XII. ENVIRONMENTAL RESTORATION AND CLEANUP

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM (DERP)

During the modern period, the Alaska District combined its traditional role of assisting the armed services through its engineering and contracting capabilities with a newer role as an environmental engineering agency. Just as civil projects reflected a growing environmental awareness during the 1970s and 1980s, the Corps participated in efforts to restore Alaska's environment in areas where the presence of the military had left unsightly scars as well as unsafe conditions. Thus, during the years that the Alaska District supervised many large military construction projects, it also worked on cleaning up formerly used defense sites.

On December 8, 1983, Congress passed Public Law 98-212, a Defense Appropriations bill that included funding for the Defense Environmental Restoration Account (DERA). National in scope, the multi-million-dollar program provided yearly allocations for "environmental restoration programs, including hazardous waste disposal operations and removal of unsafe or unsightly buildings and debris of the Department of Defense."[1]

DERP specified that each branch of the military would clean up its own land, while the Corps would remove military debris and hazardous and toxic materials from lands previously used as defense sites.[2] Officials described the program as both necessary and logical. "The overall program makes sense," asserted Richard Parrish, the Corps' DERP section chief in Alaska in 1985. "The military took some lands from the public domain and used the properties for defense purposes. Before returning the lands back to the public domain, it is logical to restore the property back to its original environmental condition."[3] Senator Ted Stevens, in

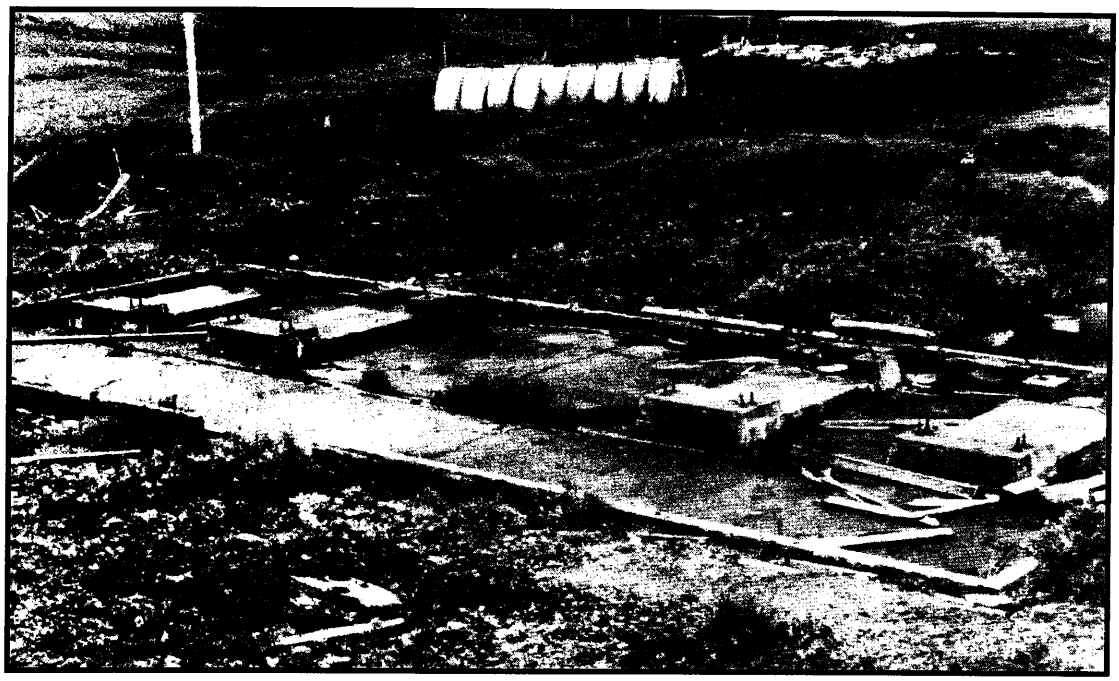
large part responsible for DERP, realized that a program created and supported by Congress "would be an important impetus to ensure that restorations could take place, adequately funded, and in a timely manner."[4]

The Alaska District administered and supervised all cleanup contracts for Alaskan sites out of its Anchorage and Fairbanks offices. By June 1985, eighteen months into the rapidly expanding program, the Alaska District anticipated an appropriation of nearly $70 million for its fiscal year 1986 DERP budget.[5]

Origin of Sites: A Hidden Price of Defense

During World War II, one of the costs of Alaska's strategic significance was hastily constructed military installations at Alaskan locations, the least concern of which was permanence of structures. At the war's conclusion it proved less expensive to abandon sites, rather than to dismantle them systematically. In the rapid demobilization that followed V-J Day, tons of materials, pieces of airplanes, entire airplanes, scrap metal, countless 55-gallon drums (some containing toxic waste), hundreds of Quonset huts, Pacific huts, barracks and other buildings, and parts of equipment were simply left to withstand — unsuccessfully — the extreme wind and the freeze-thaw pressures characteristic of Alaska's climate. Phil Morrow, a retired geologist and materials engineer, recalled that during the urgency of the Cold War era, there had been little concern about debris or waste. "Every one of these military sites just had the nearest out-of-the-way place where they just dumped everything," he explained, "without regard to even covering it up in many cases."[6]

Most of this debris and waste littered the Aleutian Islands, where World War II activity in Alaska had been concentrated. Although the actual battles had been on the Aleutians, the interior and coast had also undergone significant alterations as a result of World War II. During the early years of the Cold War, the military installed White Alice communications stations and Nike missile-launching facilities, some of which were also later abandoned as newer technologies surpassed these initial defense and communication systems. These former defense sites, located on the Aleutians, the Alaska Peninsula, and in the interior, once abandoned, had deteriorated into unsightly piles of debris. Abandonment of these stations also created unsafe and unhealthy conditions throughout the Far North.



Pictured in the foreground is a concrete foundation; a Pacific hut is visible in the background. Attu, 1976.

Remediation Efforts Prior to DERP

By the mid-1970s, an emerging awareness of the environmental hazards of military debris raised concerns over the lingering damage the debris might have caused. In 1974, Senator Stevens supported legislation to facilitate the cleanup of the Aleutian Islands and the Alaska Peninsula. A 1974 water resources act (Public Law 93-251) directed the Corps to study methods for the removal and disposal of World War II military debris at Alaskan locations.[7]

By 1977, in response to this legislation, the Alaska District had prepared a report that identified over 600 potential sites in the Aleutian Islands and Lower Alaska Peninsula. This report delineated quantities and categories of World War II debris present at each site; proposed methods of demolition, removal, and disposal; and outlined site-specific cost estimates for cleanup operations.[8] Additionally during this reconnaissance period, the Corps investigated twelve sites littered with large amounts of debris: Cold Bay (Ft. Randall), Port Heiden, Ft. Mears, Dutch Harbor, Umnak (Ft. Glenn), Atka, Adak, Great Sitkin, Amchitka, Shemya, Kiska, and Attu.[9] By 1979, the Alaska District had compiled its preliminary findings to produce an EIS that provided a systematic framework for environmental restoration.

With the creation of DERP, Congress provided the Corps with substantial means to implement its remediation plans. Out of the $150 million initially allocated for nationwide remediation under DERP, the Alaska District received $6.6 million, over a third of the $18.5 million granted to the Corps nationwide and the largest amount designated for any single area. The Alaska District then began working with the Environmental Protection Agency, the Alaska Department of Environmental Conservation, and other state and federal agencies to establish cleanup priorities and schedules for some 650 identified sites in Alaska.[37] The Corps drew on its studies and experience with other agencies to develop a list of nine priority work sites for the first year of funding for cleanup projects. In the following year, the Alaska District received $36 million and anticipated even larger annual budgets for the next several years.[38]

Implementing DERP

Responding to the creation of DERP, the Corps, in its role as federal engineer, tackled the job of awarding, coordinating and supervising contracts for removing debris, isolating and eliminating toxic materials, and revegetating affected sites. To accomplish this restoration in Alaska, the Corps contended with severe weather, remoteness and inaccessibility, and concerns for how cleanup efforts would impact wildlife.

DERP stipulations required the burning or burial of military debris and buildings, and the removal of hazardous toxic waste prior to site revegetation. In addition to securing contracts with construction and engineering firms to do this remediation work, Corps personnel conducted detailed site studies to inventory debris and waste. District employees also reviewed real estate records, inspected sites, produced engineering reports, investigated environmental impacts, evaluated the debris, negotiated rights-of-way with property owners, and estimated the costs of cleanup for each site.

The Alaska District responded quickly to the challenges of DERP. In the first three years of implementation, the District analyzed 100 sites, awarded 22 design contracts for site inventory and 11 contracts for site cleanup, and transferred over $6 million to other agencies for remediation contracts.[39] In recognition of these efforts, Paul Lancer of the Corps' Office of the Chief in Washington, D.C., praised the Alaska District as "a leader in the program."[40]

Working with Historic Preservationists to Salvage Important Relics

The sheer volume of military debris littering Alaska's landscape testified to the state's distinctive strategic importance during World War II and the Cold War. Also unique to Alaska had been the occupation of American territory by foreign troops, the first such occupation since the War of 1812. The remnants of the World War II military campaign and occupation at Kiska, Attu, and Dutch Harbor presented particular challenges to the Corps' remediation efforts in Alaska. The remnants of this occupation and military campaign presented particular challenges to the Corps' remediation efforts in Alaska.

The problem with removing military debris from the perspective of the Alaska Office of History and Archaeology was that "archaeological sites would be destroyed before they were ever discovered." This agency also worried that removing debris without first categorizing its historical significance would hinder "the ability of future researchers to study the strategies and conditions under which the Aleutian campaign was fought."[41]

To prevent the destruction of this valuable historical record, the Corps asked personnel from the National Park Service and the Alaska Office of History and Archaeology to survey all Alaskan World War II military sites and to determine their historical significance. The Alaska State Historic Preservation Office also became involved in the effort to designate and preserve those sites containing "information on the material culture of World War II" that was probably unavailable anywhere else.[42]

Brigadier General Benjamin Talley encouraged the preservation efforts. Talley, who had landed with the invasion force that ultimately recaptured Attu, saw in the fields of debris, or "carnage" as he described it, a "monument of the battlefield." He sensed "a strong move ... not to disturb those things."[43] Colt Denfeld, Alaska District historian, agreed with Talley, noting that the "Alaska District recognizes the historical significance of relics associated with these events and is being careful to identify items to be left in place."[44]

In 1985, twelve World War II historic sites in Alaska were designated national historic landmarks. These included the Attu battlefield and the Japanese occupation site on Kiska Island, as well as Dutch Harbor Naval Operating Base and Fort Mears on Amaknak Island, and Ladd Field near Fairbanks. A year later, in June 1986, the rusting hulk of the *Santiago*, a 100-year-old schooner that had been used as a coastal oil barge during World War II, was also granted national historic landmark status. Probably beached during a storm in 1946, the ship was

scheduled for dismantling as part of the Corps' remediation efforts under DERP. The schooner's designation as a national historic landmark, however, meant that time and weather would ensure its eventual demise, rather than the efforts of the Corps' demolition team. As the Corps' Bob Wood expressed it, "The *Santiago* will rust in place ... One hundred years from now you'll have iron oxide in the sand."[45]

Contending with unsightly debris, or conversely letting it become iron oxide in the sand, was one thing, but disposing of soil contaminated with carcinogenic PCBs (polychlorinated biphenyls), asbestos used in building materials, and barrels full of toxic waste presented a more serious problem. By 1986, identifying, containing, and removing these remnants of defense had become the focus of the Corps' remediation activities.[46]

Determination of Site Eligibility

Part of the Alaska District's responsibilities included identifying those formerly used defense sites listed in the 1979 EIS that were eligible for DERP funding. To determine a site's eligibility, Corps staff prepared an Inventory Project Report. Field investigations, evaluations of real estate documents, historical records, and personal interviews helped to establish a site's eligibility and priority under DERP. The Corps submitted the Inventory Project Report to the Office of the Secretary of Defense for final determination of eligibility.[47]

After the Defense Department ruled favorably on eligibility, the process to clean up a site followed several steps. First, the Corps conducted a detailed site investigation to determine the type and extent of debris and hazardous materials. The Corps then considered a site's cultural resources and any problems pertaining to historical preservation. During the next phase, the Corps finalized plans for site remediation. This included preparing NEPA documentation, coordinating activities with appropriate agencies, acquiring rights-of-way, and obtaining requisite permits. As the final step, the Corps issued a construction contract for cleanup. This process, from establishing site eligibility to completing restoration, frequently took as long as five years.[48]

Even so, the Alaska District facilitated the maximum amount of debris removal and environmental restoration in the shortest possible time by using "fast track" procedures. The District thus treated each DERP project as a priority at a time when these reclamation efforts coincided with several peak years in regular military construction work also coordinated by the Alaska District. As Richard Parrish explained, "At the Alaska District, once a project is determined

to be eligible for the program, it is given fast track treatment." Parrish continued, "All plans and specifications on [DERP] projects are prepared by contract with architectural-engineering firms because the Alaska District doesn't have staff to handle [DERP] and our normal active military sites workload."[49]

Problems in Remediation Due to Alaska's Distinctive Environment

In Alaska, volatile weather and the remoteness of sites frequently introduced additional challenges to DERP projects. Since many project sites were hundreds of miles from population centers and accessible only by water or air, Corps contractors had to demonstrate a flexible response to conditions in order to accomplish their work. For example, in 1985 the Corps contracted with a group of engineers to inventory debris at a White Alice station at Sitkinak, which had been abandoned in the late 1950s when only 79 percent complete. To reach the site safely, the group had to charter a small plane with an experienced pilot who could land on a marginal runway. Once there, however, the engineers fortunately benefitted from the loan of an all-terrain vehicle from the one person who lived on the island, the caretaker of the resident herd of cattle.[50]

Lists of materials to be removed from Amchitka and Atka islands convey a sense of the vast quantity of debris that needed to be removed from some of these sites. In September 1985, the District awarded a $4.4 million contract to clean up both of these islands. On Amchitka this task entailed removing and disposing of the following materials: 343 Quonset huts; 1,178 Pacific huts; 417 frame buildings; 3,300 barrels; 129 tanks; 400 wood poles; and 37,000 cubic yards of miscellaneous wood and metal debris. Additionally, the contract called for the cleaning of two hangars and removing all asbestos from remaining buildings. On Atka, site remediation required removing 184 Quonset huts; 32 Pacific huts; 50 frame buildings; one dock; 100 wood poles; 1,700 barrels; 16 tanks; and 500 cubic yards of other debris. The project on the islands, which also included reseeding the land, was scheduled for completion within two years.[51]

Amchitka also serves as an example of Corps personnel cooperating with historic preservationists so as not to destroy any World War II artifacts or relics. In this case, the Corps worked with the USFWS and the Alaska Museum of Transportation and Industry, located in Palmer. Their mutual objective was to find pieces of a P-40 Curtiss-built Warhawk, an airplane used in World War II by the Flying Tigers, and to send them to the Palmer museum for reconstruction.[52]

The Alaska District responded to the challenges posed by DERP projects by developing innovative designs and contracts to accommodate uniquely Alaskan

problems. Corps personnel interviewed contractors to improve design contracts, and carefully evaluated each site for ease of access. Moreover, at Amchitka, Attu and elsewhere, the Alaska District cooperated with other agencies to preserve historically significant resources. On St. Lawrence Island, however, the District encountered yet another distinctly Alaskan concern.

In 1986, at this Bering Sea island, the Corps terminated a $6.7-million contract to clean up 42 former defense sites because St. Lawrence's Native landowners objected to the issuance of permits for disposing of debris in two landfills on the island. Represented by the Savoonga and Sivuqaq Native corporations, the island's Native landowners offered to withdraw their objections if the Corps compensated them for use of the land during the site remediation work. The Corps and St. Lawrence's Native landowners had previously negotiated a somewhat unusual arrangement when the Alaska District paid $3,900 for two Native guides to accompany a contractor preparing for the cleanup at St. Lawrence.[53]

Although the Native landowners had earlier signed a right-of-way for the cleanup, they decided against allowing the burial of asbestos and other materials without compensation. They were also concerned about local hiring and protection of native resources. Colonel Gregory, Alaska District Engineer, regretted having to terminate the contract but knew there was no precedent in Corps contracts of this nature anywhere in the country for land use payments during a restoration project. Gregory explained that the intent of DERP was to "restore some of Alaska's natural beauty and remove safety hazards. We can do the work and we want to do it. However, compensation of the type requested here is not appropriate to this project."[54] Consideration of Native issues such as these required a certain degree of sensitivity on the Corps' part. Also, conditions of the Alaska Native Claims Settlement Act sometimes complicated right-of-entry agreements and raised questions regarding title status.[55]

Shift in Emphasis to Hazardous and Toxic Waste Management

By 1986, priorities in tackling restoration work at formerly used defense sites had begun to shift from the cleanup of unsightly debris to the containment and removal of hazardous and toxic waste. In part, this development reflected practical necessity: demand for DERP funding nationwide was so great that the program's emphasis had to focus on elimination of the most dangerous components of the remediation problem.[56] In response, the Alaska District initiated soil samplings and laboratory tests that, according to District Engineer

Gregory, identified sites with the most critically dangerous materials and those most in need of attention. As of August 1986, nearly 100 sites had already been tested or were scheduled for testing. To compensate for seasonal constraints, the Corps also reduced sampling design times by effectively using historical data to develop predictive models. Among the substances to be removed were benzene, toluene, various insecticides, and asbestos, as well as PCB-contaminated soil.[57]

In addition to short working seasons, Alaska's cold and wet climate and extensive permafrost complicated removal of these toxic substances. Because these climatological factors "retard natural bioremediation" and require "unique engineering practices," the Alaska District learned how to accommodate them in planning DERP projects involving the elimination of hazardous and toxic materials. By 1990, the Alaska District was supervising over 50 hazardous and toxic waste management projects throughout the state.[58]

Cleanup of formerly used defense sites sometimes involved locating and removing live ordnance. For example, on Kodiak Island's Burma Road, the Corps asked bomb disposal specialists from Fort Richardson to inspect the area three times. As of July 1986, the Corps believed the ordnance team had found all of the live ammunition and expected the contractor to remove the inert materials from the site.[59]

Similarly, in September 1992 the Corps began the dangerous work of inspecting a test site located at Cape Thompson where nuclear waste or radioactive isotopes might have been deposited. Located approximately 600 miles northwest from Anchorage, near the village of Point Hope, the site was used between 1958 and 1963 as part of "Project Chariot," the Atomic Energy Commission's proposed harbor excavation that had envisioned using nuclear explosives to create a harbor at the mouth of Ogotoruk Creek.[60]

An earlier review of real estate records maintained at the Alaska District offices had identified the Cape Thompson site as a potential DERP candidate without any awareness of the possibility of buried radioactive waste. On August 8, 1988, the Department of Defense approved the site's eligibility for DERP funding. In fiscal year 1990, the Alaska District had negotiated a remediation contract for the removal of petroleum containers and soil contaminated with both petroleum and PCBs. This cleanup was completed by the summer of 1992. An independent researcher subsequently discovered in letters obtained through the Freedom of Information Act the possibility of buried radioactive material at the Cape Thompson location. While detonation of nuclear explosives for harbor

construction had not occurred, "radioactive isotopes had been used to perform hydrologic studies of the transport of radiological material in a stream bed."[61]

The inspection team during September of 1992 was composed of an industrial hygienist and a civil engineer/project manager from the Alaska District, and two environmental specialists from the Northern Regional Office of the Alaska State Department of Environmental Conservation. Their job was to conduct initial samplings based on both aerial and ground surveys in order to confirm the existence of any radioactive debris. The team also determined the need for future investigations. Although its members concluded that no immediate threat endangered the area, they recommended that the project receive "highest priority" for the continuation of drilling and additional sampling to confirm or deny beyond question the presence of any radioactive contamination at the site.[62]

Additional problems at the Cape Thompson site, excluding the possibility of having to dispose of radioactive waste, mirrored difficulties present at most other Alaskan formerly used defense sites. Accessible only by chartered aircraft, work at Cape Thompson had to be completed within seasonal time constraints. By September the temperatures had already dropped below freezing and winter winds were expected soon. Corps personnel and other investigators needed to travel on all-terrain vehicles to the test site, located several miles from the original base camp and airstrip. One further problem at Alaskan sites that sometimes required the addition of specific planning features was the need to protect wildlife during remediation efforts.

The Corps worked with the USFWS to produce environmental assessments that addressed this particular aspect of defense restoration work in Alaska. For example, in 1991 the Corps proposed a DERP project for a former Aircraft and Warning Site at Unalakleet. In its environmental assessment the Corps attached USFWS's recommendations regarding areas of current wildlife use. These included minimizing noise from cleanup activities and removing all fences that would prevent wildlife movement. For areas with high bird use, loud noise from hydroblasting and drum crushing needed to be scheduled at times other than the nesting season in June and July. The USFWS also recommended that summer tundra travel should similarly occur before or after nesting season and that overflights of sites with high bird densities should be at a minimum of 1,500 feet above ground level.[63]

Additional aspects of the Unalakleet restoration project reflected features present at other Alaskan cleanup sites. Contaminants included PCBs, diesel fuel,

bunker oil, and polynuclear aromatic compounds in the soil. Quantities, as at other sites, were large: 10,000 cubic yards of contaminated soils and 1,830 gallons of toxic liquid required proper containment and removal. As at many other sites, given the time of their construction, asbestos was present in piping insulation and in siding materials of most structures. Like some of the other formerly used defense sites, the old radar surveillance facility at Unalakleet was located on land now under the custody of a Native corporation and the Corps needed to conduct real estate negotiations with that group. Located in northwest Alaska in the Seward Peninsula area, the site suffered from weather hazards and accessibility problems common to almost all Alaskan sites.

Finally, the history of the former military facility at Unalakleet attested to Alaska's ongoing strategic significance. The site from which the United States ferried aircraft into Siberia during World War II as part of the Lend-Lease program with the Soviet Union, then its wartime ally, later housed a military radar surveillance station during the years of increased Cold War tensions between the U.S. and the U.S.S.R.[64] Surpassed by advances in satellite technology, the abandoned and vandalized site then experienced the effects of a further political change — the growing environmental awareness of the 1970s and 1980s. Recognizing the need to clean up hazardous and toxic wastes from formerly used defense sites such as Unalakleet, the federal government directed the Corps to restore the environment as much as possible to its once pristine state. Five years into DERP, the Alaska District had accomplished more cleanup and developed more restoration projects than any other Corps district in the nation.[65]

THE CORPS' ROLE IN THE EXXON VALDEZ OIL SPILL CLEANUP

While the Corps concentrated its efforts on restoring formerly used defense areas, as well as conducting one of the largest military construction programs in the Alaska District's history, the agency also faced the challenge of assisting in the cleanup of the largest North American and the world's tenth largest oil spill — that of the *Exxon Valdez*. Although the magnitude of the problem, its immediate and urgent nature, and the manner of containment and removal all differed from the Corps' work with DERP projects, the agency's experience in former defense site remediation certainly fostered in the agency the kind of flexibility and proactive response demanded by the *Exxon Valdez* spill.

Summary of the Spill

For three hours early in the morning on Good Friday, March 24, 1989, nearly 11 million gallons of crude oil from Prudhoe Bay gushed from eight ruptured cargo tanks of the *Exxon Valdez* at the rate of 1,000 gallons per second. The oil poured out with such force that it created black waves three feet high.[66] To avoid pieces of glacial ice in the outbound lane of the Valdez Narrows in Prince William Sound, the *Exxon Valdez* had changed its route to the inbound lane and then veered three miles off course, hitting Bligh Reef at a speed of over 10 knots. When the ship hit, Chief Mate James Kunkel, who had been asleep in his quarters for a couple of hours, awoke shortly after midnight to what he described later as the sound of "a car running its side against a stone wall."[67]

The "car," in this case, weighed a half-million tons, and measured 987 feet from bow to stern, exceeding the length of three football fields; the "stone wall" was a reef in one of the most pristine, wildlife-rich places in the world. The estimated damages of the collision included 90,000 to 300,000 birds, thousands of marine mammals including otters and seals, over a hundred bald eagles, innumerable invertebrates, severe loss of income to fishermen, and unknown — perhaps unknowable — long-term ecological effects to the area. The spill had an emotional toll as well. As Dan Lawn, representative for Alaska's Department of Environmental Conservation in Valdez for ten years prior to the grounding of the *Exxon Valdez*, expressed it, "This spill has really changed me and a lot of us. I've had to deal with emotions I've never experienced before. When you see birds pulling their feathers out until they make holes in their necks and oiled otters that show no resistance when you pick them up, it brings it home to you what an oil spill really means."[68]

The oil from the *Exxon Valdez* eventually found its way to some 2,000 miles of shoreline. Partially responsible for this extensive dispersal was the frustratingly slow initial response during which Alyeska, Exxon, and federal and state agencies attempted to harness their resources and decide who should take charge of the cleanup. Out of the thousands of tankers that had carried an estimated 6.8 billion barrels of North Slope oil since completion of the TAPS in 1977, one had finally grounded. The response was more characteristic of shock than of preparedness.[69]

Perplexing and maddening to the nation as it watched the oil spread to an eventual distance of at least 350 miles from the site of the spill was the initial inadequate and confused response. Blessed with unseasonably calm waters, the

first two days after the spill would have been an ideal time to contain the spill had the necessary equipment been available and ready. Although Alyeska had developed a state-approved oil spill contingency plan, vital components necessary to implement the plan were missing. For instance, employees and contract laborers had to search in warehouses for cleanup equipment and then load it onto vessels; booms, designed especially for a spill in Prince William Sound but rarely tested in drills, were buried in a warehouse under piles of other heavy booms; ship fenders, used to hold two ships apart while cargo is shifted from one to the other, were hidden under several feet of snow. In addition, a contingency barge that state and federal officials assumed would be loaded with containment equipment had remained empty after having been unloaded for repairs two months prior to the spill.

Workers spent some ten hours first finding and then loading the barge's cargo, which had been stacked in another warehouse. Critical hours disappeared as workers also fueled boats and patched booms. The containment barge finally left the terminal at 11:00 on the morning of March 24, loaded with 50,000 pounds of equipment. Tugs carried an additional 22,000 pounds. Even though the response plan had required Alyeska to place containment booms within five hours of a spill, because of this degree of unpreparedness, Alyeska's booms were not deployed until 12 to 17 hours after the grounding. Surrounding the *Exxon Valdez* with booms took another 36 hours. After 70 hours, the point at which Alyeska's plan had guaranteed that a spill of 200,000 barrels would be picked up, only 3,000 barrels had been recovered.[70]

In addition to mechanical collection of the oil, another early procedure in large oil spills is the use of dispersants. However, the unusual calmness of the sound immediately after the spill limited their effectiveness. Yet, even if conditions had been ideal for sufficient mixing of the dispersants, their application would have suffered from inadequate equipment and supplies. Based on a chemical:surface area ratio of 1:20, Alyeska and Exxon would have needed more than 500,000 gallons of dispersants to reach the 90-100 square miles the spill had covered by Easter Sunday.[71]

Both Exxon and the Coast Guard had begun to mobilize personnel and equipment to address the spill once it became clear that Alyeska's plan was not working. The Clean Water Act had designated the Coast Guard's jurisdiction in the Coastal Zone as part of the National Contingency Plan in response to any serious oil or hazardous material spill. But from the start of operations, a lack of clarity about the chain of command and who was actually in charge hampered

the response to the *Exxon Valdez* spill.[72] As one analyst explained, "The spill tested the ability of government and industry to cooperate on a scale rarely encountered in the United States."[73]

Fundamentally difficult was the relationship between Exxon, as the responsible party and the bankroll of the cleanup operations, and the Coast Guard, as overseer of the response. The Interior Department, the Environmental Protection Agency, and Alaska's congressional delegation wanted the federal government to assume control of the cleanup effort. President George Bush silenced these arguments when he announced a partial federalization on April 7. In President Bush's plan, Exxon would direct operations and the Coast Guard would monitor and supervise all procedures. As another part of the federal government's role, the Defense Department, including the Corps, would assist the Coast Guard and Exxon by providing personnel, equipment, and facilities. Transportation Secretary Samuel Skinner became responsible for "mobilizing and coordinating all federal departments and agencies."[74]

Defense Secretary Cheney had successfully lobbied against using troops for the cleanup work. The Bush administration argued that private industry had caused the problem and private industry should have to pay for its remedy.[75] Moreover, Admiral Paul Yost of the Coast Guard worried that the Coast Guard's budget simply could not cover the costs of the oil spill recovery. Yost believed that if the spill were federalized, the Coast Guard could expect "massive" contracting problems. Speaking at congressional hearings on April 6, before the Subcommittee on the Coast Guard and Navigation of the House Committee on Merchant Marine and Fisheries, Admiral Yost explained, "Frankly, we want to take full advantage of Exxon's willingness to open their checkbook and fund this cleanup." Yost further indicated that the Coast Guard's fund for oil spill recovery was only $3-4 million and expressed his reluctance to take over cleanup efforts that were already exceeding $1 million daily.[76]

In such a remote area as Prince William Sound, where logistics and communications are complicated and crucial to the success of any large undertaking, the unusual arrangement of Exxon paying the bills and directing the cleanup tasks — with the Coast Guard supervising, approving plans and making final decisions, and the Defense Department providing support — proved insurmountably cumbersome and inefficient. But this was a crisis, with little, if any, time for devising the optimum response.

By Monday, March 27, the calm weather conditions had ended. A heavy storm, with winds up to 70 miles per hour, blasted the sound until the morning of the fifth day of the spill. This storm prevented boat operations and grounded aircraft, delaying any further application of dispersants. By the time the storm had passed, the oil covered more than 175 square miles, extending southwest almost 40 miles from Bligh Reef. Heavy seas had emulsified the oil, turning it into a thick, viscous substance called "mousse." By then, burning of the oil as a recovery method had also become ineffective because volatile components had evaporated. The presence of "mousse" further changed the nature of the spill recovery because the oil would no longer respond to dispersants, and the flow-resistant mousse was much more difficult to collect and off-load.[77]

When calm seas returned, large amounts of oil had polluted the shores of Smith, Green, Knight, Naked, and Eleanor islands. Between March 31 and April 6, currents and winds had carried approximately 2 million gallons of oil into the Gulf of Alaska. By mid-May, oil had reached the outer coast of the Kenai Peninsula and was entering Resurrection Bay. Oil from the *Exxon Valdez* eventually flowed into the mouth of Cook Inlet, 200 miles from Bligh Reef, and as far away as Kodiak Island and parts of the Alaska Peninsula.[78]

The Corps' Role in the Cleanup Operations

The Corps responded to the *Exxon Valdez* oil spill in five key ways: providing and operating dredges for oil recovery; participating in Department of Defense contingency planning; providing technical assessment, including an analysis of Exxon's cleanup plans; producing pollution reports and disseminating information; and offering the services of the Corps' laboratories in various support capacities. Of these, the Corps' dredges, the *Yaquina* and the *Essayons*, made the most visible and dramatic contribution to the remediation effort.

Following orders from Brigadier General Patrick J. Kelly, Director of Civil Works at Corps Headquarters, the *Yaquina* hopper dredge left Portland for Prince William Sound on April 11. Normally used to dredge silt from river channels and harbors on the coasts of Alaska, Washington, Oregon, California and Hawaii, this was the first time a hopper dredge had tried to recover oil. On the morning of April 17, her sister ship, the *Essayons*, steamed from Astoria, Oregon, also bound for Alaskan waters and the new task of collecting oil from the surface of the water.

Neither Exxon nor the Coast Guard particularly welcomed the arrival of the dredges. Exxon officials argued that the vessels were not necessary, and the

Coast Guard seemed convinced that the Defense Department was foisting the ships upon the Coast Guard's efforts.[79] The dredges' capacity for recovering oil had not been tested, and jurisdictional issues and political jockeying almost prevented this crucial trial run. As the cleanup proceeded, however, the Corps' dredges silenced the skeptics and thoroughly proved their effectiveness.

On April 18, the *Yaquina* arrived in Prince William Sound. The next morning, the ship edged into position next to two fishing boats that had a boom full of oil. The two boats maneuvered their "donut" of oil into position where the dredge could begin pumping. To test the oil's consistency, a crew member dropped a bucket onto the surface. Rather than sink, the bucket sat on top of the ten-inch thick "mousse" contained within the boom and laden with debris and seaweed. No aspect of the original plan to vacuum up the oil worked until Chief Mate Jimmy Holcroft suggested inverting the draghead 180 degrees, so rather than skim from the top, the draghead sucked oil from underneath the water's surface. Using this technique, which the crew immediately adopted, the dredge collected 1,500 barrels or 63,000 gallons in only fifteen minutes.[80] The *Yaquina* crew explained the draghead innovation to the *Essayons* crew so that they too could maximize the vessel's collection capacity. The crew of the *Essayons*, in turn, suggested the same adaptation for a Finnish-built Soviet skimmer/dredge, the *Vaydaghubsky*, called to assist at the spill by Exxon. Until the Soviet crew inverted their ship's draghead, they as well had little luck skimming oil from the water's surface.[81]

The *Yaquina* and *Essayons* continued recovering oil until mid-May, working various areas throughout the spill from Prince William Sound through the Gulf of Alaska and into the Shelikof Straits. They successfully accumulated 379,720 gallons of oil. Perhaps more importantly, the Corps' dredges had demonstrated that, with sufficient aerial support for locating oil, and with careful preparation to ensure a rapid early response, hopper dredges could play a decisive and critical role in future oil spill recovery.[82] The Corps' dredges also provided logistical support to smaller vessels and performed some of their own skimming, running a boom from the dredge to an accompanying ship, usually a fishing boat. Additionally, the *Essayons* served briefly in shoreline cleanup efforts. Workers loaded approximately 180 cubic yards of oily debris, sand, and gravel from the shores near Katmai National Monument into the dredger's hoppers. This mixture subsequently hardened like asphalt, proving extremely difficult to remove during cleaning of the *Essayons* before her return to Portland. For six

weeks, Exxon contract workers chipped, scaled, and shoveled pieces of the debris by hand until the dredge was sufficiently clean to resume its normal operations.[83]

On June 13, Secretary of the Army John Marsh, Jr., writing to Corps Headquarters, heartily commended the work of the dredge crews. Marsh especially praised the crews' "initiative and ingenuity to extend the capability of the dredges to collect and skim oil from the water surface," observing that their work had "greatly assisted the skimmer forces in collecting the maximum amount of oil in the shortest possible period of time."[84] *International Dredging Review* touted the Corps' dredge crew members as "heroes of the cleanup effort. They overcame the frustration of equipment that would not work and found a way to make it do the job."[85] The crew members of the *Yaquina* and the *Essayons* typified the Corps' proactive, flexible, and dedicated response to the *Exxon Valdez* crisis.

While the outfitting and operating of the two Corps' dredges was clearly the most demonstrably effective way in which the Corps participated in the cleanup, the Corps also contributed through its involvement in contingency planning, information dissemination, and technical assessment.

On April 6, to meet the demands of the oil spill, the Alaska District formed a Crisis Management Team and opened an Emergency Operations Center (EOC) in what would become its longest emergency operation — 65 days, most of that on a 24-hour basis.[86] Part of this team's responsibilities included planning with Defense Department officials in the event that Exxon failed to continue to meet its obligations. The Corps' capabilities in engineering, construction, and contracting ensured an important role for the Corps in this contingency preparedness.

Much of the actual planning work fell to North Pacific Division and Alaska District. These efforts included estimating the total number of contaminated shoreline miles and providing information daily to Corps Headquarters regarding projected costs, possible labor needs, and logistics. If implemented, the contingency plan would have created an Engineer Task Force to accomplish open water and shoreline cleanup as well as eventual environmental restoration of all impacted areas. The plan also detailed methods for handling public affairs and delineated command relationships. Because of time limitations, the plan envisioned using cost-plus contracts that under normal conditions the Corps did not use. The plan called for five large contracts: three beach cleanup proposals, one for hiring dredges, and one for oil recovery from water surfaces.[87]

In response to the possibility of increased contracting duties, the Alaska District's EOC assessed the types of contracting mechanisms that would be available on short notice. The EOC also contacted suppliers for information on accessible equipment that could be effective in cleanup operations. Additionally, the EOC collected and disseminated reports prepared by Exxon, the Coast Guard, the Regional Response Team, and the Joint Task Force.[88] The EOC also prepared its own pollution reports, forwarding these to Corps Headquarters, the Joint Task Force, North Pacific Division, and the Seattle District. EOC staff also prepared daily "Tempest Rapid" reports, which informed the Joint Task Force on such matters as numbers of Corps staff active in cleanup work, dredge location, and quantities of oil collected. EOC operators then sent the Tempest Rapid reports to the Coast Guard Marine Safety Offices in Anchorage and Valdez, via the Alaskan Air Command's computer system (OSCAR, Oil Spill Computer Automated Response) designed to coordinate all Joint Task Force efforts.[89]

Later assessments of emergency operations questioned the need for this plethora of reports, although given the critical nature of the moment, it is easy to understand the desire for as much information as possible, even if reports sometimes forwarded misinformation. Another criticism that subsequently emerged was the need for a more systematic and efficient means of sending reports; faxing documents — one of the transmitting methods — had consumed much of the EOC's time.[90]

In addition to providing daily information about the spill and participating in contingency planning, the Corps at the Joint Task Force's request analyzed Exxon's shoreline cleanup operations and offered an assessment of other methods of shoreline restoration. In response to the first request, the Alaska District produced a paper entitled "Shoreline Cleanup Analysis." District Engineer Colonel William Kakel further instructed staff from North Pacific Division as well as the Alaska District to respond to the Joint Task Force's second request. These staff members in turn submitted three sets of papers: one on employing dredges in shoreline remediation; one on hot water flushing methods; and another on additional shoreline cleanup techniques, written by scientists at the Corps' Waterways Experiment Station (WES) located in Vicksburg, Mississippi. Alaska District staff also conducted research on incineration techniques, examining different types of incinerators and methods for burning oil-soaked materials.[91]

By the end of May, nearly 9,000 workers hired by Exxon or other contractors were participating in shoreline cleanup efforts. Despite this large number of workers and the resources dedicated to shoreline remediation, no method proved

completely satisfactory. The most prevalent method involved pumping vast quantities of cold seawater from landing craft offshore to the tops of beaches. But this technique did nothing to extricate the oil that had seeped into the rocky beaches, and during the night the tide usually lifted oil to the surface or returned oil that had previously been washed off back ashore.[92]

Earlier in May, WES scientists had arrived to review and evaluate Exxon's methods for removing oil from shorelines. The WES team concluded that neither cold nor hot water flushing methods were proving materially effective. Neither technique could remove oil that had seeped into the cobble and gravel that comprised most of the impacted area's shores.[93] This analysis served to strengthen the importance of collecting oil mechanically while it remained on the water's surface, which in turn emphasized the need to respond as quickly as possible to any future oil spill.

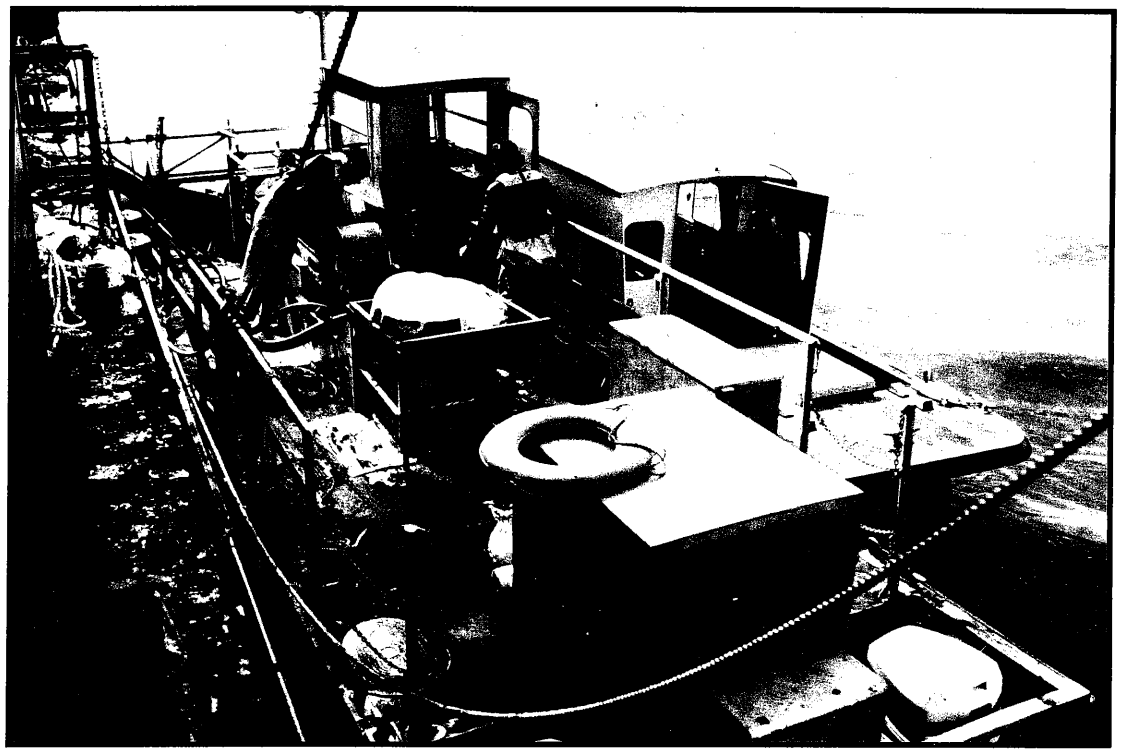
In mid-September, Exxon curtailed its shoreline operations for the winter. The federal on-scene coordinator, Vice Admiral Clyde Robbins, approved for demobilization a total of 1,632 miles of shoreline that had been "treated" — a mutually agreeable definition of "clean" having proved stubbornly elusive.[94]

Given the inadequacy of shoreline cleanup methods, the Corps focused its research and development work on improving techniques for locating and collecting oil. The Corps called on its Cold Regions Research and Engineering Laboratory to provide technical assistance in this area. In late April, a team of CRREL scientists began operating out of Joint Task Force headquarters at Elmendorf Air Force Base. This CRREL team contributed chiefly by providing remote sensing via a multispectral sensing package, including side-looking radar, optical sensors, and thermal infrared sensors. Without sufficient aircraft having both proper sensing capacity and video capabilities, the CRREL scientists were limited in their immediate effectiveness. Other disadvantages were the lack of data processing ability and the inability to send information regarding the oil's location to cleanup vessels. CRREL's participation, however, had certainly delineated questions and needs for future research.

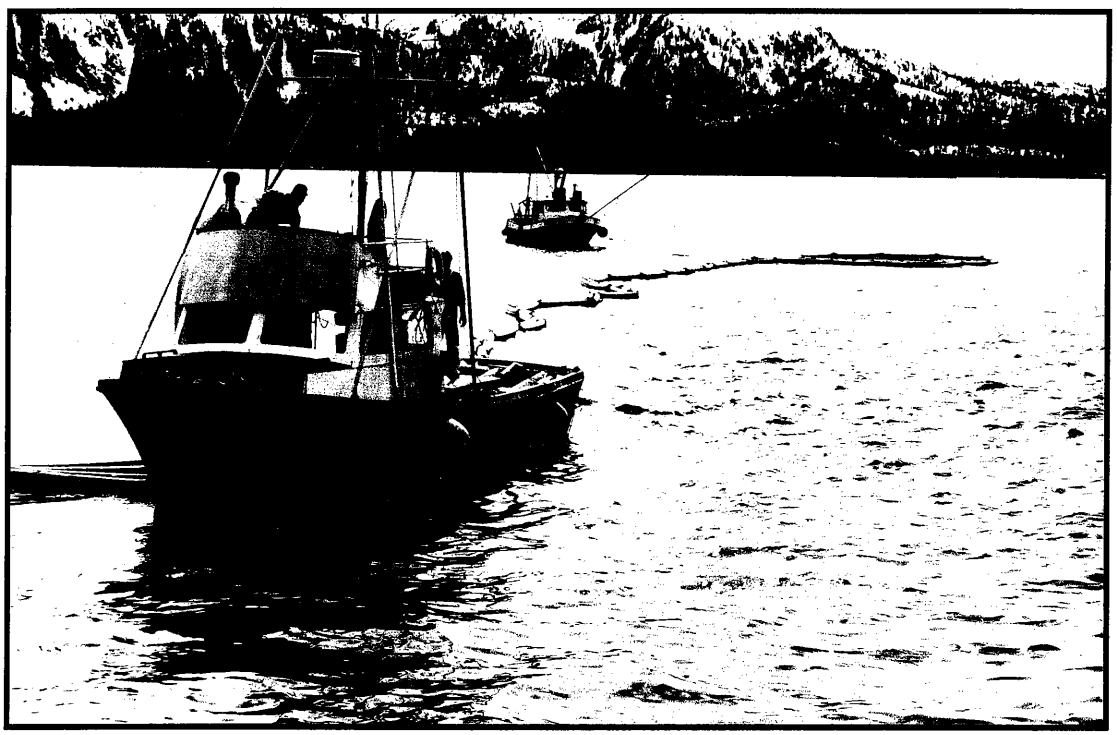
Despite valiant efforts on the part of numerous agencies and countless individuals, the general inadequacy of these cleanup operations — only about one-quarter of the oil that spilled from the *Exxon Valdez* was recovered[95] — reasserted the paramount need for prevention. Taking steps to avoid another large oil spill stood as a valuable lesson to the March 24, 1989, *Exxon Valdez* disaster. Similarly instructive were the lessons concerning the need for more

adequate spill preparedness; hopper dredges' capacity for collecting oil given sufficient aerial reconnaissance, and the importance of research into further modifications to make these dredges even more effective; the need to continue developing remote sensing abilities as well as devising a means of transmitting information about oil location to oil-collecting vessels; and the necessity for clearly delineated command and control procedures. During the oil spill cleanup, the Corps had participated in each of these lessons. The Alaska District proved itself a worthy player on the team chosen to ensure a federal presence in the oil spill response.

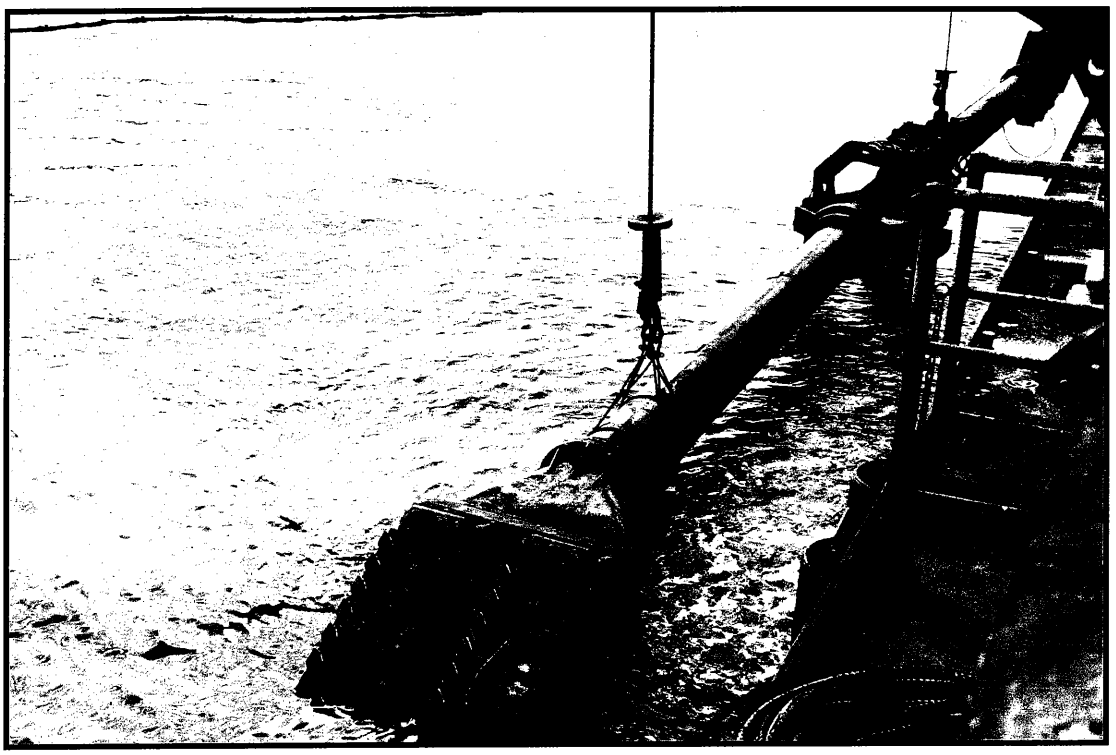
Also learned, or relearned, during the *Exxon Valdez* oil spill was that no two spills are the same. Alaska's unique environmental characteristics measurably impacted the recovery efforts. The coldness of the waters in Prince William Sound and the Gulf of Alaska affected how the oil reacted with the water. The icy temperatures of the shorelines hindered natural processes that would disperse oil and help impacted areas recover. Harsh weather often delayed cleanup activities and increased safety risks to workers. The remoteness of the spill complicated logistics and communications. Poor flying conditions and Alaska's vast distances — the spill covered an area that on the East Coast would have stretched from Boston to North Carolina — made media coverage of the spill difficult and generally frustrated remediation goals. Given the Corps' experience with Alaskan conditions, and with cleanup practices gained during its implementation of DERP, the Corps proved not only a worthy but also a veteran player in meeting the challenges presented by the *Exxon Valdez* oil spill.



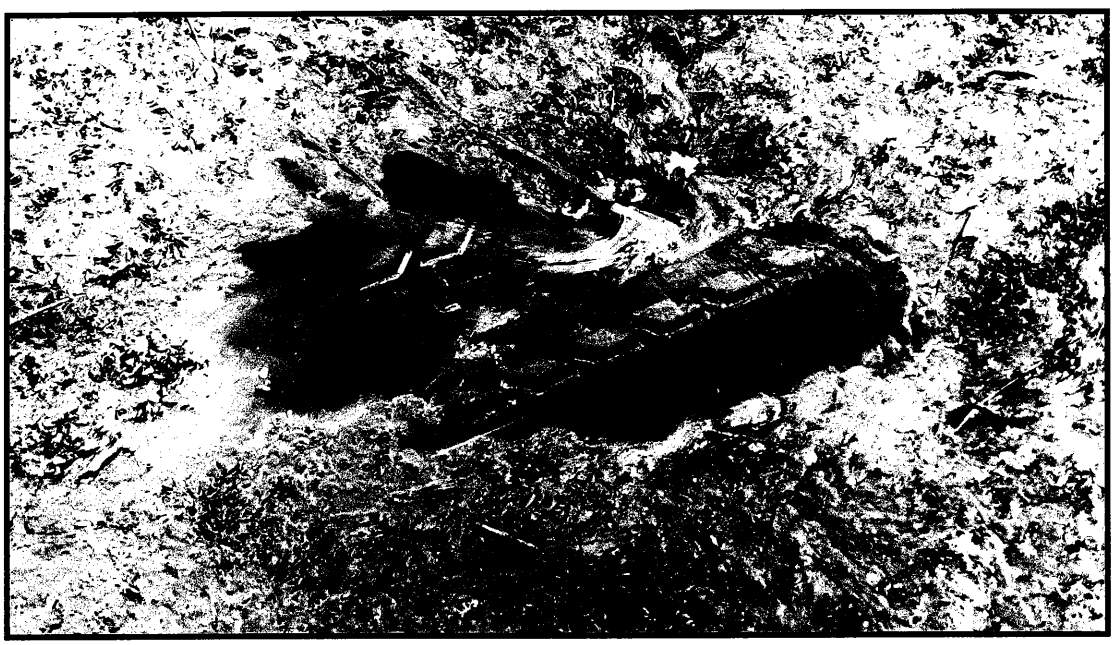
Army Corps of Engineers' hopper dredge, *Yaquina*, sailed to Prince William sound from Astoria, Oregon, arriving April 18, 1989. Modifications made room to carry an oil skimmer on board. The dredge, *Yaquina*, is at left, the skimmer in center and a launch at right. The Corps' larger hopper dredge, *Essayons*, was diverted from dredging San Francisco's harbor to Prince William Sound, arriving April 20, 1989.



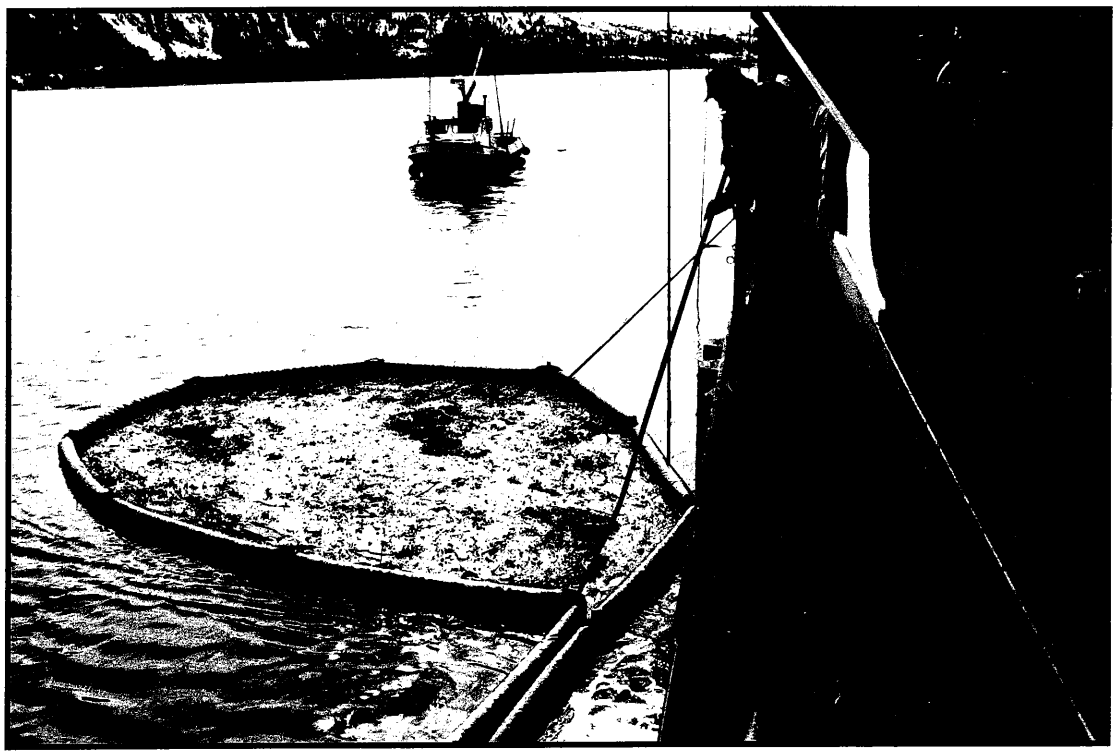
Fishing boats place boom in a circle around oil spilled in Prince William Sound.



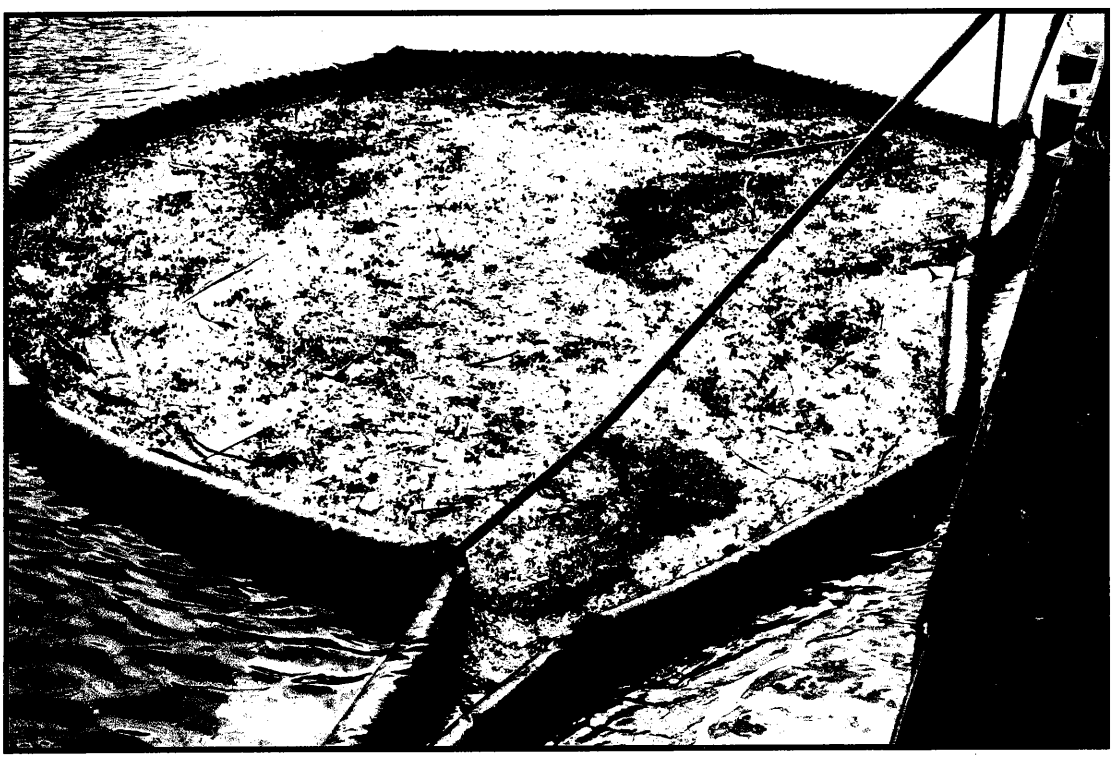
Draghead was turned upside down to suck oil out of a "donut", oil contained in a boom circle. The draghead dredges sand from the bottoms of rivers and oceans along the west coast. The Corps of Engineers' *Yaquina* crew at first tried taking in oil with the draghead in the normal position but found it took in too much water. A crew member suggested turning the draghead upside down. That innovation turned the hopper dredge from a bottom dredging craft into an oil-hungry pumper.

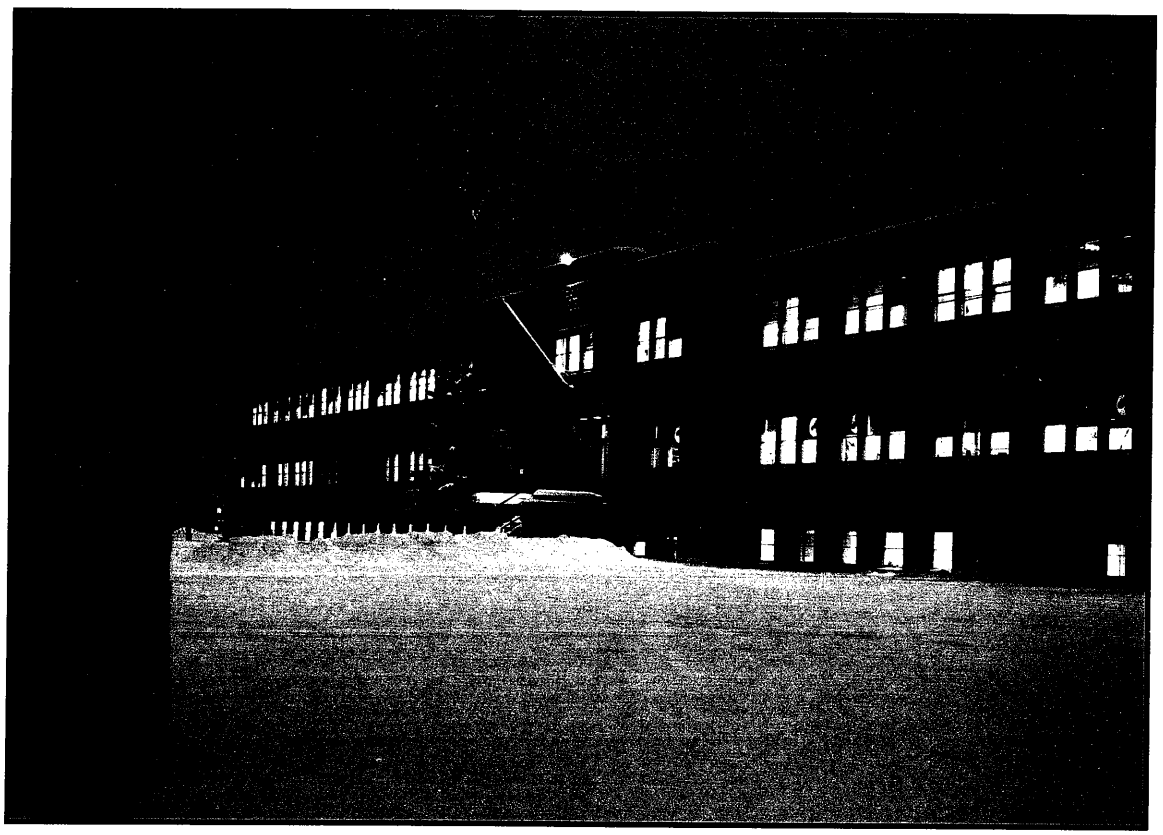


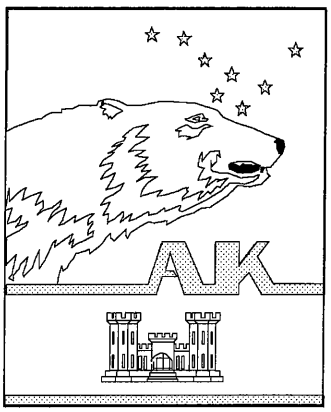
Inverted draghead comes up under oil, sucking it through the dragarm into the hopper. The U.S. Army Corps of Engineers' dredge, *Yaquina*, pumped up 1500 barrels of oil in 15 minutes on April 19, 1989.



Oil is contained by a boom circle in Prince William Sound. The oil is stored in the dredges' hopper until it can be offloaded into barges.







XIII. EPILOGUE

In summary, a number of significant developments affected the Alaska District between 1975 and the 1990s. Some of these date back to the early days of the Army Engineers in Alaska. During the modern era, for example, the Alaska District continued to confront difficulties stemming from the distinctive environment of the Far North. For all the advances in the state's transportation network, the lack of accessibility between some Corps projects and populated areas remained a problem. Although more information about the weather and terrain had become available, the Corps continued to encounter unusual conditions that required innovations in design and construction.

Another persistent theme reflected in the modern era is the large-scale development inspired by the Far North's natural resources. Plans for a colossal dam at Rampart Canyon resurfaced during this period. Although the proposal had originated decades earlier, it was reconsidered — and again rejected — during the late 1970s.

Additional large-scale projects included the Trans-Alaska Pipeline System, which began transporting oil from the Arctic to the port at Valdez in 1977. So momentous was the completion of this project that observers compared it to construction of the transcontinental railroad and the Panama Canal.[1] Owing to its regulatory responsibilities, the Corps reviewed the draft EIS, and surprised some environmentalists by criticizing the project.

In response to environmental legislation, the Corps' role in protecting natural resources expanded, affecting both civil and military projects. In addition to the agency's preparation of EISs, its monitoring of activities that affect wetlands and

navigable waterways increased. As the Alaska District continued its traditional role in assisting the military buildup of the modern era, the Corps also assumed a new role as an environmental engineering agency, investigating the deaths of waterfowl at ERF and cleaning up formerly used defense sites.

Limitations on federal funding brought further changes to Alaska District operations. The Water Resources Development Act of 1986, which emphasized cost sharing, encouraged state agencies and local residents to assume more responsibility for expenses for projects such as small boat harbors. By the mid-1980s, water resources development generally had become smaller in scope than earlier plans to construct enormous projects.

The appeal of the Far North increased throughout the modern era, as a growing number of Alaska District employees elected to remain in the state after retirement. Bill Oakes, Chief of Specifications, noted the continued attraction of Alaska. He and his wife moved to Anchorage from Seattle in the early 1960s. "When we came we never thought we'd be here the rest of our career," he reflected. "It's been a good country up here, a good place to raise a family."

■ ■ ■

Erwin Long, Chief of the Alaska District's Foundations and Materials Branch in the early 1970s, agreed. A pilot from Minnesota, Long first came to Alaska hoping to sell a plane. "I fell in love with the country," he recalled. Although Long returned to the University of Minnesota to complete his engineering degree, the day after graduation he left for Alaska, and has "been up here ever since."

... from Oakes and Long Interviews

At the end of the 20th century, the Alaska District faced numerous challenges, particularly in the environmental arena and in project funding. As their history demonstrates, however, the Army Engineers gained considerable experience adapting to new circumstances and devising innovative solutions to problems in the Far North. General Talley had observed during the 1940s that "the changes in Alaska perhaps have been no greater than the changes in many of us up here — myself included."[2] This experience should prove useful as the Alaska District faces the challenges that lie ahead.

APPENDIX

- ***Acronymns for Army Engineers in Alaska***
- ***Timeline***
- ***Alaska District Engineers***

ACRONYMNS FOR ARMY ENGINEERS IN ALASKA

ACRONYM	DEFINITION
ALCAN	Alaska-Canada Highway
ADC	Alaska Defense Command
ALSIB	Alaska-Siberia Project
APA	Alaska Power Administration
ARC	Alaska Road Commission
ATC	Air Transport Command
ATS	Army Transport Service
AWS	Aircraft Warning System
CAA	Civilian Aeronautics Administration
CANOL	Canadian Oil Line
CCC	Civilian Conservation Corps
cfs	cubic feet per second
CRREL	Cold Regions Research and Engineering Laboratory
DERP	Defense Environmental Restoration Program
DEW	Distant Early Warning
EIS	Environmental Impact Statement
EOC	Emergency Operations Center
ERF	Eagle River Flats
HES	Hunter Environmental Services
JSS/ROCC	Joint Surveillance System/Region Operations Control Center
MARS	Minimally Attended Radar System
NAWAPA	North American Water and Power Alliance
NEPA	National Environmental Policy Act
OMB	Office of Management and Budget
OSCAR	Oil Spill Computer Automated Response
PCBs	polychlorinated biphenyls
RCAF	Royal Canadian Air Force
TAPS	Trans-Alaska Pipeline System
USFWS	U.S. Fish and Wildlife Service
WACS	White Alice Communications System
WAMCATS	Washington-Alaska Military Cable & Telegraph System
WDC	Western Defense Command

ALASKA DISTRICT ENGINEERS: 1946 - 1996

NAME	DATES
Colonel James D. Lang	May 1, 1946 - April 8, 1948
Colonel William E. Potter	April 9, 1948 - April 11, 1949
Colonel Lyle E. Seeman	April 12, 1949 - June 26, 1952
Colonel Louis H. Foote	June 27, 1952 - April 30, 1954
Colonel Carl Y. Farrell	May 1, 1954 - May 30, 1956
Colonel Pierre V. Kieffer, Jr.	August 23, 1956 - June 30, 1958
Colonel William C. Gribble, Jr.	July 1, 1958 - June 30, 1960
Colonel Christian Hanburger	July 1, 1960 - December 18, 1962
Colonel Kenneth T. Sawyer	December 19, 1962 - August 22, 1964
Colonel Clare F. Farley	August 23, 1964 - August 2, 1967
Colonel Ernest L. Hardin, Jr.	August 3, 1967 - July 19, 1970
Colonel Amos C. Mathews	July 20, 1970 - June 29, 1973
Colonel Charles A. Debelius	August 8, 1973 - June 3, 1976
Colonel George R. Robertson	June 17, 1976 - June 13, 1979
Colonel Lee R. Nunn	June 14, 1979 - May 24, 1982
Colonel Neil E. Saling	May 25, 1982 - June 11, 1985
Colonel Wilbur T. Gregory, Jr.	July 26, 1985 - June 29, 1988
Colonel William W. Kakel	July 15, 1988 - July 12, 1991
Colonel John W. Pierce	July 12, 1991 - July 12, 1994
Colonel Peter A. Topp	July 12, 1994 - present

TIMELINE: 1867–1989

1867	The United States purchases Alaska from the Russians for $7.2 million.
1869	Captain Charles Raymond initiates Army survey work out of Fort Yukon.
1902	The Rivers and Harbors Act authorizes preliminary surveys of Wrangell Narrows.
1914-1915	Congress authorizes construction of the Alaska Railroad — and Anchorage becomes its headquarters. Thousands of workers form a tent city along the banks of Ship Creek.
1923	Alaska Railroad is completed.
1940	Construction of Ladd and Elmendorf fields commences during the summer. In November, the Army post at Elmendorf is named Fort Richardson, in honor of Brigadier General Wilds P. Richardson. Elmendorf field is named for Captain Hugh M. Elmendorf, Air Corps.
1942	Japan attacks the Aleutian Islands — and the Corps builds the Alaska Highway.
1946	The Alaska District is established.
1957	The Corps begins work on Operation Stretchout, an extension of the DEWline.
1959	Alaska becomes the 49th State.
1964	The Good Friday earthquake hits South Central Alaska; the Corps assists in recovery efforts.
1967	The Chena River flood devastates the Fairbanks area; Corps responds to the emergency.
1971	As part of its regulatory duties, the Alaska District responds critically to the Department of Interior's Draft Environmental Impact Statement for the Trans-Alaska pipeline.
1973	The Alaska District completes the first phase of Snettisham Hydroelectric Project.
1979	The Alaska District completes the Chena River Lakes Flood Control Project.
1982	The Corps awards contracts for constructing the first Minimally Attended Radar Sites.
1989	The *Exxon Valdez* oil spill fouls Prince William Sound; the Corps assists in cleanup operations.
1989	The Alaska District completes the second phase of Snettisham.