draft as of this writing; the record of decision is not expected until late 2003/early 2004.

# Conclusions:

The Aleutian/Pribilof Islands Association has been involved with the remedial planning for Adak restoration. The leaders of the Association have been concerned with the lack of acknowledgement of Native traditional use of the lands. In a February 24, 2000 letter from the President of the Association to the EPA Region 10 administrator, the Association points out that the EPA was misinformed about Native use of the lands: "Please note that our archaeological staff has identified historical evidence that Adak was being actively used by Aleuts at the time the military arrived on Adak to survey the site for use during the war, and that the Naval base was constructed on an existing Aleut trapping camp."[19] This has not changed. EPA should revise their website to reflect the historical knowledge of local peoples.

The Association is also concerned about the long-term impacts to the Tribes. "Our concern is that existing reports may focus on impacts to natural resources without considering the long-term impacts to the Tribes. Consideration of traditional Native resources and *how* the resource use will be impacted should be fully integrated into the assessment."[20]

The Association challenged the methods used for risk assessment, indicating that they would like to see more details. "We need further clarification by EPA of risk assessment methodologies selected. Based upon the results of this clarification, we may request re-evaluation of the development of these methodologies." The Association indicated that risk assessment should focus on "the actual diet of local people."[21]

The Association made an argument for "more emphasis placed on public perception issues as related to the environmental restoration process." They pointed out that even if all contamination is remediated, "the perception of the use of resources" must also be addressed if the restoration process is to be successful. "People need to feel reassured and safe in their surroundings."[22]

In the opinion of the authors, the Navy has done the absolute minimum to address the contamination at Adak. Virtually nothing has been removed from the island. Instead, landfills have been capped, chemical agents lost, institutional controls such as fencing and "no trespassing" signs posted where unexploded ordnance remains, and monitoring and warning signs put in place where waters are contaminated. The Navy's position is they will neither confirm, nor deny that nuclear submarines and bombs were housed at Adak, although military personnel do, in fact, confirm such. The Navy has avoided proper assessment and monitoring for radioactive contaminants.

According to information released by the Department of Defense in 2002, a series of biological and chemical weapons tests were conducted in mission SHAD (Shipboard Hazard and Defense). However, many of these tests were conducted on lands. In Alaska, tests were conducted at Gerstle River and Fort Greely, and may have been conducted elsewhere. Additional records will be released spring 2003.[23] The Navy ought to come forward with all records regarding Adak. The Cold War is over. The island is now home to some 100 people, with a growing community. They are about to inherit whatever legacy the Navy leaves behind when a transfer of lands from the Navy to the community of Adak takes place. The community of Adak deserves to know just what that legacy consists of.

Unexploded ordnance (UXO), mustard gas and lewisite, in particular, are a serious concern. Not only are they toxic, the quantity in which they are present constitutes a much higher risk to human health. The "loss" of some 40,000 pounds of mustard gas and lewisite ought not to be taken lightly. In addition, UXO presents a very immediate danger should they explode.

The authors commend the Navy for their consultations with the Association, fulfilling their environmental justice obligation much better than at any other military Superfund site in Alaska. However, they failed to actually implement suggestions or adequately address concerns brought forward by the Association. As the Association stated, the Navy has relied entirely too much on institutional controls at a site that is horrible contaminated. Radiation contamination has never been investigated and ought to, especially now that a community of civilians occupies the island.

The authors also commend the Navy on the provision of Superfund documents through the website www.adakupdate.com/. The Army and Air Force ought to follow the example set forth by the Navy.

**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.***

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Information is available online at:
www.adakupdate.com and

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

**Sites where Adak Superfund documents are located:**
University of Alaska Anchorage (Administrative Records)
Library Reserve Room
3211 Providence drive
Anchorage, AK 99501
907-786-1871

Information repository, Adak community
Second Floor, Adak City Hall Building

Footnotes:

[1] http://adakupdate.com/bkg.html

[2] Record of Decision, Operable Unit B

[3] anecdotal evidence: conversations with former military personnel who chose to remain anonymous

[4] Ibid

[5] http://yosemite.epa.gov/r10/nplpad.nsf

[6] RAB meetings notes, June 2002: "There was a decision by the community members to not renew the TAPP grant. The rationale was that there appeared to be sufficient oversight provided by EPA, ADEC, and USGS. Cathy Villa thanked Dr. Scrudato for his efforts to date."

[7] get this from Pam

[8] Department of Veterans Affairs, VA Fact Sheet, "Mustard Gas Exposure and Long-Term Health Effects," April 1999, www.va.gov/pressrel/99mustd.htm

[9] Agency for Toxic Substances and Disease Registry, "Blister Agents, Lewisite and Mustard-Lewisite Mixture," www.atsdr.cdc.gov/

[10] Harte, J, Holdren, C, Schneider, R, Shirley, C, *Toxics A to Z: A Guide to Everyday Pollution Hazards,* University of California Press, Berkeley, 1991

[11] "Communities in the Line of Fire: The Environmental, Cultural, and Human Health Impacts of Military Munitions and Firing Ranges," Military Toxics Project, June 2002

[12] Greater Boston Physicians for Social Responsibility, *In Harm's Way: Toxic Threats to Child Development*, January 2001

[13] Adak-Final Five Year Review, January 2002

[14] Ibid

[15] Ongoing consultation between the EPA and Aleutian/Pribilof Islands Association (AP/IA), Adak Island Operable Unit "A", Superfund Record of Decision, Feb 24, 2000, letter to Chuck Clark from Dimitri Philemonof, AP/IA

[16] Ibid

[17] Adak-Final Five Year Review, January 2002

[18] Record of Decision, Operable Unit A

[19] Ongoing consultation between the EPA and Aleutian/Pribilof Islands Association (AP/IA), Adak Island Operable Unit "A", Superfund Record of Decision, Feb 24, 2000, letter to Chuck Clark from Dimitri Philemonof, AP/IA

[20] Ibid

[21] Ibid

[22] Ibid

[23] American Forces Information Service News Articles, "DoD Releases Info on Cold War Chemical, Biological Weapons Tests," October 9, 2002, www.defenselink.mil/news/Oct2002/n10092002_200210092.html

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