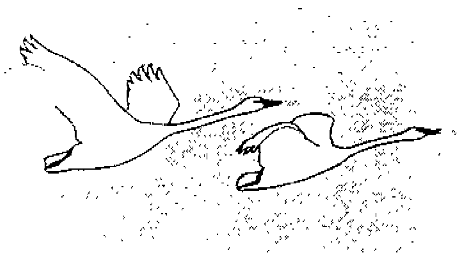


Proposed Plan for Cleanup Action at

OPERABLE UNIT C

Fort Richardson, Alaska

August 1997

The purpose of this Proposed Plan is to present cleanup alternatives for Operable Unit *(OU)* C at Fort Richardson near Anchorage, Alaska. These alternatives are being considered by the U.S. Army, the Alaska Department of Environmental Conservation *(ADEC)*, and the U.S. Environmental Protection Agency *(EPA)*. The Army, ADEC, and EPA are soliciting comments from the public on the information and proposed ***cleanup actions*** discussed in this document. For your convenience, this Proposed Plan contains an alphabetical glossary of terms that defines the words and abbreviations printed in ***bold italic*** type.

This Proposed Plan fulfills the requirements of Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act *(CERCLA)*, also known as Superfund, by describing the cleanup action plan for OUC. The Army, ADEC, and EPA have determined that the sites included within OUC will be addressed under the conditions of the Federal Facility Agreement *(FFA)*, a document signed by the three agencies. The agencies have selected preferred alternatives for the two sites within OUC based on criteria found in the National Oil and Hazardous Substances Pollution Contingency Plan *(NCP)*.

The two sites within OUC are the former Open Burning/Open Detonation *(OB/OD)* 1 and Eagle River Flats *(ERF)*. Site investigations performed at OB/OD Pad indicate that concentrations of contaminants are well below levels that are acceptable for closure action. Therefore, except for ***institutional controls***, no further cleanup action is recommended for OB/OD Pad.

This Proposed Plan addresses only the cleanup alternatives for ERF. The preferred cleanup alternative for ERF includes a combination of (1) routine monitoring of the waterfowl use, presence of contamination, and changing physical conditions at contaminated ponds at ERF; and (2) draining of contaminated ponds with pumps followed by application of a cap-and-fill material. The performance and results of the cleanup alternatives will be monitored routinely to ensure the effectiveness of cleanup.

Although this Proposed Plan identifies a preferred alternative for ERF, the agencies will not make the final decision until the public comment period ends and all comments are reviewed and considered. Therefore, the public is encouraged to review and comment on all alternatives presented in this Proposed Plan. The box titled "How You Can Participate" on page 2 provides details about the public participation process.

SITE BACKGROUND AND SUMMARY OF CONTAMINATION

Site Description and History

Established in 1940 as a military staging and supply center during World War II, Fort Richardson now occupies approximately 56,000 acres bounded to the north by Knik Arm, the west by Elmendorf Air Force Base, and the south by the Municipality of Anchorage. Figure 1 on page 2 shows the location of Fort Richardson. The current mission of Fort Richardson is to conduct operations necessary to support the rapid deployment of Army forces from Alaska to the Pacific Theater.

In June 1994, the EPA included Fort Richardson on the National Priorities List *(NPL)*. Following negotiations, the Army, EPA, and ADEC signed the FFA for Fort Richardson on December 5, 1994. The FFA outlines the approach for a thorough

GLOSSARY

ADEC
Alaska Department of Environmental Conservation

Administrative Record
a comprehensive reference collection that contains all files, records, and documents associated with the cleanup process for each OU.

ARAR
applicable or relevant and appropriate requirement. Any federal, state, or local statute that pertains to protection of human life and the environment in addressing specific conditions or use of a particular cleanup technology at a Superfund site.

baseline
the natural or existing state; condition before implementation of an alternative

CERCLA
Comprehensive Environmental Restoration, Compensation, and Liability Act of 1980, also known as Superfund. The CERCLA established a nationwide process for cleaning up hazardous waste sites that potentially endanger public health and the environment.

cleanup action
the actual construction or implementation chosen to clean up a contaminated site.

crustacean
mostly aquatic invertebrates with exoskeletons and antennas. Examples are shrimp, lobster, crabs, and wood lice.

dabbling
reaching with the bill to the bottom of shallow water to obtain food. The principal feeding activity of ducks at ERF.

continued on page 5

How You Can Participate

The public is encouraged to participate in ~~e decision-making process affecting JC. A 30-day public comment period for this Proposed Plan is scheduled from January 6 to February 6, 1998. You can comment on the proposed actions presented in this Proposed Plan in three ways:

1. Attend the Open House public meeting at ____ p.m. on January 15, 1998, at ______________ in Anchorage
2. Leave a recorded telephone message at 1-888-343-9460 (toll-free)
3. Write to the following address before the public comment period ends:
   Bill Gossweiler
   Fort Richardson Project Manager
   U.S. Army Alaska
   Attn: APVR-RPW-EV
   724 Quartermaster Road
   Fort Richardson, Alaska 99505-6500

All public comments, whether provided at the public meeting, submitted in writing, or recorded on the toll-free ~~lephone line during the public comment .riod, will be considered equally by the Army, ADEC, and EPA when reaching a final decision for cleanup action. In addition to this Proposed Plan, other documents can be found at the information repositories. See the list of related reports in the box on page 3. Photocopies of these materials can be made at the information repositories, which are listed on the back page. The Administrative Record is available for the public to view at the Public Works Environmental Resource Office, 724 Quartermaster Road, Fort Richardson.

The Army, ADEC, and EPA will present their responses to all comments received during the public comment period in a document called a Responsiveness Summary. The decision on cleanup action for OUC will be presented in a Record of Decision (ROD). The Responsiveness Summary will be part of the ROD and will be available for review at the information repositories and in the ~dministrative Record. Depending on ıblic comments, the actual cleanup actions selected may be the preferred alternatives, a modification to the alternatives, a combination of alternatives, or a different alternative.

investigation of suspected historical hazardous-substance sources. It also calls for cleanup response activities that will protect public health and welfare and the environment in accordance with state and federal laws.

The FFA divided Fort Richardson into four OUs–named with letters A through D–to represent the potential source areas for hazardous substances. The OUs were created based on the amount of existing information, the similarity of potential hazardous-substance contamination, and the level of effort required to complete a Remedial Investigation (*RI*). As stated earlier, this proposed plan focuses on OUC.

CERCLA Process

CERCLA requires investigation and cleanup of hazardous substances at all facilities on the NPL. The process begins with an RI, during which information is gathered through field investigations to determine the nature and extent of contamination and the potential human health and ecological risks associated with that contamination. Next, a Feasibility Study *(FS)* is performed to evaluate site cleanup alternatives based on information collected during the RI. The cleanup alternatives developed during the FS are reviewed by the agencies–the Army, EPA, and ADEC–which evaluate them against nine criteria established by the NCP. The nine criteria are listed on page 11.

This Proposed Plan summarizes the cleanup options and methods presented in the FS report and presents the rationale for selection of the preferred alternatives. The FS report and the RI report for OUC are both available for public review at the information repositories listed at the end of this document. See the list of available documents about OUC on page 3.

OUC–History and Extent of Contamination

The ERF, which occupies most of OUC, is a 2,160-acre salt marsh where Eagle River meets the tidal waters of Cook Inlet in Knik Arm. The remainder of OUC is the OB/OD Pad, an 8-acre gravel pad on the eastern edge of ERF that was used for open burning and open detonation of

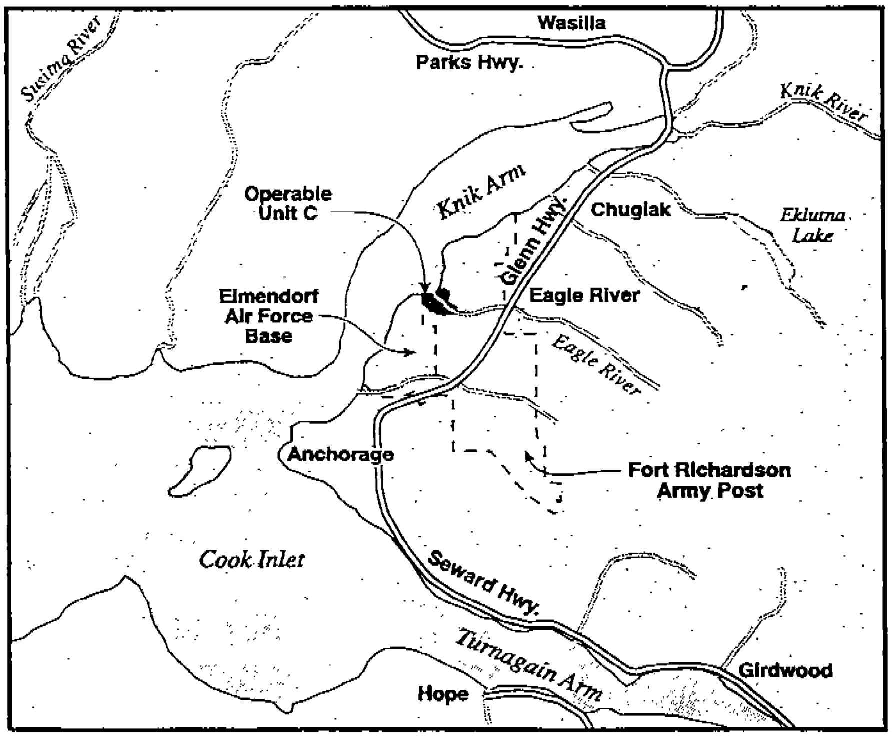


Figure 1
Location Map

expired *ordnance*. Open burning and open detonation is a standard practice for disposal of unused ordnance.

Following the review of data collected during the RI, it was determined that the FS should address only the ERF portion of OUC. All contaminants identified at OB/OD Pad were found in concentrations considerably below levels that require cleanup action under either the CERCLA or the Resource Conservation and Recovery Act (*RCRA*). As a result, no further action was recommended for OB/OD Pad. The Army will proceed with closure of the site according to the requirements established by the CERCLA. In addition, the use of current institutional controls will continue at the OB/OD Pad. Examples of these controls are restriction of access to the site by a locked gate and the Army's prohibition of future development of the site because of the potential existence of unexploded ordnance (*UXO*).

ERF is the primary ordnance impact area on Fort Richardson and contains approximately 25 targets that have been used for artillery training since 1949. Artillery shells have created thousands of craters in the wetlands and associated mud flats. Areas with denser concentrations of craters generally are the places where more munitions have been fired. An estimated 10,000 pieces of unexploded ordnance are buried in the shallow subsurface. Concern about the hazards presented by these ordnance has led to severe restrictions on the activities of onsite workers.

A productive wetland, ERF serves as an important staging ground for migrating waterfowl during the spring and fall migrations. It supports local populations of fish, birds, mammals, and ***macroinvertebrates*** (primarily insects, snails, and ***crustaceans***). One important characteristic of ERF is the occurrence of small interconnected ponds, which provide excellent habitat for ***dabbling*** ducks and other waterfowl. (See the explanation of dabbling ducks in a box on page 4.)

ERF had received considerable investigation before its inclusion on the NPL because of concern about waterfowl deaths. Biological, chemical, and physical investigations have been ongoing at ERF since the early 1980s, when unusually high levels of waterfowl deaths, with no obvious cause, first were documented. These multidisciplinary investigations have been conducted by a broad range of experts. As shown in Figure 2, ERF was subdivided into nine areas for investigation purposes: A, B, C, C/D, D, Racine Island, Bread Truck, Coastal East, and Coastal West.

The cause of death was identified as white phosphorus (*WP*) in 1990. The WP was left by a type of munition called a smoke that was used during training missions to mark firing targets. WP smokes were fired in ERF until 1990. Rounds of high explosives (*HEs*) were aimed at the WP smoke clouds. The HE rounds explode when they hit the ground, creating craters and spreading the existing WP particles near the impact zone. The impacts of the HE rounds contributed to the dispersion of WP. The WP identified during sampling tends to be found in highest concentrations in areas with lots of craters.

As a result of the discoveries at ERF, the Army stopped the use of WP during training

Related Reports

Numerous reports have been prepared to document studies of OUC. The following reports and work plans are available at the information repositories. Addresses of the information repositories are provided on the last page of this Proposed Plan.

OUC Final Feasibility Study Report, September 1997.

OUC Final Remedial Investigation Report, May 1997.

OUC Final Remedial Investigation/Feasibility Study Management Plan, April 1996.

OUC OB/OD Pad Site Investigation Work Plan. 1996.

ERF Final 1995 Work Plan, June 1995.

ERF Comprehensive Evaluation Report, July 1994.

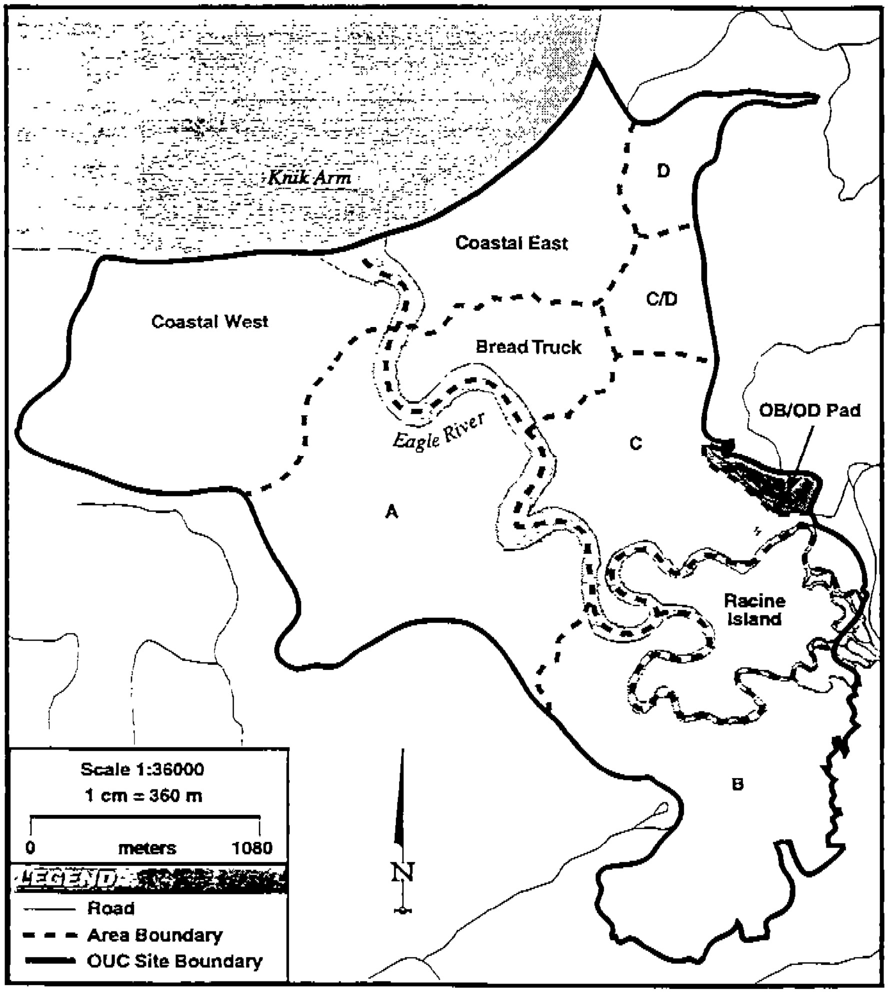
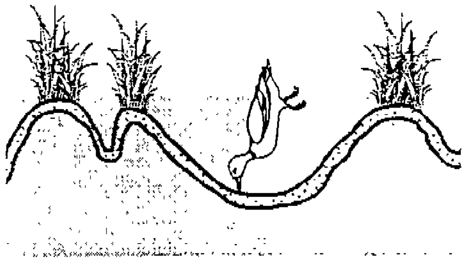


Figure 2
ERF Areas and OB/OD Pad



What Is a Dabbling Duck?

Species of ducks usually are discussed in three groups as described below:

- **Surface feeding.** These ducks frequent quiet waters such as ponds. Examples are mallard, pintail, and teal.
- **Diving.** These ducks typically are found on bays, rivers, and lakes. Examples are canvasback and eiders.
- **Fish eating.** These ducks prefer open water. Examples are mergansers.

The habitat in ERF provides feeding conditions favored by surface-feeding ducks. One feeding activity of these ducks is called dabbling–reaching with the bill to feed in shallow water. When dabbling, the ducks eat invertebrate larvae and plant seeds from pond sediments.

Particles of WP are similar in size to the larvae and seeds. Ducks that consume WP particles are believed to confuse hem with these sources of food.

What Are Sublimation and Oxidation?

Sublimation and oxidation play important roles at ERF because they are naturally occurring and result in WP removal.

Sublimation is transformation of solids directly to the vapor state without appearing in the intermediate liquid phase. The transformation also may be from vapor to solid under appropriate conditions of temperature.

An example of sublimation from solid to vapor phase is the disappearance of snow and ice without melting while the temperature is below freezing. At ERF, sublimation occurs during the transformation of solid WP particles to a gas that dissipates.

Oxidation is the increase in oxygen content of a compound. It results in the transformation of WP to other compounds.

At ERF, WP is removed from sediment following the sublimation and oxidation processes. Sublimation of WP from a solid to a gas results when WP in sediment is exposed to warm air and dry conditions. The WP gas combines with oxygen and is transformed (oxidized) into phosphates and phosphate salts.

For both sublimation and oxidation to occur at ERF, the WP must be available in a dry state.

nationwide in 1990. Current practice is to only conduct test firing into ERF during winter months when the ground surface is frozen.

Waterfowl are exposed to WP when they sift through sediments in the pond bottoms during feeding. Although low-level WP exposure has been identified in plants, macroinvertebrates, and fish, no significant effects of WP in these species have been documented. See the discussion of the ecological effects of WP in the section titled "Summary of Ecological Risks at ERF."

To define areas most likely to contain WP, researchers focused on locations where carcasses were observed, areas preferred by waterfowl, and areas with the most craters. The sediments in the open ponds in these areas were extensively sampled for WP. The distribution of ponds and the results of WP sampling in sediments were compiled. This information, data on bird use of different areas, and the identification of areas with certain combinations of topographical features enabled researchers to identify areas believed to present the highest risk of WP exposure to waterfowl.

Sampling results showed that the concentrations of WP detected were highest in Area C, Bread Truck, and Racine Island. The highest concentration of WP, 3,071 micrograms per gram, was found on Racine Island. WP has been detected as deep as 20 to 24 inches in the sediment. The typical depth is 8 inches.

In Areas A and C/D, few detections of WP were found, and the amounts were small. No WP was detected in Areas B and D. Limited WP contamination has been detected in the gully sediments that are transported during ebb tide in the tidal flooding cycles. The movement of WP through Eagle River to Knik Arm was found to be minimal, and WP has not been detected in the water of gullies or Eagle River.

The distribution of WP particles is not uniform throughout ERF sediments. One reason for the differences in concentrations of WP particles is the size of the particles themselves. Studies of particle size found that particle lengths ranged from 0.01 inch to 0.113 inch. In addition to particle size, the dispersion of the WP particles was affected by the nature of detonations in an area and whether munitions were detonated on land or over water.

The WP particles can break down when exposed to air and warm temperatures. By contrast, when WP particles settle into pond and marsh sediments that remain saturated, WP particles can last for an indefinite time. The processes that break down the WP particles-***sublimation*** and ***oxidation***–are explained in a box to the left.

The most significant areas of concern for exposure to WP are the sediments of permanent ponds and some marshes, for which all of the following conditions apply:

1. WP presence has been confirmed and/or the number of craters (density) is moderate to high.
2. Moderate to high use by ducks and/or swans has been observed.
3. High numbers of waterfowl deaths have been observed.

The ponds where these conditions exist are the areas believed to present the highest risk of WP exposure to waterfowl. They have been labeled *hot ponds*.

Eighteen hot ponds were identified for cleanup action. They cover a total area of 46 acres in Areas A, C, and C/D. Removal actions are under way at contaminated ponds in Bread Truck and Racine Island areas.

Treatability Studies

To identify feasible ways to treat contamination in areas of ERF, numerous methods were examined for possible use. The following list notes treatment methods that were tested at ERF for their abilities to eliminate WP or remove opportunities for coming into contact with WP:

- Capping and filling–application of a material to act as a physical barrier to the WP in the sediments of pond bottoms. A composite material of gravel and clay that expands in water to seal spaces was tested at Racine Island to create a barrier to permeability.
- Dredging–removal and drying of sediments that contain WP from permanently flooded areas
- Geosynthetics–use of textile material as liners for the bottoms of ponds. The material acts as a physical barrier.
- *Hazing*–use of visible objects and sounds to deter waterfowl from use of an area, thereby preventing exposure to WP. Hazing has been conducted with propane exploders, pyrotechnics, scarecrows, flagging, balloons, and other visual, acoustic, and behavioral devices designed to frighten birds.
- Methyl anthranilate–application of this bird repellent, which settles to the bottom of ponds and deters waterfowl from feeding
- Pond draining by breaching–blasting a channel from a pond containing WP to permit the water to flow out into a gully or Eagle River. The draining activity permits the sediments of pond bottoms to dry.
- Pond draining by pumping–use of pumping systems to draw water from ponds containing WP. The draining activity permits the sediments of pond bottoms to dry.

In addition to examining treatment methods, field studies tested the feasibility and effectiveness of using radio tracking to identify duck movement at ERF. See explanation and illustration of this technology in the box on page 6.

SUMMARY OF ECOLOGICAL RISKS AT ERF

The Ecological Risk Assessment (*ERA*) was prepared to address the current and future impacts and potential risks posed by WP contamination to the plants and animals of ERF in the absence of cleanup action. Potential risks to individuals of a species identified during the ERA were then evaluated within a larger context to determine their ecological significance.

Ducks and swans that feed on the bottom of ponded areas are the primary receptors of WP from contaminated sediments in ERF. The waterfowl ingest WP particles, which are about the same size as typical waterfowl food such as seeds and *invertebrates*. Almost 97 percent of the recorded bird deaths are associated with three duck species: northern pintail, green-winged teal, and mallard. These species

GLOSSARY

continued from page 1

EOD
Explosive Ordnance Disposal. A division of the U.S. Army Alaska that specializes in disposal of explosive ordnance.

EPA
U.S. Environmental Protection Agency

ERA
Ecological Risk Assessment. An analysis used to determine the potential risks to plants and wildlife from contaminants at a source area.

ERF
Eagle River Flats. One of two sites at OUC on Fort Richardson.

exposure pathway
the means of contact by which an animal or human encounters a contaminant

FFA
Federal Facility Agreement. A legal document that details the involvement and interaction among the Army, EPA, and ADEC for cleanup activities at Fort Richardson.

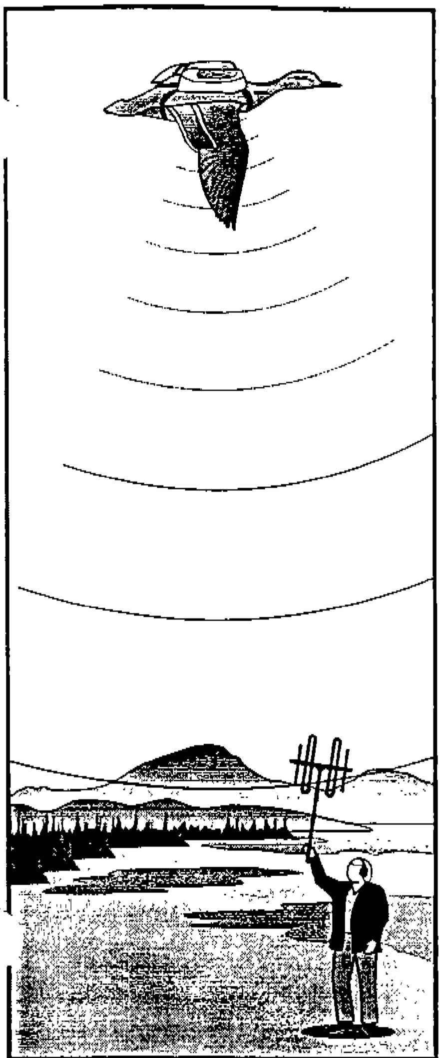
FS
Feasibility Study. Analysis of the practicability of proposed alternatives for cleanup at a National Priorities List site. The FS recommends selection of cost-effective alternatives.

hazing
use of visible objects and sounds to deter waterfowl from an area, thereby preventing exposure to WP. Has been performed using propane exploders, pyrotechnics, scarecrows, flagging, balloons, and other visual, acoustic, and behavioral devices designed to frighten birds.

HE
high explosive. An explosive that generates gas with extreme rapidity and has a shattering effect. (HE rounds do not contain WP.)

HHRA
Human Health Risk Assessment. An analysis used to evaluate the estimated human health effects that could result if no cleanup action is performed.

continued on page 7



Radio Tracking Obtains Important Data

One technology used to gather information at ERF is radio tracking of birds. It enables researches to study the activities of ducks carrying transmitters that send radio signals.

The birds are caught and fitted with identification leg bands and tiny backpack transmitters. To identify bird locations, researchers use directional antennas at fixed and mobile stations. By receiving radio signals from the ducks with transmitters, the researchers are able to observe increased or decreased use of specific areas, movement patterns, and deaths.

also are the most prevalent in ERF, and aerial surveys have shown that the use of ERF by these ducks and other waterfowl increases during the spring and fall migrations.

Several methods were used to observe waterfowl and estimate deaths. The effects of hazing (explained in the previous list of treatability studies) were considered because these activities deterred birds. Study methods included establishing permanently marked areas to facilitate carcass counts, the use of aerial surveys, and tracking ducks with radios. (See the explanation of radio tracking in the box to the left.)

Results of the studies indicated decreasing waterfowl deaths during recent years. Radio tracking studies that monitored duck movement from 1993 through 1995 found that approximately 16 percent of ducks that used ERF died. Causes of the deaths are assumed to be directly from WP poisoning or because the toxic affects of ingested WP impaired the ability of the ducks to escape predators. Radio tracking studies in 1996 were conducted on a larger sample of birds and when no hazing was being conducted. Those results showed deaths of 35 percent, a value probably more indicative of current risk at ERF without cleanup.

Although studies of plants, macroinvertebrates, fish, shorebirds, and predators have shown detectable levels of WP, these species account for a minor percentage of overall deaths in ERF. The following conclusions were reached about ecological effects on plant and animal groups:

- *Water birds–ducks, swans, and shorebirds.* Death has been related to exposure while feeding in contaminated sediments.
- *Scavengers and predators–coyotes, fox, mink, and bald eagles.* As indicated by studies of bald eagles, no direct effect from WP was observed in the field. Studies concluded that no mammals were affected. Secondary effects (such as feeding on poisoned ducks) will disappear as the deaths of water birds decrease.
- *Other mammals, birds, and amphibians–moose, beaver, muskrat, cranes, grouse, wood frogs, and others.* No significant effects were observed.
- *Plants in ERF and Knik Arm.* Aquatic plants growing in contaminated sediments contained only low levels of WP, indicating that they do not create a risk of food-chain contamination.
- *Invertebrates and fish.* No significant accumulations of WP were found during sampling. No evidence of adverse effects on invertebrates in ERF were identified.
- *Fish and wildlife in Knik Arm.* Adverse effects in Knik Arm are considered to be insignificant because only minimal transport of WP particles from ERF has been identified.

In addition to the lethal effects of WP, laboratory studies did record other effects of exposure to WP that did not lead to death–called *chronic* effects. Those effects could have been caused by influences other than WP, and would not be useful as indicators of success during cleanup. For example, a change in reproduction rates could be influenced by many factors other than WP.

By contrast, the deaths of dabbling ducks are measurable. This effect of WP exposure has been shown to be a good indicator, provided that the background death rate is low and evidence of WP presence is confirmed. Further development of a good indicator for measuring achievements during cleanup led to the focus on mallards. This species was selected because mallards are abundant in ERF and their sensitivity to WP exposure has been proven.

An additional reason to use duck deaths as an indicator is the concern for safety of people performing field activities at the site. For example, to measure the chronic effects of WP on reproduction, researchers at ERF first would have to find the nests of ducks through ground searches. Besides combing vegetation that is typical of nesting habitat, the researchers also would have to revisit the nests weekly to identify impacts to reproduction. These activities would repeatedly expose people to the dangers of detonations from the UXO that is present in ERF.

JMMARY OF HUMAN HEALTH RISKS AT ERF

The baseline Human Health Risk Assessment (*HHRA*) was prepared to evaluate the estimated human health effects that could result if contamination at ERF is not cleaned up. The HHRA was based on the location and amount of contamination, toxicity of each contaminant, current and potential future use of the site, and pathways by which people could be exposed to contaminants.

Potential risks were evaluated for onsite workers and trespassers to the site. The HHRA identified ways that people working or living on or near the site could be exposed: touching and ingesting sediment, inhaling vapors and dust released from the sediment, and using groundwater for drinking water.

Human exposure at ERF is expected to be limited because the federal government anticipates maintaining control over the entire OUC. Recognizing the absence of any physical barriers to prevent access to ERF, the consideration of scenarios for human-health risk included onsite recreation by trespassers as well as offsite hunting. Previous assessments had found little risk to human health from eating contaminated duck. For example, exposure calculations indicate that a human lethal dose would require consumption of more than 3,000 teals. The probability of an offsite hunter harvesting a contaminated bird from ERF was estimated to be very low.

At both ERF and OB/OD Pad, the presence of UXO does pose a danger of physical harm to authorized and unauthorized personnel. As noted earlier, an estimated 10,000 pieces of UXO exist at ERF. The Army controls access. To restrict entry, the Army maintains a locked gate at the entrance to ERF, posts signs next to Eagle River for boaters, and regulates admission to ERF through monitoring activities of the *ınge Control.*

To minimize risks to workers from UXO, all personnel who work in ERF are required to participate in 40 hours of health and safety training and attend daily site safety meetings. They also receive briefings from the staff of Range Control and Explosive Ordnance Disposal (*EOD*). In addition, all work areas and walking pathways are visually or electronically cleared by UXO specialists before entry by personnel. The program to clear areas of UXO has been implemented at ERF since 1996.

PURPOSE AND SCOPE OF CLEANUP ACTION

The OUC RI identified hot ponds with contamination requiring cleanup action. The OUC FS further defined specific needs for cleanup action based on the results of the ERA. The following are objectives of the cleanup action for OUC:

- *Reducing the number of duck deaths.* This objective is considered the primary cleanup objective for ERF. The Army, EPA, and ADEC have set a short-term (5-year) goal of reducing the death rate by 50 percent above a natural ***baseline*** death rate at ERF. The long-term (20-year) goal identified is reducing the death rate to only 1 percent above a natural baseline rate.
- *Reducing hot zones.* The short-term (5-year) goal for this objective is to reduce the area included in the hot ***zones*** (locations identified as having high environmental risk) at ERF by 50 percent. The long-term goal is to reduce the area of hot zones by 99 percent.
- *Reducing the WP* ***exposure pathway.*** This objective is the most direct measurement of a successful cleanup at ERF. Its attainment will be determined by the use of radio tracking to monitor the effectiveness of cleanup in terms of duck deaths following completion of the specific cleanup action. Reduction of the exposure pathway will eliminate the availability of WP to ducks, which in turn will reduce duck deaths.

GLOSSARY

continued from page 5

hot pond
a pond believed to present the highest risk of exposure to WP

hot spot
an area within a pond that contains a high concentration of WP

hot zone
an area identified as having comparatively high environmental risk because of WP contamination

institutional controls
land use restrictions imposed to decrease human contact with contamination. Examples include fences, gates, and warning signs.

invertebrate
an animal lacking a backbone and internal skeleton. Examples are insects of all sizes.

macroinvertebrate
a larger member of the invertebrates. At ERF, representative animals are insects, snails, and crustaceans.

NPL
National Priorities List. A list maintained by the EPA of the most serious hazardous waste sites identified for possible long-term cleanup response. The list is based primarily on criteria in the Hazard Ranking System. EPA is required to update the list at least once a year.

OB/OD
open burning/open detonation. Activities that are standard practice for disposal of unused ordnance. The OB/OD Pad is one of two sites at OUC on Fort Richardson.

ordnance
military supplies. Specifically at ERF, munitions.

OU
Operable Unit

oxidation
the transformation of a compound through an increase in oxygen content. At ERF, when the WP particles that have been buried in sediment are exposed to warm air and dry conditions, WP combines with oxygen and is transformed to phosphates and phosphate salts.

continued on page 9

SUMMARY OF ALTERNATIVES

Many technologies were considered for use in reducing exposure to WP and its impacts at ERF. The most promising technologies were selected based on their effectiveness, implementability, and relative cost. Another consideration was the dangers posed to onsite workers from UXO. These technologies were combined to create alternatives. The proposed alternatives and the technologies used are discussed below.

Alternative 1: No Action

A no-action alternative was evaluated as a baseline that reflects current conditions without any cleanup effort. This alternative is used for comparison to each of the other alternatives and does not include monitoring or institutional controls.

Published studies suggest that several natural processes occurring at ERF may lead to some natural restoration over time. These processes include WP sublimation and oxidation (described in a box on page 4), reduction in gully size that occurs with tidal changes and natural changes in terrain, and the covering of WP with sediment, called ***sedimentation***. Because no monitoring would occur under Alternative 1, the effects of the natural processes on the existence of WP in pond sediments and the resulting effects on waterfowl that use ERF would not be known. No costs would be associated with this alternative.

Alternative 2: Detailed Monitoring

This alternative includes only natural processes, but adds the activity of monitoring the ERF areas to determine whether natural restoration is occurring and at what rate. The following monitoring activities are the chief components of the monitoring program: radio tracking of duck movement, aerial surveys of bird numbers and deaths, aerial photography, and sedimentation measurement. In addition, hazing would be used in ERF to deter waterfowl during the critical migration periods. Other activities would include baseline (before initiation of the alternative) and verification (after completion of the alternative) sampling of WP, elevation surveys of pond bottoms, and monitoring of WP sublimation and oxidation.

Alternative 3: Pumping with Capping and Filling

The objective of this alternative is to temporarily drain ponds with the use of pumps and allow the pond sediments to dry so that conditions for WP sublimation and oxidation are fostered. This alternative would consist of draining ponds by pumping after flooding cycles and/or rain. After several drying periods and verification sampling (approximately 5 years), capping and filling would be performed.

In each pond system, a dedicated pump system would be installed annually after spring breakup and would be removed before the winter freeze. The typical useful drying season is mid-May to mid-September. Pumped water would be discharged to an adjacent unconnected pond, river, gully, or open area. Mounted on floats, each pump system would be completely automated to start and stop at established elevations of pond surface. Scheduled maintenance service and refueling would be required.

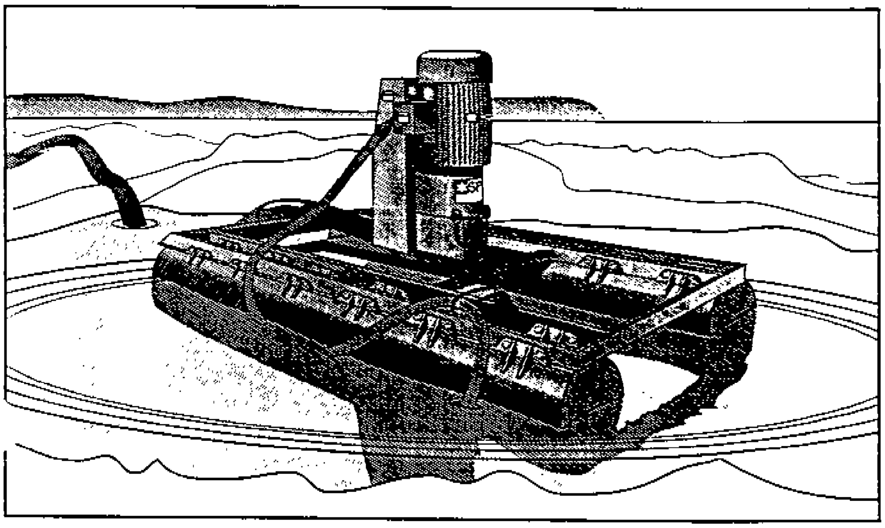


Figure 3
Floating Pump System

The pumping activity of Alternative 3 is expected to require 5 years, based largely on tide predictions, and includes WP verification sampling to determine areas that require further cleanup. Alternative 3 also includes the ERF monitoring and hazing activities of Alternative 2. WP sampling is expected to continue annually for about 5 years.

Pond systems where WP 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 WP. The cap-and-fill material evaluated in the FS and tested at ERF in treatability studies is a manufactured gravel and clay mixture called AquaBlok™. is material expands in water, sealing spaces in gravel and creating a barrier to rmeability. It provides a horizontal cover that blocks the exposure pathway between dabbling waterfowl and sediment contaminated with WP.

During treatability studies, the cap-and-fill material was applied from a helicopter in a manner similar to that used for spreading fertilizer. Areas where capping and filling would be performed would be inspected regularly for integrity and thickness. Following cleanup, restoration of the pond systems would occur naturally through precipitation and tidal flooding.

Alternative 4: Breaching and Pumping with Capping and Filling

The objective of this alternative is to breach ponds through the use of explosives. By creating a gap through which the water would flow out of a pond, the pond bottom could dry, providing the conditions necessary for sublimation of WP in the sediments.

Alternative 4 includes the use of explosives to blast a ditch from a hot pond (or pond system) to the Eagle River or a nearby gully or creek that ultimately would permit the water to drain into Cook Inlet. Areas that do not drain through the breached gully then would be pumped with the pump system that is described in Alternative 3. For example, the elevations of some pond bottoms may be lower than the breached gully elevation, and a pump would be needed to fully drain water from the ponds and dry pond bottom sediments. Finally, areas that do not dry sufficiently would be capped and filled as described above.

Blasting with explosives would occur in March, when ERF is frozen and access is easier. It is expected that explosives would be strategically placed to create a 20-foot-ide, 6-foot-deep ditch. Pumping operations would be similar to those for lternative 3, but would require smaller pumps because most of the water is expected to be drained through the breached gully system. The drying season also would be the same as described under Alternative 3.

Operation of Alternative 4 is estimated to require 5 years based on tide predictions. This alternative also would include the monitoring, WP sampling, and hazing activities of Alternative 2. Selection of areas for capping and filling is expected to occur after roughly 5 years of sampling. Application of the cap-and-fill material would be similar to that for Alternative 3 and would require the same follow-up inspection.

When selecting a breaching route, considerations would include preference of gullies that naturally progress toward pond systems, the shortest possible drainage route, and the shallowest possible ditch. These criteria would minimize negative effects on existing habitat.

Alternative 5: Capping and Filling

The objective of this alternative is to cap and fill portions of hot ponds where the presence of WP has been identified. As mentioned under the discussion of Alternative 3, capng and filling prevents WP ingestion by ducks. Alternative 5 is particularly well suited for use in areas that cannot be drained or dried.

GLOSSARY

continued from page 7

Range Control
divisions of the U.S. Army Alaska that regulates access and maintaining safety standards at all firing and training ranges on Fort Richardson. Range Control also monitors activities at landing zones and obstacle courses.

RCRA
Resource Conservation and Recovery Act of 1976. The RCRA was enacted to protect the quality of groundwater, surface water, the air, and the land from contamination by solid waste. It establishes requirements for clean closure of hazardous waste sites.

recharge
the process by which water is added to a zone of saturation either directly or indirectly from another formation

residual
amount of a contaminant remaining in the environment after a natural or technological process has taken place. (The concentrations of residual contaminants would be expected to be high in areas covered by capping and filling. Although exposure pathways would be blocked, contaminants still would be present.

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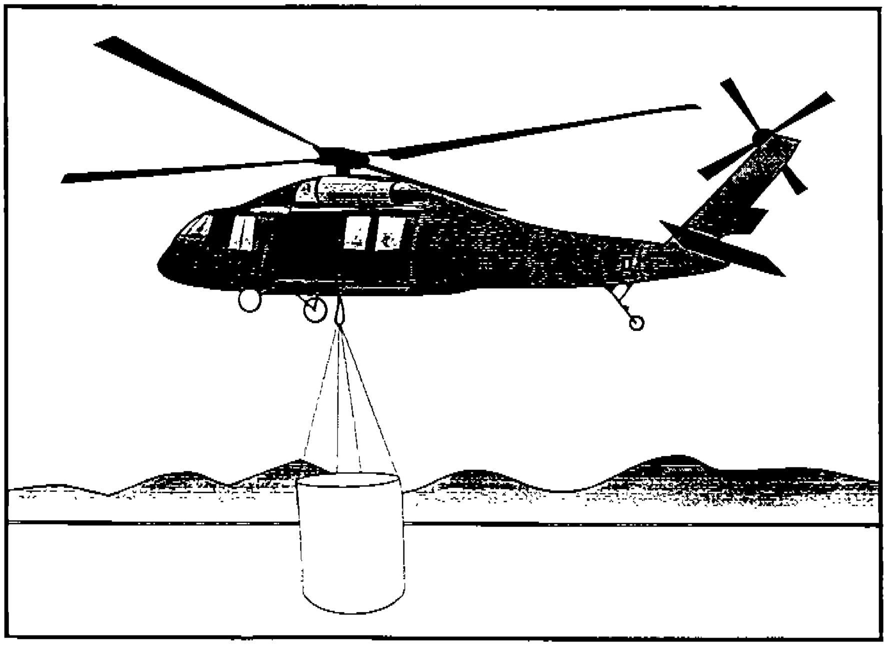


Figure 4
Blackhawk Helicopter
Application of Cap-and-Fill Material

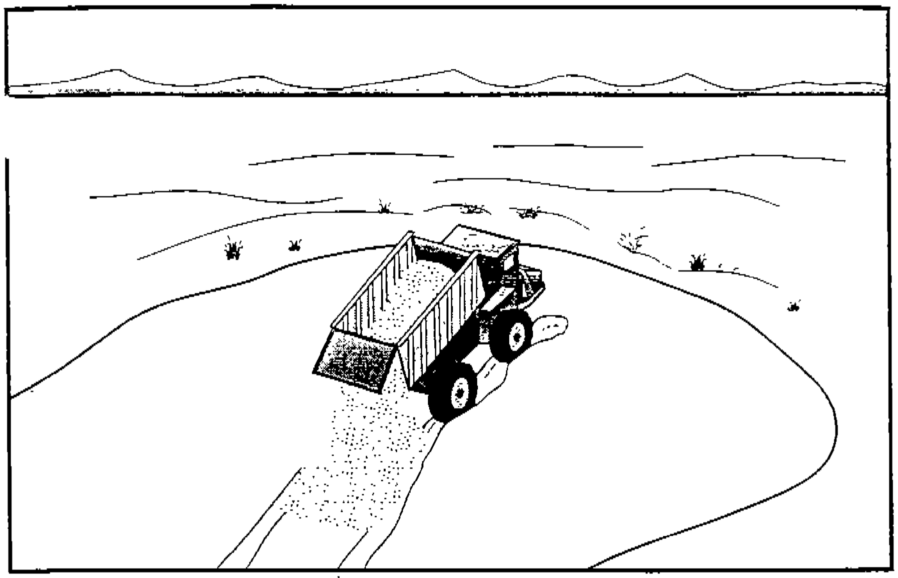


Figure 5
Winter Truck Application of Cap-and-Fill Material

The cost of applying cap-and-fill material by helicopter is high. Truck application is about twice as fast as application by helicopter, and the equipment cost for trucks would be as much as one-tenth the cost for helicopter application. Therefore, where capping and filling is required over larger areas, the applications likely would be by vehicles on wheels or tracks during winter. Truck application of cap-and-fill material will be tested during winter 1997-98. The use of vehicles would require driving heavy equipment on the frozen ground to transport the material. Transport to and spreading at the ponds would be done when ice thickness is sufficient to support the weight without damage to the ground surface. At some ponds, the cap-and-fill material could be spread in a slurry in the spring.

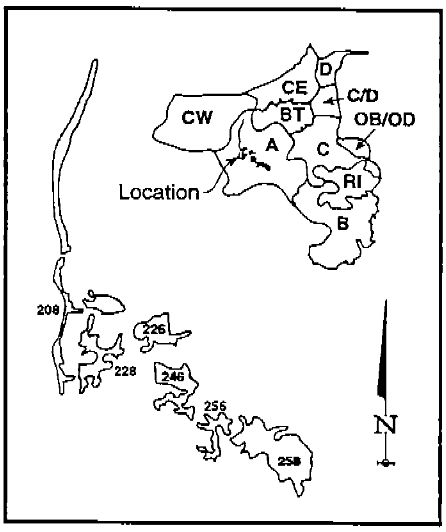
Alternative 5 includes the monitoring activities of Alternative 2, as well as baseline sampling for WP and inspection of the integrity of areas where capping and filling is performed.

EVALUATION OF ALTERNATIVES AND PREFERRED ALTERNATIVE

This section presents the preferred alternative for ERF, compares the preferred alternative to the other alternatives, and emphasizes the reasons why the Army, EPA, and ADEC selected the preferred alternative. Comparisons of alternatives are based on an evaluation according to the nine criteria established by the CERCLA. (See Table 1 to the right.) The criterion of community acceptance will not be evaluated until after the public comments are received.

The preferred alternative described in this Proposed Plan is a preliminary selection. On the basis of new information or comments received from the public, the Army, ADEC, and EPA may modify the preferred alternative presented in this Proposed Plan or choose a different alternative. Therefore, the public is encouraged to review and comment on all alternatives identified in this Proposed Plan during the public comment period. The OUC FS report contains detailed information about each alternative and the comparison of the alternatives.

The comparison of alternatives was conducted by evaluating how portions of ERF would perform under each alternative. These different portions of ERF are reflected by hot pond groupings. The separate section on pages 12 and 13 provides information on the five pond groups that were established.



Northern A Pond Group

Overall Protection of Human Health and the Environment

Alternatives 1 and 2 do not meet the ***threshold criteria;*** they are neither protective of the environment nor do they achieve location-specific applicable or relevant and appropriate requirements (*ARARs*). Alternatives 3 and 4 would provide similar levels of protection to human health and the environment by blocking the exposure pathway and actively treating the WP contamination. Although Alternative 4 would treat and remove the WP, it also would cause permanent, large-scale habitat changes to ponds in the Northern A area and the Northern C and C/D area. Alternative 5 would provide protection by blocking the exposure pathway; however, it does not treat or remove the WP.

Compliance with ARARs

The following requirements are significant ARARs that apply to ERF:

- Section 404 of the Clean Water Act, which coincides with Alaska water quality standards, for protection of wetlands

- Provisions in the Migratory Bird Treaty Act of 1972 that prohibit unregulated "taking" of birds, including poisoning at waste sites

Alternatives 1 and 2 do not meet ARARs for protection of wetlands and migratory .. Alternatives 3, 4, and 5 meet all identified ARARs.

Long-term Effectiveness and Permanence

The WP contamination would not be addressed in Alternatives 1 and 2, except through natural restoration. Therefore, Alternatives 1 and 2 would provide the least-effective long-term permanence. Alternative 2 would include monitoring of the natural processes and WP reduction. Alternative 1 does not include monitoring, and the effects of natural processes would not be known.

Alternatives 3 and 4 would involve treatment and removal of the WP contamination and, therefore, would provide long-term effectiveness and permanence.

Under Alternatives 3 and 4, cap-and-fill material would be applied to areas of pond bottoms that do not dry. ***Residual*** risk–the risk of future exposure to WP–would remain in those areas because capping and filling would not treat and remove WP. The levels of residual risk expected to remain under Alternatives 3 and 4 are as follows:

- Low residual risk in the Northern A pond group because the isolated nature of this pond group would enhance the success of pond draining.
- No residual risk in Ponds 290 and 183 because treatability studies have demonstrated that isolated ponds can be drained.
- Low to moderate residual risk in Pond 146 and in Northern C Area ponds because recharge may reduce the success of pond draining
- High residual risk in Area C/D ponds because recharge and the large volume of water to be removed would hinder the success of pond draining.

continued on page 14

GLOSSARY

continued from page 9

Responsiveness Summary
a compilation of oral and written public comments received during the public comment period and the responses to those comments. The Responsiveness Summary is included in the Record of Decision.

RI
Remedial Investigation. An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site; establish site cleanup criteria; identify preliminary cleanup alternatives; and support analyses of alternatives.

ROD
Record of Decision. Documentation of the selected remedy for a site and the rationale for its selection. This legally binding document is signed by the Army, ADEC, and EPA.

continued on page 17

Table 1
Criteria for Evaluation of Alternatives

THRESHOLD CRITERIA: Must be met by all alternatives.

1. **Overall protection of human health and the environment.** How well does the alternative protect human health and the environment, both during and after construction?
2. **Compliance with requirements.** Does the alternative meet all applicable or relevant and appropriate state and federal laws?

BALANCING CRITERIA: Used to compare alternatives.

3. **Long-term effectiveness and permanence.** How well does the alternative protect human health and the environment after completion of cleanup? What, if any, risks will remain at the site?
4. **Reduction of toxicity, mobility, and volume through treatment.** Does the alternative effectively treat the contamination to significantly reduce the toxicity, mobility, and volume of the hazardous substances?
5. **Short-term effectiveness.** Are there potential adverse effects to either human health or the environment during construction or implementation of the alternative?
6. **Implementability.** Is the alternative both technically and administratively feasible? Has the technology been used successfully at similar areas?
7. **Cost.** What are the relative costs of the alternative?

MODIFYING CRITERIA: Evaluated as a result of public comments.

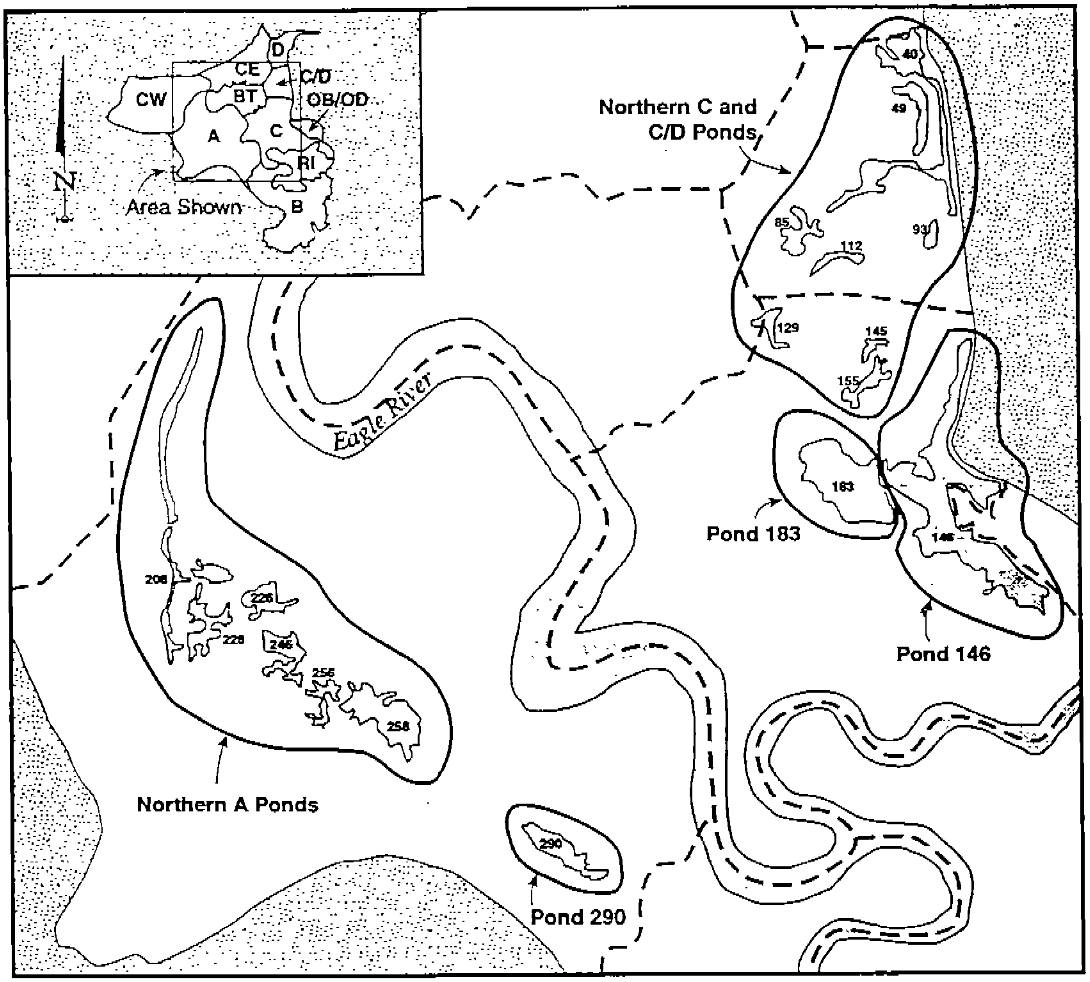
State acceptance. What are the state's comments or concerns about the alternatives considered and about the preferred alternative? Does the state support or oppose the preferred alternative?

9. **Community acceptance.** What are the community's comments or concerns about the alternatives considered and the preferred alternative? Does the community generally support or oppose the preferred alternative?

ERF HOT PONDS

The 18 hot ponds identified were divided into five geographical pond groups based on physical site characteristics: (1) Northern A (7 ponds); (2) Pond 290 (1 pond); (3) Pond 183 (1 pond); (4) Pond 146 (1 pond); and (5) Northern C and C/D Ponds (8 ponds). The characteristics of these pond groups are discussed below. See the figure on this page for an illustration of the pond group locations.

- **Northern A Pond Group.** Seven ponds comprise the Northern A pond group. The 14.3-acre area has uneven topography and a medium to high number of craters. The ponds are believed to be interconnected by a small to medium-sized area of surrounding marsh.
- **Pond 290.** A region of high elevation separates Pond 290 from the Northern A pond group and contributes to its relative isolation. WP contamination has been detected in the north end of this 2.2-acre pond, which has a medium number of craters.
- **Pond 183.** During sampling, WP was found in Pond 183 and a high number of craters was observed. The 7.2-acre pond is connected to Pond 146. A treatability study that used pumping showed that inflow from Pond 146 to Pond 183 can be controlled and that Pond 183 can be drained and dried.



Pond Groups

- **Pond 146.** During sampling, WP was found in Pond 146 and a high number of craters was observed. Studies of this 13.6-acre pond, which is connected to Pond 183, have shown that water flows into this area, a condition called *recharge*, from Clunie Creek and the adjacent marsh. A dredging treatability study conducted at Pond 146 changed the elevation of the pond bottom and removed a moderate amount of (but not all) WP.
- **Northern C and C/D.** The 9.1-acre Northern C and C/D pond group encompasses eight ponds. The area has uneven topography and a medium to high number of craters. The ponds are believed to be interconnected to a large system of permanent ponds and a large area of marsh, which provide constant sources of recharge. Ponds 129, 145, and 155 in the northern C Area may be more isolated from the recharge and may be able to be drained. Ponds 40, 49, 85, 93, and 112 in the C/D area are interconnected to a large system of ponds, and draining by pumping and breaching may not be successful.

The "Size of Hot Ponds and Hot Pond Groups" table below identifies the ponds in each area and provides information on pond and area size. The "Groupings of ˋt Ponds" table to the right notes reasons for ouping the hot ponds.

Size of Hot Ponds and Hot Pond Groups

Hot Pond Group	Pond Number	Size (acres)
Northern A	138	2.2
	208	2.0
	226	1.2
	228	1.7
	246	2.0
	256	1.0
	258	4.2
Subtotal		**14.3**
Pond 290		**2.2**
Pond 183		**7.2**
Pond 146		**13.6**
Northern C and C/D	129	0.7
	145	0.25
	155	1.0
	40	4.4
	49	1.1
	85	1.0
	93	0.2
	112	0.5
Subtotal		**8.9**

Groupings of Hot Ponds

Pond Group	Rationale for Grouping
Northern A Ponds	Ponds are believed to be interconnected by surrounding marsh. There is little understanding of the extent of WP contamination in these ponds.
Pond 290	A region of high elevation exists between Pond 290 and the Northern A ponds that separates the two pond groups. Pond 290 is relatively isolated and is adjacent to a small intermittent pond (a pond that does not always contain water) and a small area of marsh. WP contamination has been detected in the northern end.
Pond 183	This pond has been heavily sampled. There are confirmed WP hot spots in this pond. This pond is interconnected with Pond 146. The permeability of Pond 183 is low. Water levels are average to low, and inflow can be controlled by pumping. A treatability study of pond pumping was conducted at this pond in summer 1997. The study demonstrated that Pond 183 could be drained and dried.
Pond 146	This pond has been heavily sampled. There are confirmed WP hot spots in this pond. Studies suggest that there is a constant source of recharge (up to 100 gallons per minute) along the eastern part of ERF. A dredging treatability study conducted at this pond in 1995 and 1996 changed the pond-bottom elevations. In 1996, while dredging a channel to Pond 183, a shallow portion of Pond 183 was breached. This pond is interconnected with Pond 183.
Northern C and C/D Ponds	There is little understanding about the extent of WP contamination in these ponds. Studies suggest that there is a constant source of recharge (up to 100 gallons per minute) along the eastern part ERF. Ponds 40, 49, 85, 93, and 112 in Area C/D are believed to be interconnected to a large system of permanent ponds and a large area of marsh. Draining these ponds would require draining a large area of uncontaminated habitat. Ponds 129, 145, and 155 in the northern portion of Area C may be more isolated from the rest of this pond group. An aerial survey conducted in June 1997 suggests that these ponds may be drained.

Alternative 5 would not provide permanent removal of the WP, but it would block the exposure pathway. Residual risk would remain in the entire area of the pond that is covered under Alternative 5, because capping and filling does not actively treat and remove the WP in sediments.

Reduction of Toxicity, Mobility, and Volume Through Treatment

Alternatives 1 and 2 do not involve treatment technologies that reduce the toxicity, mobility, and volume of WP-contaminated sediment. Alternatives 3 and 4 would treat the largest area of WP-contaminated sediment by reducing water level, drying pond sediment, and causing WP removal by sublimation and oxidation. These two alternatives are estimated to remove 100 percent of the WP in Ponds 290 and 183. Alternative 5 does not involve treatment to reduce toxicity and volume of WP-contaminated sediment, although it would prevent exposure by reducing the mobility of WP.

Short-term Effectiveness

Cleanup objectives may be met through natural processes under Alternatives 1 and 2; however, the length of time may be greater than 20 years. Effectiveness of natural processes would not be monitored under Alternative 1. Effectiveness of natural processes and cleanup technologies would be monitored under Alternatives 2 through 5.

It is estimated that the cleanup objective of reducing hot zones by 50 percent in 5 years would be met by Alternatives 3 and 4. Cleanup levels would be achieved faster under Alternative 3, but exposure pathways would be removed slower. The slower removal of exposure would occur under Alternative 3 because bird habitat would still be available until all pond water is removed by pumps. Once the water is removed (1 to 2 weeks), however, the pond would remain dry and would only become wet again during heavy rains or high tides. Conversely, exposure pathways would be removed faster (1 to 2 days) under Alternative 4, but cleanup levels would be achieved slower. This slower cleanup would occur under Alternative 4 because of potential refilling. Although the ***threshold elevation*** of ponds would be lowered by blasting to allow a large volume of water to initially drain to Eagle River, the ponds then would flood more frequently during lower tides. The frequent refilling of the pond system under Alternative 4 would not allow pond sediment to dry quickly.

The criteria of short-term effectiveness also would be met under Alternative 5, when capping and filling were completed. Application of cap-and-fill material throughout ERF is estimated to take 2 to 3 weeks.

Alternatives 4 and 5 may result in permanent changes and Alternative 3 would result in temporary changes to pond bottoms, habitat, and bird use. Short distances of vegetation or uneven topography may restrict water movement within and between ponds. To enhance draining of the ponds, Alternative 3 also may include limited use of explosives to clear small drainage channels that radiate from the pump location. The effects from use of explosives to create the drainage channels is expected to be very short term.

All alternatives, except Alternative 1, would pose some short-term potential risk to onsite workers during monitoring activities and during setup, operation and maintenance, and removal of monitoring and cleanup equipment. These potential risks could be minimized by engineering and institutional controls. The most significant risk to workers is from the existence of UXO at ERF. To reduce this risk, all areas where workers would be exposed would be cleared of UXO either visually or electronically. This activity as well as training and briefings are described in the "Site Background and Summary of Contamination" section of this Proposed Plan.

The community would not experience any significant effects from the alternatives. The blasting for pond breaching in Alternative 4 may affect the community through impacts such as noise and vibration. Use of explosives on clear weather days would reduce these impacts, and a community relations program would alert the public in advance of the blasting activities.

Implementability

Alternatives 1 and 2 do not involve treatment technologies. Alternatives 3 and 4 would use [illegible]ily available technologies and would be [illegible]sible to construct and operate. Alternative 5, which includes a containment technology only, also would use readily available materials. Minor technical difficulties are anticipated during application of cap-and-fill material because of the presence of craters throughout ERF. In addition, visual inspections of caps to assess their integrity would be performed under Alternatives 3 to 5. Plans for implementing large-scale capping and filling are currently being developed.

Alternatives 2 to 5 involve UXO hazards to onsite field personnel. Steps previously described, including having work areas and pathways cleared by UXO specialists, would be taken to minimize risk.

Costs

The estimated costs for each alternative evaluated at each pond group are in Table 2 to the right. The estimates are based on the information available at the time the alternatives were developed.

[illegible]te Acceptance

[illegible]EC has been involved with the development of the cleanup alternatives for the five pond groups and concurs with the preferred alternative.

Community Acceptance

Community acceptance of the preferred alternative and other alternatives will be evaluated after the public comment period is conducted and all comments are considered.

RATIONALE FOR SELECTION OF THE PREFERRED ALTERNATIVES

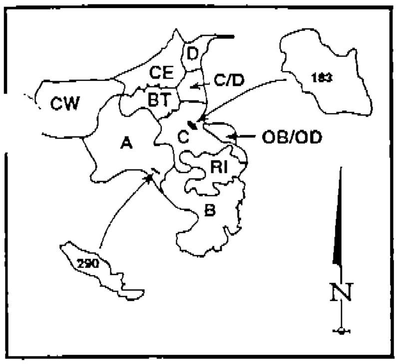
A thorough assessment of alternatives considered the ecological risks from WP contamination, the risk to onsite workers from the presence of UXO, times needed to achieve cleanup goals, potential impacts to habitat from implementation of the technologies, and costs. The preferred alternatives for each pond group are summarized below:

- **Northern A Ponds**–Alternative 3. Pumping is expected to sufficiently drain the majority of these ponds to permit sediments to dry and to cause the WP to sublimate and oxidize. Very limited follow-up capping and filling is assumed to be necessary.

Table 2
Cost Estimate for Cleanup Action Alternatives

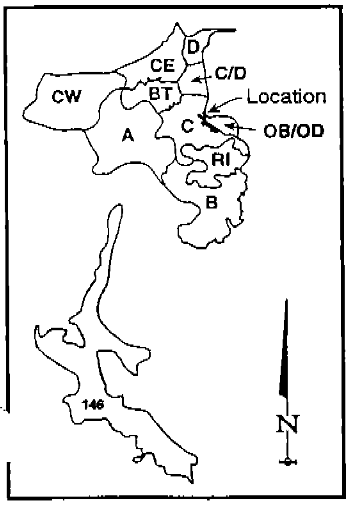
Location	Capital Cost ($000)	20 Year O&M Present Worth ($000)	Total Cost–20 Year O&M ($000)
ERF-wide Monitoring Activities	0	4,670	4,670
Alternative 1–No Action			
ERF	0	0	0
Alternative 2–Detailed Monitoring			
Northern A Ponds	40	230	270
Pond 290	20	110	120
Pond 183	20	190	210
Pond 146	20	190	220
Northern C and C/D Ponds	50	310	360
Alternative 3–Pumping with Capping and Filling			
Northern A Ponds	1,470	680	2,150
Pond 290	200	200	400
Pond 183	400	240	640
Pond 146	1,420	510	1,930
Northern C and C/D Ponds	3,620	1,730	5,350
Alternative 4–Breaching, and Pumping with Capping and Filling			
Northern A Ponds	1,170	620	1,800
Pond 290	180	190	370
Pond 183	330	250	580
Pond 146	880	400	1,280
Northern C and C/D Ponds	2,430	1,330	3,760
Alternative 5–Capping and Filling			
Northern A Ponds	1,370	60	1,420
Pond 290	220	20	240
Pond 183	680	20	700
Pond 146	1,220	20	1,230
Northern C and C/D Ponds	900	60	950

ERF-wide = All pond groups
O&M = Operations and maintenance



Isolated Ponds 290 and 183

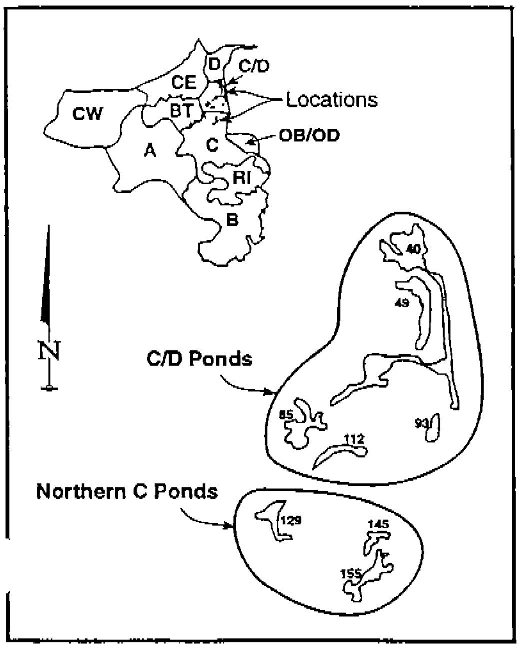
- **Pond 290**–Alternative 3. Pumping is expected to completely drain and dry sediments and cause the WP in Pond 290 to sublimate and oxidize. No capping and filling is anticipated.
- **Pond 183**–Alternative 3. On the basis of treatability tests performed at Pond 183 in 1997, pumping is expected to completely drain and dry sediments and to cause the WP to sublimate and oxidize. No follow-up capping and filling is anticipated.
- **Pond 146**–Alternative 3. The dredging treatability study performed at this pond in 1996 removed contaminated sediment. To verify whether WP removal was complete, sampling will be performed before implementation of an alternative. If additional treatment is needed, a combination of pumping with capping and filling will be implemented. Pumping is expected to drain the majority of Pond 146 to dry sediments and cause the WP to sublimate and oxidize. It is assumed that capping and filling will be necessary for the portion of the pond bottom that does not sufficiently dry.
- **Northern C and C/D Ponds**–Alternatives 2 and 3. This pond group has been divided into the following two portions based on its physical properties and expected performance under each alternative: the Northern C portion, which includes Ponds 129, 145, and 155, and the C/D portion, which includes Ponds 40, 49, 85, 93, and 112.



Pond 146

Alternative 3 is the preferred alternative for the Northern C ponds because pumping is expected to drain and dry a majority of the pond bottoms. These ponds are separated from the larger C/D pond area by vegetation. It is assumed that capping and filling will be necessary for the portion of the pond bottoms that do not dry sufficiently. It is possible that some ponds in the lower Area C portion of this pond group may be successfully drained without affecting Area D ponds.

Alternative 2 is the preferred alternative for the C/D ponds. Selection of detailed monitoring is based on information currently known about the properties and distribution of the water network that consists of the ponds in this area of ERF. Use of cleanup technologies that will drain ponds in this area may cause negative impacts to adjacent Area D ponds because of the interconnections among ponds in the two areas. Area D is a very important waterfowl use area, and negative impacts to that area should be avoided. WP sampling will be conducted at the C/D ponds to identify localized ***hot spots*** within the ponds. It is assumed that following several years of sampling, capping and filling may be necessary.



Northern C and C/D Pond Group

Summary

It was determined that for most hot ponds, attainment of cleanup objectives would best be accomplished by Alternative 3, pumping to drain ponds followed by capping and filling for areas that do not dry sufficiently. Draining ponds and drying contaminated sediments to the maximum extent practicable before application of cap-and-fill material is preferred because it would produce a significant, and potentially total, reduction in risk. Through the results of pumping and the natural processes that would follow, residual risk would decrease because the source of contamination would be permanently removed. Capping and filling would break the exposure pathway to the WP that may remain in sediment.

The waters of the C/D ponds do not appear to be isolated, and wide-scale draining could affect adjacent sensitive habitat. Therefore, Alternative 2, detailed monitoring, is the preferred alternative for this portion of the Northern C and C/D pond group.

The preferred alternatives for OUC are subject to public comment and participation. No alternative will be selected until the public comment period ends and all comments are reviewed and addressed.

PUBLIC INVOLVEMENT

A public meeting is scheduled from ____ p.m. to ____ p.m. on January 15, 1998, at ____________ in Anchorage. Representatives from the Army, ADEC, and EPA discuss the Proposed Plan and answer questions.

The public meeting also will provide an opportunity for interested parties to submit written or verbal comments on this Proposed Plan. A 30-day comment period is scheduled from January 6 to February 6, 1998. (See the box on page 2 for more information on ways to add your comments.)

The Army, ADEC, and EPA will respond to all comments on the Proposed Plan in the Responsiveness Summary. After consideration of all public comments, a final cleanup decision will be made for OUC. The document that will detail the decisions made during the CERCLA cleanup process is the ROD. The ROD will include a Responsiveness Summary containing the public comments received and will be added to the information repositories. The locations of the information repositories are shown in the shaded box on the next page.

This space is available for additional text in response to comments.

GLOSSARY

continued from page 11

sublimation
transformation of solids directly to the vapor state without passing through a liquid phase. At ERF, the transformation of solid WP particles to a gas.

RI
Remedial Investigation. An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site; establish site cleanup criteria; identify preliminary cleanup alternatives; and support analyses of alternatives.

ROD
Record of Decision. Documentation of the selected remedy for a site and the rationale for its selection. This legally binding document is signed by the Army, ADEC, and EPA.

sedimentation
the accumulation of sediment. At ERF, one of the naturally occurring processes that blocks an exposure pathway to WP.

sublimation
transformation of solids directly to the vapor state without passing through a liquid phase. At ERF, the transformation of solid WP particles to a gas.

threshold criteria
criteria that must be met by all cleanup alternatives. They are (1) overall protection of human health and the environment and (2) compliance with requirements.

threshold elevation
the lowest level along the perimeter of a pond that would permit water to flow in (flood) or out (drain)

UXO
unexploded ordnance. Munitions that have not been detonated. About 10,000 UXO are estimated to remain throughout ERF.

WP
white phosphorus. The contaminant of concern at ERF on OUC.

CONTENTS OF THIS PROPOSED PLAN

ction	Page
Introduction	1
Site Background and Summary of Contamination	1
How You Can Participate	2
Related Reports	3
What Is a Dabbling Duck?	4
What Are Sublimation and Oxidation?	4
Summary of Ecological Risks at ERF	5
Radio Tracking Obtains Important Data	6
Summary of Human Health Risks at ERF	7
Purpose and Scope of Cleanup Action	7
Summary of Alternatives	8
Evaluation of Alternatives and Preferred Alternative	10
Hot Pond Groups	12
Rationale for Selection of the Preferred Alternatives	15
Public Involvement	17

For More Information

Copies of site documents, fact sheets, and other supporting reports are available for public review at the following locations:

University of Alaska Anchorage
Consortium Library
3211 Providence Drive
Anchorage, Alaska 99508-8176
(907) 786-1845

Alaska Resources Library
222 West 7th Avenue
Anchorage, Alaska 99513
(907) 271-5025

Fort Richardson Post Library
Building 636, B Street
Fort Richardson, Alaska 99505
(907) 384-1648

Directorate of Public Works
Building 724
Fort Richardson, Alaska 99505
(907) 384-3175

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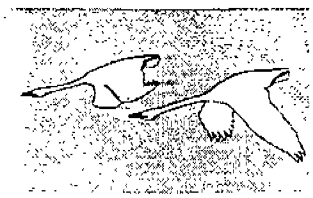

U.S. Army Alaska
Attn: APVR-RPW-EV
724 Quartermaster Road
Fort Richardson, Alaska 99505-6500