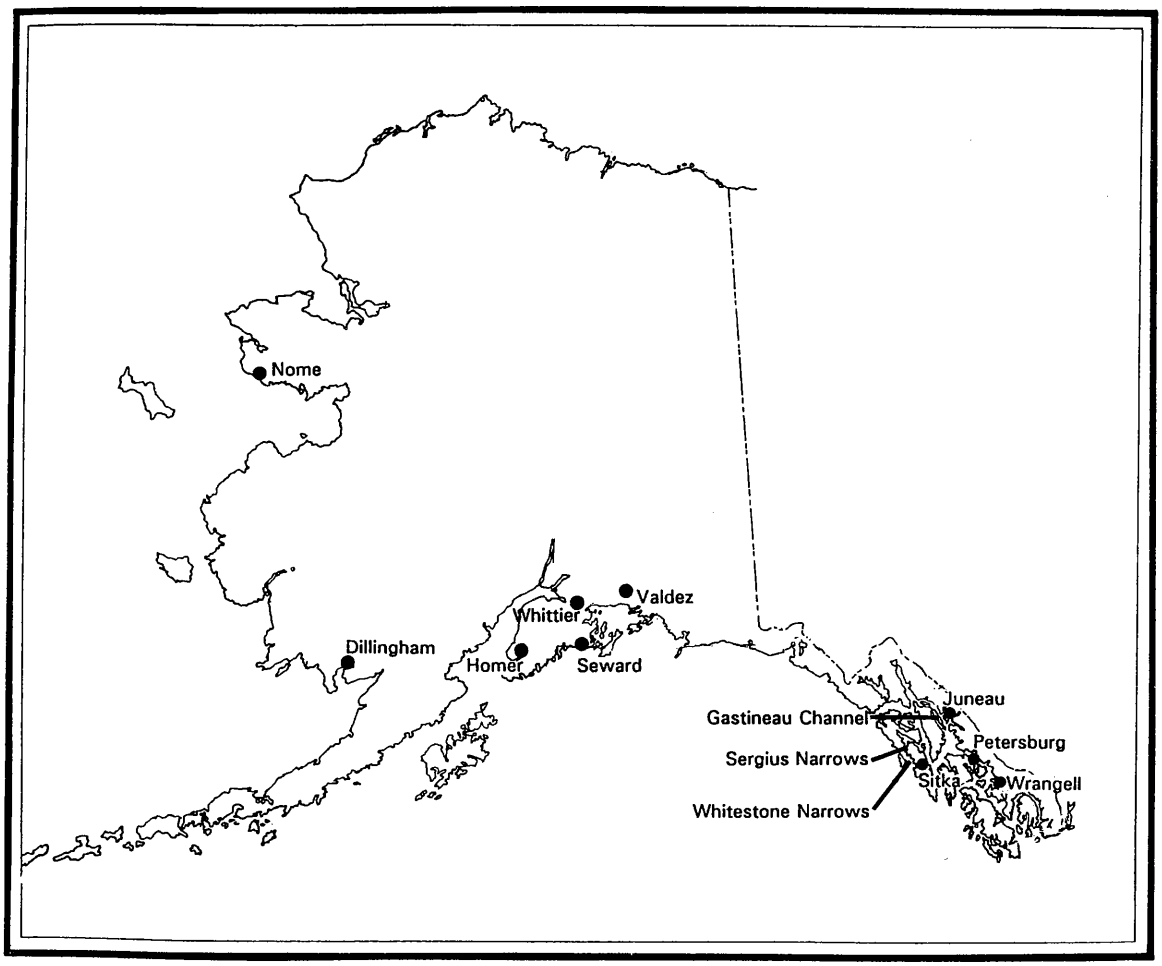
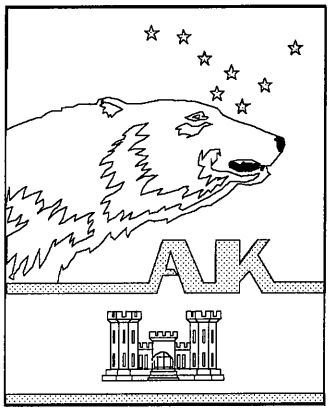


Alaska harbor improvements.



VI. CIVIL WORKS IN ALASKA

EARLY DEVELOPMENT

The Army Engineers had constructed civil works projects in Alaska since the early 20th century. During World War II, however, the Corps remained focused on military projects. By the mid-20th century, the agency predicted that "the Civil Works program could become most important to the future of Alaska." For all the urgency of the Cold War, Alaska District Engineer Colonel P. V. Kieffer, Jr. observed that "Military construction by its nature is not a reliable and continuing business." Alaska should "look forward to a constantly-expanding Civil Works program," he concluded. "This is the program which should receive the emphasis over the long pull in the future."[1] Other observers similarly noted that military projects alone would not provide a stable economy in the Far North. "If Alaska is to avoid a period of decline or stagnation," economist George W. Rogers predicted in the early 1960s, "its natural resources must provide the basis for expansion."[2]

On July 1, 1949, the Alaska District assumed responsibility from the Seattle District for the Corps' civil works functions in the Far North. After this date, the Alaska District took charge of all water resources development, including navigation and harbor projects, flood-control work, and hydroelectric power investigations. Alaska District Engineer Colonel William E. Potter, in his March 28, 1949 "Information Bulletin Number 1," anticipated that the Corps' efforts in civil works projects would "benefit the civilian communities and aid in the development of the Territory."[3]

Some officials, such as Territorial Governor Ernest Gruening, cast the need for the development of Alaska, in which the Corps' civil works projects would

play a major part, in the light of fighting the Cold War on the home front. In 1949, the year that the Alaska District acquired this responsibility, Governor Gruening expressed his views on Alaska's future in an address to the 19th territorial legislature. Gruening warned that across the Bering Strait, "another way of life, which contrasts wholly with American ideals of freedom, is strongly entrenched and active in pursuit of its goals." Alaska, he asserted, "should become a bulwark not merely of physical defense, but of the American idea." This meant pursuing advances in social services, transportation, and communications, all contributory, according to Gruening, to permanence and security in the region. In 1952, in his annual report to the Secretary of the Interior, Gruening again painted the increased development of Alaska as necessary because it stood as "a contrasting citadel of civilization." Here in the Far North, society could "embody, ideologically, our heritage of freedom and the limitless potentialities flowing from it."[4]

Gruening's comments often appeared in conjunction with his pro-statehood stance. President Truman, also advocating statehood for Alaska, had recognized that the strong defense of the region required its further social and economic advancement. Truman noted that a key obstacle to this development had been the embryonic state of the Territory's transportation system: "From the standpoint both of military and civilian development," the President advised, "much needs to be done immediately to improve transportation in Alaska." Truman observed that weather conditions were "difficult," adequate ports were "few and scattered," and shipping traffic was "very unbalanced at different seasons." At several Alaskan ports, the President also found a need for better docking and storage facilities. In this regard, he referred to the Corps' involvement both in improving several harbors and in conducting surveys to determine the need for future harbor and navigation projects.[5]

WATER RESOURCES DEVELOPMENT

The Far North has long been known for its abundant natural resources, including wildlife, minerals, and timber. By the mid-20th century, water had become one of Alaska's most valuable assets. The Corps recognized that its development would encourage the growth of agriculture, hydroelectricity, shipping, and recreation. In the late 1950s, just before Alaska achieved statehood, the agency viewed the Territory's possibilities for water resources work with considerable enthusiasm.

Assistant District Engineer Lieutenant Colonel William H. H. Mullin was especially optimistic. "I feel very strongly that we are now on the threshold of an era of development which has no parallel in history," he predicted in 1958.[6] Four years later, Assistant District Engineer Colonel Kenneth T. Sawyer pointed out that Alaska had far more miles of coast line than any state in the nation, and that the region included two enormous river basins: the Yukon and Kuskokwim. "The potential," he noted, "defies the imagination and challenges our best efforts."[7]

The Alaska District inherited many of its civil works projects from the Seattle District, which had also been directed by the Flood Control Act of 1948 to initiate a comprehensive survey of the Far North's water resources. Implementing this directive, the Alaska District examined seven separate regions. Water resources development in each region became the subject of individual interim reports, each later published as a House Document between 1954 and 1964. The seven reports subsequently "formed the basis for the approval and development of water resources projects" throughout Alaska.[8]

The first of these reports, completed in February of 1952, presented the Corps' findings in its survey of the possibilities for improving harbors in southeastern Alaska. This included studies of the following small boat harbors: Gustavus, Haines, Hoonah, Hydaburg, Kake, Petersburg, Port Alexander, Wrangell and Tenakee. Additionally, the Alaska District examined the advisability of deepening a channel through the portage that connected Seymour Canal and Oliver Inlet. In many of these early studies, the Alaska District recommended deferring improvements until they became more economically feasible.[9]

The second report, done by January of 1950 but not printed until 1957, focused on Cook Inlet. This paper reviewed potential development of harbors at Anchorage, Kasilof, and Kenai. The report also examined the possibility of building causeways across Knik and Turnagain Arms of Cook Inlet. In addition, the second report looked at flooding problems in the Knik River Basin and on the Little Susitna and Matanuska rivers.[10]

In the third of these reports, also completed in 1950, the Corps surveyed the Copper River region and the Gulf Coast. Navigation projects included the expansion of harbors at Cordova, Seward, and Valdez. Within less than a year, the agency had also finished the fourth report. It primarily concentrated on flood control problems of the Tanana River Basin.[11]

By January, 1954, the Corps had completed the fifth document in this series. Its focus was Southwestern Alaska. Navigation projects reviewed in the report included ice problems at Kodiak Harbor and the advisability of improvements to the Upper Kvichak River channel.[12]

The sixth interim report, done by 1957, presented the Corps' findings of a survey of hydroelectric power sites in Northwestern Alaska. The seventh and final interim report, finished in 1962, similarly investigated potential power sites in the Yukon and Kuskokwim basins.[13]

HARBOR AND NAVIGATION IMPROVEMENT

The comprehensive regional survey of Alaska's water resources represented only a part of the Corps' involvement in developing small boat harbors and deepening channels to improve navigation in Alaska. The Rivers and Harbors Act of 1824 had granted the Corps the authority to plan and construct navigation improvements. When Congress authorized a specific civil works project, usually in response to requests from local interests, then the Alaska District planned and constructed, or supervised the construction of, the necessary improvements. Long-time employee Wendell Moore considered the Corps' work on small harbors to be one of the most important features of the District's efforts in Alaska. "[W]e traveled down southeastern constantly," he recalled. "It was just one harbor after another there for a few years." Moore also noted that, after finishing the construction of a small boat harbor, the Alaska District also needed to maintain it. This work often required annual dredging, which meant, as Moore explained, "keeping them up to a certain specification so that the boats can all be brought safely into the harbors."[14]

In Southeastern Alaska, the Corps either built or improved harbors at 11 locations, including Ketchikan, Wrangell, Petersburg, Sitka, Juneau, Douglas, Skagway, Metlakatla, Elfin Cove, Pelican, and Craig. In addition, the Alaska District worked on channel improvements at Wrangell Narrows, Gastineau Channel, Whitestone and Sergius Narrows, Rocky Pass, and Dry Pass.[15]

The Corps also actively developed harbors in the Gulf of Alaska and Prince William Sound. These included the principal ports of Seward, Whittier, and Valdez, each important as a connecting point for transporting freight to the interior; and Cordova, once important for service to mining interests but now more important as a fishing center.[16]

In Cook Inlet, the Alaska District cooperated with municipal authorities to develop the harbor and dock facilities at Anchorage. The Corps' work on the Anchorage harbor focused on monitoring conditions there and dredging when necessary. By 1974, the cost of this work had reached nearly $2 million.[17] Other projects along Cook Inlet included improvements to Seldovia's waterfront and harbor; channel deepening at the mouth of the Ninilchik River; clearing operations at the mouth of the Kenai River; and expansion of the harbor at Homer.[18]

On Kodiak Island, the Alaska District supervised the dredging of the basin at Old Harbor as well as the building of an earth-filled dike there. At Kodiak, the Corps completed a dredging project begun by the Seattle District and supervised the construction of a new small boat basin.[19]

In western Alaska, the agency focused on siltation problems at Dillingham; the removal of hazardous rocks from the Naknek River near King Salmon Air Force station; and at Nome the construction of a seawall, dredging of a turning basin, and repair of the harbor's original jetties.[20] Assessing all the harbor and navigation projects accomplished by 1968, Alaska District employee Don Wilbur stated that this work had provided "21 small-boat harbors capable of accommodating 4,765 craft with a total physical output of 95,300 tons of fish catch" and over six million "ton-miles of commerce annually." By the late 1960s then, the Corps' civil works program in Alaska had measurably contributed to the improvement of the state's transportation system, which, in turn, augmented the state's economic viability.[21]

Specific Harbor and Navigation Improvement Projects

Nome

One of the first projects completed by the Alaska District was construction of a seawall measuring 3,350 feet in length at Nome harbor. The seawall was necessary owing to severe storms that had resulted in the loss of life, and had caused beach erosion and serious damage to buildings. Located on the Seward Peninsula some 540 air miles from Anchorage, Nome had been an important commercial and transportation center since the days of the gold rush. The Corps' prior efforts at Nome date from 1917, when work on the small harbor first commenced. Features of the harbor included two entrance jetties that extend into Norton Sound, riverbank revetments, and a dredged channel and turning basin.

The Corps' responsibilities at Nome also included annual dredging. Without this yearly maintenance work, the harbor's basin would quickly become clogged with silt from the glacier-fed Snake River.[22]

Congress authorized the construction of the seawall in 1948. Justification for the project reflected the Cold War perspective that characterized this period. The Senate Committee on Public Works, for example, in its report regarding the seawall, observed that Nome was located "only 160 miles from Russia." Reasoning that, because Nome was "one of the most northerly outposts of the United States" as well as "the sole supply center" for nearby military installations and most of northwest Alaska, the Senate recommended constructing the seawall.[23]

By the mid-1970s, the Nome harbor continued to facilitate commerce and transportation in this part of Alaska. The seawall proved essential to the protection of both private and public property. The Corps continued to dredge the harbor annually, and in 1964, replaced old equipment by purchasing a clamshell dredge, the *Gilpin*, and a tugboat, the *Yamhill*. In its 1974 Draft Environmental Impact Statement, prepared as a preliminary step to conducting yearly dredging operations, the Alaska District recognized that the Nome harbor and seawall together had played an important role in the "economic and social well-being of the Nome community." Chief among the benefits of the federal project at Nome were the "reduced freight and transportation costs," as well as "the provision of a harbor of refuge."[24] By 1977, total federal expenditures at the Nome harbor had exceeded $5 million.[25]

Dillingham

Dillingham, located near the confluence of the Wood and Nushagak rivers in the Bristol Bay area of Southwestern Alaska, serves as an example of a Corps' harbor project assisting a small community, populated primarily by Natives. Transportation in this remote area relies solely on air or water travel. The harbor remains ice-free only from May through October. Prior to construction of the harbor, all cargo destined for Dillingham and vicinity was lightered ashore and unloaded on the beach. Handling freight in this manner often resulted in delays and breakage. Also, without a harbor of refuge, the sudden and violent storms characteristic of this area frequently caused serious damage to fishing boats and other equipment.[26]

The Alaska District's *Interim Report no. 5*, completed in 1954, proposed the construction of the small boat harbor at Dillingham. Congress approved the project in 1958. Its features consisted of a 5.3-acre harbor dredged to a depth of two feet above mean lower low water (MLLW); an entrance channel, 40 feet wide and 1,100 feet long; and a rock sill across the basin outlet with a top elevation of seven feet above MLLW.[27]

In June, 1960, the Corps awarded a contract for the project. By September, initial dredging had begun, and by May, 1962, the project was completed. Soon thereafter, the harbor began to fill with silt from tide-borne sediments, prompting lengthy studies of the siltation problem conducted both by the Corps and the U.S. Geological Survey. In 1969, the Alaska District purchased a small suction dredge, the *Dillingham*, to perform annual dredging operations at the harbor. Nearly every year since, the Corps has overseen the dredging of approximately 60,000 cubic yards of material from Dillingham harbor.[28]

The Alaska District's efforts at Dillingham have resulted in the construction of a harbor that provides all-tide moorage and half-tide access to a fleet of 200 boats. The community and surrounding areas, heavily dependent on both water transportation and the fishing industry, have benefitted greatly from the addition of this harbor. Among the specific benefits are the following: a sheltered basin for moorage and boat repair; a base for fishing operations; improved efficiency in fishing activities as well as in general freight delivery; and a resupply point for Dillingham and vicinity. As of the late 1970s, federal expenditures on the project amounted to just less than $1,800,000.[29]

Homer

Like the project at Dillingham, the small boat harbor improvements at Homer had been the subject of one of the Corps' interim reports, in this case, *Interim Report no. 2*. Unlike Dillingham, however, justification for the project focused more on improved service to the fishing and tourist industries than on transportation needs in a remote area. Homer is located on the Kenai Peninsula, near the confluence of Kachemak Bay and Cook Inlet, about 125 air miles southwest of Anchorage. Completed by September, 1962, the project at Homer first consisted of an L-shaped breakwater, 840 feet long, which enclosed a mooring area of 2.8 acres. Large enough for a 70-boat fleet, the initial phase of this small boat harbor project cost over $600,000.[30]

The March 27, 1964 earthquake, however, ensured that additional work at Homer would be necessary. While the harbor at Homer, as well as all of Homer Spit, seemed at first to have escaped damage, in the weeks following the earthquake the Spit lost more than six feet in elevation. This essentially destroyed the small boat harbor, and by the end of the year, the land subsidence had also ruined the old city dock.[31]

The Corps quickly responded by selecting a new site for the Homer harbor. This resulted in one of the few "keyhole" harbors in Alaska, "constructed by cutting into the land rather than by extending a protective structure into an existing waterway."[32] Features of the replaced harbor include a 10-acre mooring basin, dredged to a depth of 15 feet below MLLW; an entrance channel 120 feet in width; and two rock breakwaters, 1,018 and 238 feet in length, built to protect the entrance channel.[33]

A city-financed project, supervised by the Corps, increased the size of the Homer harbor by dredging an additional 6.4 acres to a 16-foot depth. Completed by 1965, the joint project provided moorage to a maximum of 200 vessels, serving the commercial fishing and tourist industries. Within the next seven years, local interests financed the continued expansion of the harbor, nearly doubling its capacity. Maintenance work at Homer, an additional responsibility of the Alaska District, required the dredging of the entrance channel approximately once every three years. Typically, this operation involved the removal of 15,000 cubic yards of material.[34]

Economic benefits accruing from the Alaska District's efforts at Homer include an extended fishing season, greater efficiency in fishing operations, and growing recreational use of the area. By the mid-1970s, reflecting the increased interest in developing the oil industry in Cook Inlet, the harbor had also begun to serve oil company vessels. Responding to the Corps' Draft Environmental Impact Statement for maintenance operations, submitted in 1973, the Alaska Department of Economic Development concluded that, because the small boat harbor contributed to the continued economic vitality of the Homer area, the Alaska District's maintenance work of the harbor was no less than "mandatory." By 1977, federal expenditures to build, restore, and maintain the Homer harbor had exceeded $3.5 million.[35]

Whitestone and Sergius Narrows

In addition to developing small boat harbors along Alaska's more than 33,000-mile shoreline, the Corps has also improved navigation at several locations. In Southeastern Alaska, near Sitka, the District enlarged Whitestone Narrows, providing a deep-draft channel about a mile in length, 200 feet in width, and 24 feet deep. Completed in 1959 at a cost of over $150,000, the Corps continued to maintain the project at Whitestone for several years.[36]

In 1968, Congress authorized a modification of the original project to widen the channel at Whitestone Narrows by another 300 feet, and to deepen the waterway at Sergius Narrows. This second phase of the modified project involved the removal of submerged rock ledges and pinnacles in order to create a navigation channel 450 feet in width and 24 feet deep.[37]

Local interests, particularly at a public hearing held at Sitka on April 12, 1965, had expressed the need for the additional work at Whitestone and Sergius Narrows in order to increase the efficiency of waterborne commerce. Prior to these improvements, substantial and expensive delays had occurred while ships, able to traverse the Narrows only at or near slack water, waited for favorable tidal conditions. Vessels had also incurred costly damages as a result of several groundings in the area.[38]

Part of the process in developing harbor and navigation projects involved cooperation with other federal and state offices. While planning the Whitestone and Sergius Narrows improvements, for example, the Alaska District sought the views of several of these agencies, including the U.S. Fish and Wildlife Service and the Alaska Department of Fish and Game. In this case, these efforts led to a decision to prevent blasting during the period from June through September in order to protect fish species, especially immature salmon and salmon eggs.[39]

The commercial fishing industry, crucial to the economy of this region in Alaska, benefitted from the channel improvements at Whitestone and Sergius Narrows. Other key beneficiaries included the logging and wood pulp manufacturing industries. Additionally, because of fewer delays and safer conditions, the state ferry system profited from these navigational improvements. This in turn helped to increase the growing tourist business in Southeastern Alaska.[40] Once again, the Corps' ability to respond to local needs with the efficient planning and construction of harbor and navigation projects had contributed to an area's

economic and social development. As of 1977, federal expenditures at Whitestone and Sergius Narrows reached nearly $2 million.[41]

Gastineau Channel

Not all Corps harbor and navigation projects, however, have enjoyed complete success. At Gastineau Channel, for instance, excessive shoaling continued to frustrate the Corps. Located between mainland Alaska and Douglas Island near Juneau, Gastineau Channel is 19 miles long; at its western end, alluvial deposits accumulate, creating in part what is known as Mendenhall Bar. Residents of the area rely totally on air and sea travel. The alternate route around Douglas Island is slower and less sheltered.[42]

The initial project at Gastineau was completed in 1960. This involved dredging the channel from Juneau northwest to Fritz Cove, for a distance of 4.5 miles and a width of 75 feet. Almost immediately, serious shoaling followed the dredging operation. During a 1994 interview, Wendell Moore remembered that after resurveying and redredging, the shoaling continued to be a problem. Explaining that at Gastineau Channel, "the tide comes in from both directions," Moore added that the channel "fills back up fed by a glacier," a reference to Mendenhall Glacier. He noted that, as of 1994, the surrounding communities were "still playing games with the tide," waiting for the best time to traverse the channel. Moore observed that this affected both the ferry system and the fishing industry. Suggesting that "sometimes nature gets you" despite all efforts, Moore further speculated that Gastineau Channel represented "God's way of saying this is the way it's going to be."[43]

■ ■ ■ ■ ■

Responsibility for developing small harbors and improving navigation fell to the Corps as part of its civil works program. As testimony to the government's commitment to encouraging the development of Alaska, total federal expenditures on harbor and navigation projects through the mid-1970s had reached nearly $50 million.[44] In Alaska, where remoteness and terrain often combine to produce a heavy reliance on sea travel, the Corps, since 1949, has contributed to the safety and efficiency of that travel. Between 1949 and 1974, the agency tackled the planning, surveying, designing, and contracting work for harbor and navigation projects in over 35 locations along Alaska's vast shoreline. Following a process that included first responding to local needs, and then presenting projects to Congress in order to receive authorization and funding, the Alaska

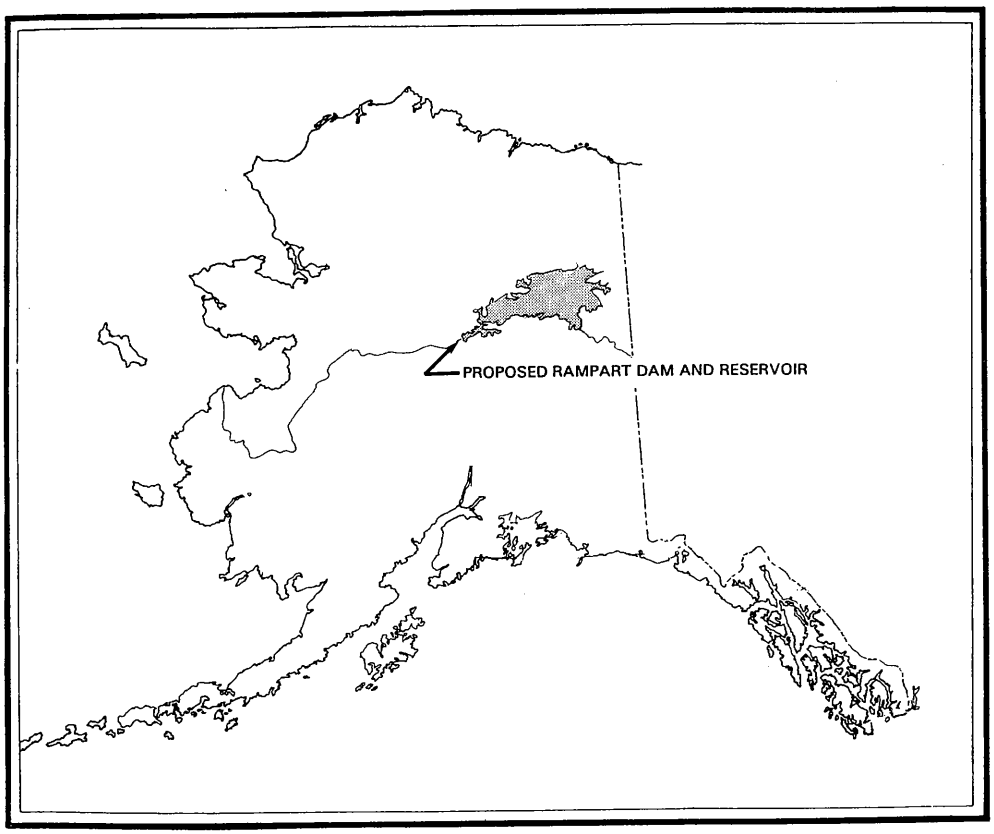
District, as Colonel A. C. Welling explained, has acted "as an agent of the people and as a consultant to Congress."[45] The Alaska District's job has entailed making recommendations regarding both the engineering feasibility and economic potential of any given project. During this period, Alaska's economy, population, and transportation system grew and prospered in part due to the ongoing efforts of the Corps.

HYDROELECTRIC DEVELOPMENT

Since 1824, the Corps' mission has included navigation, harbor improvements, and flood protection. In the late 1920s, the Corps' responsibilities broadened to include large multipurpose dams that spanned entire river basins. These projects were designed to provide power, irrigation, and improved transportation. During the early 20th century, they alleviated unemployment and promoted regional development. By the 1960s, however, the emerging environmental movement, with its focus on protection of ecosystems and its questioning of traditional values, had encouraged Americans to view hydroelectric dams with an increasingly critical eye.[46] During the 1960s, this development affected the fate of large multipurpose projects in Alaska.

The mandate to develop the state's hydropower had originated with the Flood Control Acts of 1948 and 1950, which, as noted, authorized the agency to conduct surveys with a view to navigation and power improvements. At this time the Department of the Interior also funded its own dam-building agency, the Bureau of Reclamation, to study the potential of Alaska's water resources. These investigations provided the basis for a "master plan" of water resources development, which the Corps considered to be "one of the most significant and important mileposts" of its work in Alaska.[47] Hydroelectric power in particular was viewed as being "the touchstone to general economic development."[48]

In its series of reports on water resources issued as House Documents from 1954 to 1964, the Corps emphasized the potential for hydroelectric development, particularly on the Yukon, Alaska's largest river, and around Juneau. From the late 1950s to the 1980s, the Corps pursued the hydroelectric projects outlined in the reports.[49]



Proposed Rampart Dam.

Rampart Dam Proposal

Of the nine potential dam sites the Corps identified along the Yukon River in 1954, one seemed especially promising. This was Rampart Canyon, a 100-mile gorge downstream from the Yukon Flats in central Alaska. Here the Corps proposed to build a dam providing twice the capacity of the nation's largest hydroelectric project, Grand Coulee on the Columbia River. When completed, Rampart Dam would flood the Yukon Flats, creating a reservoir the size of Lake Erie. This project, which would have become the world's biggest dam, had the potential to provide 5 million kilowatts, in comparison to Grand Coulee's 2.2 million. Its power lines would have transmitted power 2,000 miles, to Canada and the Lower 48.[50]

Rampart Dam would also prove to be an immense project in terms of the labor and expenditure it required. Plans included the establishment of a community to support construction workers and operations personnel, and the

Corps was to provide fish passages as well as recreational facilities. The Alaska District estimated that construction would span eight years and would cost approximately $2 billion.[51]

Initially, the Rampart Dam Project appealed to many employees in the Alaska District. To them, it represented an engineering challenge in the tradition of the construction of the Alaska Highway. Plans called for a concrete gravity structure with a crest line of 4,700 feet and a maximum height of 530 feet, and the reservoir behind the dam would have taken approximately 22 years to fill.[52]

Some officials in the Corps associated Rampart Dam with the large hydroelectric projects of the Pacific Northwest, including Bonneville and Grand Coulee dams. As early as 1957, Alaska District Engineer Colonel P. V. Kieffer, Jr. informed the Alaska Rural Electric Cooperative Association, "We have been stimulated as we see Pacific Northwest history repeating itself here in Alaska."[53] During the 1960s, the Alaska District continued to view Rampart Dam construction as part of a larger history. "Once the Yukon was said to be paved with gold," one press release read. "Interest in the river country, long quiescent, now is reviving because the old dream is reinterpreted." Water had replaced gold as the attractive resource in Alaska. While the development spurred by the gold rush had proven to be transitory, however, the prosperity that Rampart Dam would bring "may be as permanent as Rome."[54]

Throughout the 1950s and 1960s, promoters argued that Alaska's growth depended on the availability of inexpensive power. What the economy of the Far North needed, Senator Henry Jackson of Washington noted in 1953, was "just a little electric push to get off dead center." In his estimation, the lack of low-cost power prevented industries from locating in Alaska.[55] Similarly, Senator Richard L. Neuberger of Oregon predicted in 1959 that electricity would lure the lucrative aluminum industry to Alaska. During the late 1950s, Senator Ernest Gruening, Alaska's former territorial governor, launched a campaign in favor of its construction.[56] The ensuing controversy revealed much about the nation's political climate, as well as its changing attitudes toward the natural world and the Alaskan wilderness.

By 1960, the proposal to build Rampart Dam had gained momentum. That year, the Rivers and Harbors Act provided a $2-million appropriation for the Corps to conduct a feasibility study for the project. Accordingly, the Alaska District established the Rampart Economic Advisory Board, which included a

Senator Ernest Gruening (pictured left), Congressman Ralph J. Rivers, and Colonel Christian Hanburger of the Alaska District visited Rampart Canyon as part of the Corps' project study during the early 1960s.

mining engineer, the president of the University of Alaska, and a former territorial legislator. In 1961, Gruening's tour of the dam site with the Army Engineers strengthened his support of the project, prompting him to declare, "we're going to get Rampart." For all its optimism, however, the Corps remained cautious. Colonel Christian Hanburger, Alaska District Engineer, warned that the market for the project's power would determine its feasibility.[57]

To obtain an objective opinion, the Corps retained the Development and Resources Corporation (DRC) of New York to study the potential market for hydropower generated in Alaska. Some historians have interpreted this action as the Corps' attempt "to remove any impression of over-eagerness."[58] David E. Lilienthal, former chairman of the U.S. Atomic Energy Commission, served as chairman of the Board for the DRC, and Gordon R. Clapp, formerly associated with the Tennessee Valley Authority, served as its president. By 1962, the firm had produced a report arguing that the project's electricity was not only

marketable but also necessary to accommodate the region's growing population and industries.[59]

The view that Alaska needed power to meet future demands reflected high expectations and an increasing faith in the region's potential. Throughout western history, promoters argued that if a resource became available, development would inevitably follow. As Colonel Hanburger put it, "Ample low-cost power has and will continue to attract industry, business, and people. Simply stated, power is wealth."[60] In any case, projections of the market for Rampart Dam's power were based on the enthusiastic assumption that the nation's population and standard of living would continue to increase sharply.[61]

> "I see the greatest dam in the free world at Rampart Canyon, producing twice the power of TVA to light mills and cities and farms all over Alaska."
>
> *... John F. Kennedy, 1960*

Supporters praised the project as a "visionary concept." Its magnitude, suggested one observer, "is more than enough to excite and stagger the imagination."[62] Colonel Hanburger noted with pride that although "Alaska is heavily endowed with potential hydroelectric power sources," Rampart Canyon remained "the titan of them all."[63] According to historian Peter A. Coates, "early Rampart boosting echoed contemporary arguments for grandiose Alaskan developments" emphasizing "Alaska's role as a beckoning frontier." In part, the project's appeal was that it involved taming the western wilderness on a colossal scale. Rampart Dam, the DRC argued, represented the "traditional national urge to pioneer." It became the first in a series of proposed projects that were mammoth in scale, inspired by the vastness of Alaska's natural resources.[64]

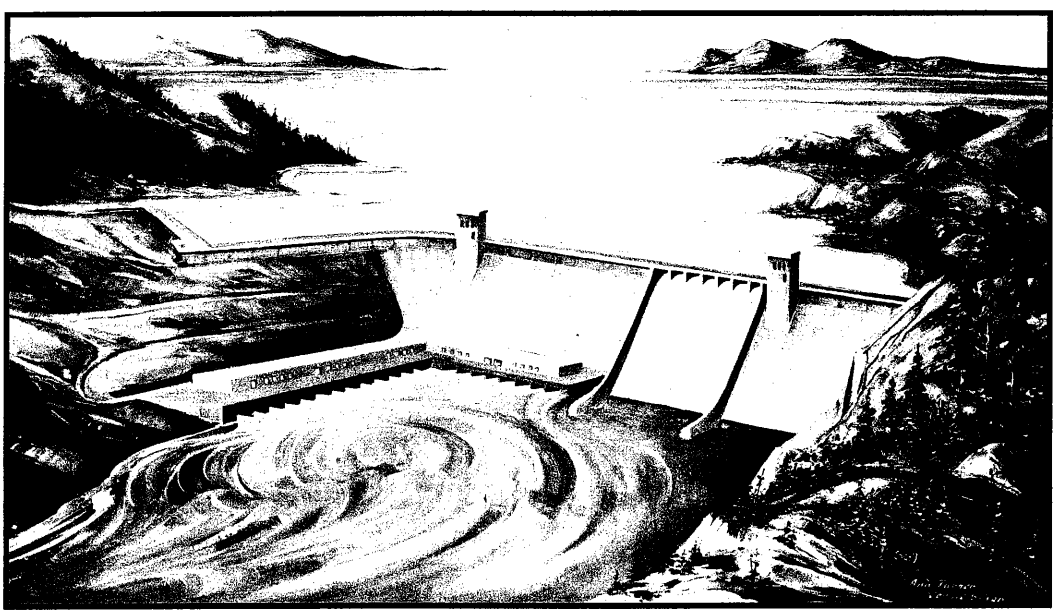
A related grandiose idea involved shipping water from Alaska to the Lower 48 and Mexico. Established in 1964, the North American Water and Power Alliance (NAWAPA) projected a shortage in the nation's future water supply and proposed a $100-billion project as a solution. The plan called for creation of a 500-mile reservoir stretching from British Columbia to Idaho. Its objective was to move water from the Yukon and Tanana rivers south through an extensive network of canals and tunnels, which would join the Columbia and Snake rivers in the Pacific Northwest and the Mississippi River in Minnesota. So fantastic was the proposal that one anonymous engineer concluded, "NAWAPA is the kind of thing you think about when you're smoking pot."[65]

Yet the idea received support among members of Gruening's staff, and the senator served on a special committee established to consider its merits.[66] Since

the 19th century, the search for water had remained a "basic force" in western American politics, and by the 1950s and 1960s, the "aquaholics" had looked to the vast supplies of water in Alaska with increasing zeal.[67] Even Secretary of the Interior Stewart Udall offered his tentative approval of the NAWAPA proposal. "I'm for this type of thinking," he noted in the 1960s. "I'm glad the engineers think so much of it, and I want more people to hear about it."[68] Viewed in the context of the NAWAPA proposal, Rampart Dam appeared to be a plausible, reasonable project.

In addition to its appeal as a grandiose project, Rampart Dam exemplified the nation's political climate during the 1950s and 1960s. Senator Gruening, for example, toured the Soviet Union in 1959 as part of a Senate subcommittee investigating Russian hydropower. Fearing that Soviet dams had eclipsed American facilities in size and generating capacity, he warned Chief Engineer General Walter K. Wilson, "I don't think that we can afford to be left behind."[69] Similarly, Senator Frank E. Moss of Utah compared Rampart to the large hydroelectric projects of the U.S.S.R., asserting in 1963 that "Water resource development is vital to the further advancement of our Nation."[70] Rampart Dam, then, became a potential weapon in the Cold War.

For all this interest in Rampart Dam, however, the project sparked considerable opposition, even among Corps employees. In 1965, for instance, Senator Gruening's staff asked Colonel Clare F. Farley, District Engineer, to investigate



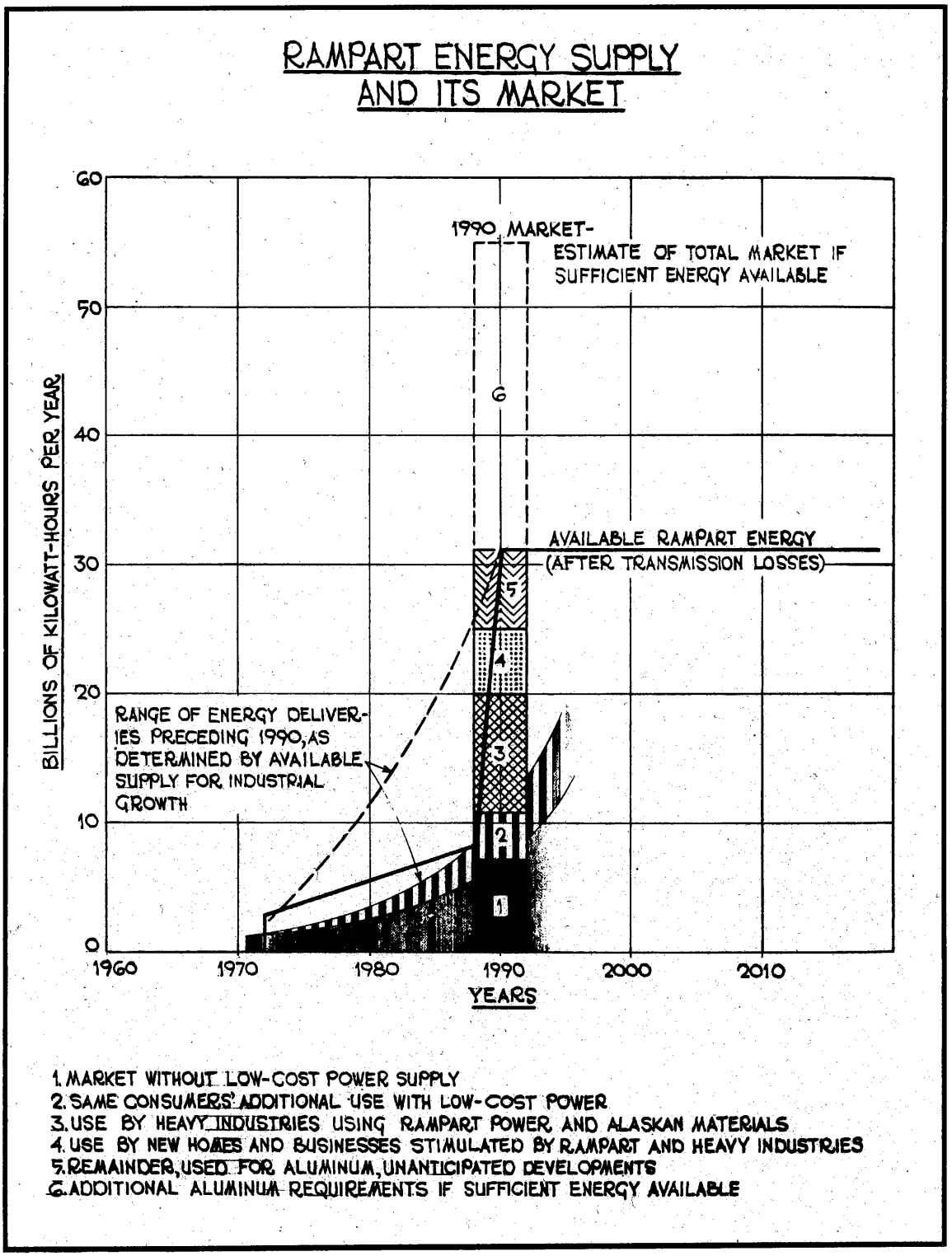
Artist's conception of Rampart Dam.

engineers who were publicly denouncing the project. Even so, Gruening's assistant stressed that the senator did not intend "to indicate there ought to be 'thought control' in any government agency." Although Colonel Farley neither supported nor condemned the issue of Corps employees speaking against the Rampart Dam, he informed Gruening's office, "I heartily concur with your expression concerning thought control."[71]

Critics outside the Corps argued that the Rampart Dam proposal represented "a squalid alliance" between the agency and "the job-hungry, tax-hungry politicians of the large emptiness of Alaska."[72] Describing the project as the "World's Biggest Boondoggle," the *New York Times* worried that the Corps viewed the Rampart Dam with "overawe."[73]

Paul Brooks, an editor at Houghton Mifflin, penned one of the most widely publicized critiques of the Corps' project. Appearing in the *Atlantic Monthly*, his article titled "The Plot to Drown Alaska," likened the Army Engineers to small boys unable to resist impounding "running water."[74] Gruening countered this

Proposed dam at Rampart Canyon, located 100 miles northwest of Fairbanks and approximately 290 air miles from Anchorage.


RAMPART ENERGY SUPPLY
AND ITS MARKET
60
50
40
30
20
10
0
BILLIONS OF KILOWATT-HOURS PER YEAR
1990 MARKET-
ESTIMATE OF TOTAL MARKET IF
SUFFICIENT ENERGY AVAILABLE
AVAILABLE RAMPART ENERGY
(AFTER TRANSMISSION LOSSES)
RANGE OF ENERGY DELIVER-
IES PRECEDING 1990, AS
DETERMINED BY AVAILABLE
SUPPLY FOR INDUSTRIAL
GROWTH
6
5
4
3
2
1
1960
1970
1980
1990
2000
2010
YEARS
1. MARKET WITHOUT LOW-COST POWER SUPPLY
2. SAME CONSUMERS' ADDITIONAL USE WITH LOW-COST POWER
3. USE BY HEAVY INDUSTRIES USING RAMPART POWER AND ALASKAN MATERIALS
4. USE BY NEW HOMES AND BUSINESSES STIMULATED BY RAMPART AND HEAVY INDUSTRIES
5. REMAINDER, USED FOR ALUMINUM, UNANTICIPATED DEVELOPMENTS
6. ADDITIONAL ALUMINUM REQUIREMENTS IF SUFFICIENT ENERGY AVAILABLE

claim with a speech titled "The Plot to Strangle Alaska," delivered to the Senate.[75] Their use of the words "plot," "drown," and "strangle" evoked images of conspiracy and conflict, suggesting the fierce conviction of each side. The Rampart Dam controversy exemplified two divergent images of Alaska: one emphasized the pristine wilderness that should be kept inviolate and the other portrayed the Far North as a storehouse of natural resources waiting to be developed.

Rampart Dam's most formidable opponent proved to be Floyd E. Dominy, commissioner of the Bureau of Reclamation. Dominy had promoted the construction of dams throughout the West. Yet he questioned whether a large enough market for Rampart's power existed to warrant the expense of construction. Building the project "at this stage of the Alaskan economy," he warned, "would be similar to have thought about building Grand Coulee in the Pacific North West when the Oregon Trail was still being traveled by covered wagons ... ."[76] Gruening conceded that although Alaska is "young, economically and politically," Rampart Dam would help the state "grow up."[77]

A strong rivalry had developed between the Corps and the Bureau of Reclamation since the passage of the 1902 Reclamation Act, which the Corps had opposed. Historian Daniel McCool has examined this rivalry by noting that "the reclamation program was essentially a modified western counterpart of the rivers and harbors program so popular in other regions of the country." McCool explained further that, because both agencies depended upon congressional funding, either program — rivers and harbors or reclamation — "could be used to justify — or threaten — the other." This, McCool concluded, "militated against any kind of coordinated planning" between the two agencies.[78]

In the debate over Rampart Dam, the Bureau of Reclamation preferred to promote a smaller project that it had studied since the late 1950s: Devil Canyon in the Susitna River Basin. In 1960, Dominy advised a Senate Interior and Insular Affairs Committee to drop consideration of Rampart Dam in favor of the "more modest" Susitna Project. Supporters of Rampart believed that, ironically, Dominy's position drew from a long-standing Republican sentiment "against Grand Coulee and the other great dams of the West." According to some observers, this debate involved far more than the traditional rivalry between the Corps and the Bureau of Reclamation.[79]

In 1962, shortly before the DRC issued its favorable market report on the Rampart Project, the Secretary of the Army and the Secretary of the Interior

negotiated an agreement to resolve the conflict and duplication of effort between the Corps and the Bureau of Reclamation. Henceforth the Corps was to handle the engineering and construction of projects in Alaska, while the Bureau of Reclamation became responsible for economic feasibility and power-marketing studies. This agreement allowed the Corps to complete its ongoing studies of Rampart Dam, and the Department of the Interior was authorized to investigate the project's marketing potential as well as its effect on natural resources.[80]

Nowitna Refuge downstream of proposed Rampart Project.

The Department of the Interior's five-year study of Rampart Dam revealed serious concerns, particularly regarding the project's impact on animals in the Yukon Flats. "Nowhere in the history of water development in North America have the fish and wildlife losses anticipated to result from a single proposed project been so overwhelming," the report read.[81] The U.S. Fish and Wildlife Service opposed the project, concluding that "Construction and operation of the Rampart Canyon project would result in enormous losses of fish and wildlife resources." The Yukon Flats provided breeding habitat for more than a million water birds, and biologists feared that the flooding of nesting grounds would considerably reduce Alaska's contributions to the four international flyways. The dam also would displace 5,000 moose and block salmon runs.[82]

A variety of conservation groups, including the National Wildlife Federation and the Alaska Conservation Association, also opposed construction of Rampart Dam. "Maybe we Alaskans will have to pay the price of a lower standard of living than is found in Suburbia in order to enjoy a higher standard of life,"

suggested one contributor to the *Sierra Club Bulletin*.[83] Such dissent puzzled the advocates of large hydroelectric projects. Since the turn of the century, conservationists had supported the construction of large multipurpose dams on the nation's waterways as an efficient, wise use of natural resources. As Gruening noted, "In the application of conservation practice, the greatest good for the greatest number should be the goal."[84]

Moreover, unlike the Grand Canyon, which had also inspired fervent anti-development campaigns, the Yukon Flats did not boast spectacular scenery. In contrast to proposals to dam the Colorado River, the Rampart Dam Project did not threaten the integrity of a national park. As a spokesman for the Fairbanks Chamber of Commerce explained, "It seems incredible to me that anyone would want to preserve in its natural state an area as wild and as bleak as Rampart Canyon."[85] Gruening, too, portrayed the site of Rampart Dam as "one of the few really ugly areas in Alaska."[86] The Yukon Flats, his assistant argued, "is about as useless and worthless an area as can be found in the path of any hydroelectric development."[87] Its salmon run, moreover, "has never been of any importance, commercially or otherwise."[88] Interestingly, David Brower of the Sierra Club suggested nuclear power as an alternative to Rampart Dam, while Gruening worried that "there are yet many serious problems of physical safety to be solved before this source of energy becomes practical."[89]

Opposition to Rampart Dam in fact marked the emergence of the environmentalism that would become prominent during the 1960s and 1970s. Unlike previous debates concerning development of natural resources, protests against this project drew from ecological arguments and a growing recognition of the importance of wilderness. According to one observer, the proposal to dam the Yukon River "triggered one of the first development vs. environment battles of the new ecology age." To his mind, the controversy "may have been the off runner of ... nationwide environmental battles."[90] The *New York Times* also suggested that the Rampart Dam proposal had helped spark an "ecological revolution" in the nation.[91] The controversy concerning its construction, then, carried implications far beyond the immediate development of Alaska. It demonstrated that environmentalism could influence the future of the Far North.[92]

RAMPART DAM — OPERATION SNOWBALL

"Operation Snowball" started with a mechanized snowsled and ended with a cat-train.

This winter on January 12 [1961], two men equipped with a mechanized sled headed north out of Fairbanks to blaze the trail to Rampart Canyon on the Yukon River about 130 miles to the northwest. They were Alvin Patscheck and Elmo "Pat" Aultman.

They were arctic-wise before they left, but they are post-graduates in arctic survival now. Both are long-time employees of the U.S. Army Engineer District, Alaska.

They were in on the beginning of many Alaska "boondocks" construction projects — getting there before the roads or the airstrips or anything else short of the moose and the Sourdoughs.

Tough jobs, they have had, but "Operation Snowball" was the toughest. The mission was to establish a base camp near the site for a proposed giant hydroelectric development site on the Yukon.

This camp will be a base for drilling operations which will be made through the river's ice to core bedrock under the river.

The data acquired in this way will be essential to a study being conducted of Rampart by the Alaska District.

Actually, "Operation Snowball" wasn't an unqualified success. It succeeded after two failures. Aultman and Patscheck fought powdery snow, bitter cold and winds for three days in the first try.

Then they were forced to turn back after going about 30 miles—10 miles a day. They returned to Fairbanks to get heavier equipment, consisting of a snow tractor called a Bombardier Muskeg.

On January 20, the pair again headed toward Rampart Canyon across tundra snowfields. They made good progress until they passed the mining camp of Eureka and headed over the hills to Rampart. Then they were stopped in their tracks by heavy brush protruding above a light snow cover.

Once more they came back to Fairbanks where Army Engineers made the decision to launch a cat-train to get to the site and get the camp set up.

Meantime, airplanes were used to reconnoiter the river's ice. Joe Savaria, Fairbanks pilot for Interior Airlines, landed on rough ice of the Yukon opposite the mouth of Bear Creek about two miles upstream from the proposed damsite.

RAMPART DAM — OPERATION SNOWBALL

Robert Lyle, an Alaska District engineer, flew in with James Freericks, on February 4 to land and core the ice and learn if it was thick enough to support cargo-hauling C-46 supply planes.

A turbulent wind blowing out of the Canyon prevented them from landing for two days in succession. In order to get the information, doughty Al Patscheck hired a dogsled, team and driver at Rampart Village to make the 64-mile round trip.

The sled ride was the roughest episode in the operation. Henry W. Wiehl, owner of the dogs and sled, accompanied as the driver. His dogs were the best conditioned for the long trip in the village, but even so they were barely up to the strenuous effort.

The drive started downriver over the ice on February 5. It continued the remainder of the day and all night. Patscheck immediately began augering the ice with a hand auger going down four feet, the length of the tool, at eight places where the airstrip is now, to make sure there were no weak spots in the ice. He never did find out how thick the ice was, but it was thicker than four feet at all places. Later the ice has been measured up to five feet thick.

As soon as the testing was finished, and the strip was marked out, the men started for Rampart Village facing a wind, bitter cold and rough ice — "heaved like it was laid on with a spatula."

They had to halt to build a fire with spruce wood found along the shore to warm up at one point before they could proceed.

Patscheck broke trail for the dogs and Wiehl helped them by pushing the sled. The last few hundred yards were pathetic to witness. Dog-tired men urging on tired dogs. The dogs would go a few feet and then lie down. They were back in the Village on February 6, 35 hours after they left and just in time for Patscheck to catch a plane to Fairbanks where he was needed to help get the cat-train started.

The train consisted of a bulldozer towing a bob-sled loaded with a housetrailer, fuel, food, a generator and other supplies. The lighter snow tractor was part of the assembly. The train got started on February 12. Besides Patscheck and Aultman, Leo King, Don Stabenow, and Red Bolin went along.

Two days later they battled snowdrifts for five miles. The drifts were eight to twelve feet deep located in the foothills of the Sawtooth Mountain Range. Despite the heavier equipment, it required 20 hours of continuous work to get the train through the drifts.

Ironically the trail from there on to the destination was too bare of snow for good progress. The iron runners on the sled were worn out.

RAMPART DAM — OPERATION SNOWBALL

More sled irons were flown in and attached before the train could proceed. A plane carrying the iron couldn't land at Eureka because of high winds on February 15, three days after the train started. It dropped lighter items such as face masks which the crew needed to protect their faces against the bitter wind. The next day the sled irons were delivered by helicopter and installed. The cat-train headed over the Sawtooth Mountains. On the other side of the mountains was their destination.

The next day, February 17, at 1:00 p.m. AST they were over the divide at the headwaters of Texas Creek and 23 hours away from the destination. They were on the home stretch, but they still had a difficult descent to make. They chose a more gradual route down Steven's Creek which came out on the Yukon further upstream.

The men and train arrived at the proposed landing strip at noon and started to smooth the runway for the cargo planes immediately. By 3:00 p.m. they had smoothed a strip 4,000 feet long and 75 feet wide. In seven more hours of continuous work the strip was widened to 150 feet, lengthened and completed.

A light plane was the first aircraft to land on the completed strip that evening. The next morning the first cargo flight landed and unloaded.

Interior Airlines, the low bidder for the airlift contract, brought in 210,000 pounds of equipment and supplies between February 21 and February 27. In addition an Alaska Air National Guard C-123 airlifted a churn drill in two trips from Anchorage.

The men at the site managed by working about 10 hours a day, seven days a week, to move the cargo by sled from the incoming planes to a campsite at the mouth of Texas Creek, and between hauls established a camp. It was virtually established on February 27. One Jamesway Hut was assembled for living quarters, a road was built and other facilities were installed.

By March 4, two more huts were assembled, one for a messhall; and more men were brought in so that drilling at the proposed damsite could start — as it did on March 6.

The drilling will proceed with all speed possible, because it can be done only by using the ice shield as a platform. The current of the river in the canyon is too swift to permit the drilling to be done from a moored barge.

Source: U.S. Army Engineer District, Alaska, n.d.

Additional protests came from Alaska Natives. Rampart Dam would have inundated seven villages in central Alaska, with a total population of around 1,200 residents. In addition, flooding would have depleted populations of furbearing animals essential to their economy.[93] Gruening argued that "Living as they do now, in grim deprivation of the most elementary comforts of modern life, the Natives of the Yukon would have, with Rampart, the first chance in their history to achieve a stable, prosperous economy."[94] The Corps also indicated that the project would benefit the Alaska Natives by providing permanent, as well as temporary, employment to the area.[95] Villagers remained skeptical, however, and requested that the Corps provide training to prepare them for the construction work on the dam. They also protested the federal government's proposed withdrawal of nine million acres as a power site reserve.[96]

One of the strongest objections to building Rampart Dam was based ultimately on the questionable need for the 5 million kilowatts of electricity that the facility would generate. Several smaller dams located closer to population centers, built for far less money and able to operate more efficiently, could produce what hydropower was necessary. Even in 1962, another consulting firm, Arthur D. Little, Inc., had questioned the need to build Rampart Dam, arguing that "low-cost hydroelectric power" proved effective only when accompanied by "high-volume use." The Little firm found that Rampart Dam would "produce a quantity of power many times the ability of present Alaskan industry, commerce and population to absorb." Even a dam that produced one-fifth of Rampart's power-generating capacity would produce too much, "unless several electric-intensive industries appeared on the scene within a short period of time." This, the consulting firm concluded, was "of course, a possibility, but not a very realistic expectation."[97] By the late 1960s, more and more officials and analysts had recognized that there simply was no market for Rampart's power that justified its costs, despite how hard Gruening and others had tried to persuade them otherwise.

In 1967, arguments against the dam convinced Secretary of the Interior Stewart Udall to recommend shelving the project. His reasons included the adverse effects on wildlife, the enormous federal investment the project required, and the limited market for power. The Corps, however, continued the studies that had been authorized in the late 1950s. By 1971, the North Pacific Division in Portland announced that it, too, would not recommend the project.[98]

In sum, the Rampart Dam proposal remained significant to the Alaska District for several reasons. First, it alerted the nation to the Far North's enormous potential for hydroelectric development. The controversy also signalled the emergence of environmentalist — as opposed to conservationist — protests against what they viewed as exploitation of natural systems in Alaska and the West.

In 1966, Lieutenant General William F. Cassidy, Chief of Engineers, noted a development in the Corps' civil works mission. At one time, he reflected, the agency's projects "were for the most part simple and non-controversial," and "it was relatively easy" to meet "high standards of public performance." By the 1960s, however, the Corps had faced issues "of great complexity and intense public concern." He concluded that "like it or not, emotion seems increasingly to condition public attitudes toward the selection of choices from competing alternatives. The current trend in this direction is not likely to diminish."[99] During the 1970s and 1980s, the accuracy of Chief Engineer Cassidy's prediction became apparent. Rampart Dam in fact served as a harbinger of the conflicts the Corps would later face on other projects in Alaska, such as Susitna.

Snettisham Project

The Snettisham Hydroelectric Project proved to be less controversial than the proposal to build Rampart Dam, in part became it was a smaller endeavor that did not result in the flooding of large areas. Unlike Bradley Lake Dam, which competed with coal and natural gas interests, it inspired few protests. Snettisham was named by Captain George Vancouver, an 18th-century explorer, who was reminded, as he passed through what is now Southeast Alaska, of a town in Norfolk, England.[100] The Snettisham Project featured a number of unique elements, reflecting the Far North's distinctive terrain and climate. Owing to innovations in design and construction, the Snettisham Project became nationally recognized as an engineering accomplishment.

Located nearly 30 miles south of Juneau, Alaska's capital, the Snettisham Project lies in a spectacular region of 5,000-foot mountains that rise steeply from the waters of the Inside Passage. This section of the Tongass National Forest remains covered with Sitka spruce and hemlock trees, and annual precipitation reaches 150 inches. Here, the combination of rugged terrain and abundant rainfall presented an ideal setting for a hydroelectric project.

Interest in developing the site dated from 1913, when a mining company requested permission from the U.S. Forest Service to construct a dam. During the 1920s, the site attracted the attention of William Randolph Hearst, who joined a growing number of developers submitting applications for construction. For nearly 50 years, exploration and feasibility studies indicated the potential for power generation.[101] By the early 1960s, Congress had acted on the construction phase of the project. The Flood Control Act of 1962 authorized the Snettisham Project, and four years later Congress appropriated funding for construction. Although the Bureau of Reclamation had produced a feasibility study for the Snettisham Project, the Corps became responsible for its design and construction. As noted, an agreement — or uneasy truce — between the Secretary of the Army and the Department of the Interior established the Corps as the lead agency for developing Alaska's hydroelectric projects.[102]

Much of the Corps' water resources work involved multipurpose development, including flood control, irrigation, navigation, and the generation of electricity. The Snettisham Project, however, had a sole purpose: generation of power. "The scant population of southeastern Alaska," one Corps official explained, "does not require more than this seemingly old-fashioned approach provides."[103] High fuel prices in the late 1960s and 1970s increased the appeal of developing Alaska's hydroelectric potential. The Corps' work on Snettisham proceeded in two phases. While the first phase began in 1967, engineers would construct the second phase during the 1980s, when demands for power increased.[104]

Snettisham proved to be an unusual project in its design and construction. One of its distinctive features was that it had to be constructed on a ridge of existing natural bedrock. "By requiring the building of a concrete dam on top of a natural one," one Corps publication explained in 1967, "this site is certainly unusual — perhaps even unique in North America."[105] Another striking element of the project involved the tapping of Long and Crater lakes, both of which were perched high in the mountains above the powerhouse site, which was located near sea level. Before Snettisham, the Corps had not tapped glacial lakes for the generation of power. To accomplish the task, engineers constructed diversion tunnels to convey the water down to the turbines and generators at the powerhouse.[106] At Long Lake, water plunged 820 feet through the tunnel, providing more "operating head," or energy for the amount of water, than any other Corps project.[107]

Another significant feature of the Snettisham Project was its underground powerhouse, the first facility of its kind constructed in Alaska. Engineering studies concluded that a subterranean facility would cost less than an outside plant, saving $1.3 million. Placing the plant underground also protected the wildlife and scenic values of the area.[108]

When completed in 1973, the Snettisham Project became noteworthy for its attention to aesthetics. The facility remained barely visible from the surface, even from a short distance. Engineers also added specially designed access and service tunnels to blend into the mountainside, where peaked roofs protected entrances from snowslides.[109] As a result, in 1974 the Alaska District received the Chief of Engineers Distinguished Design Award. Two nationally recognized engineers and an architect selected the Snettisham Project for this honor, owing to its "ingenuity and quality of engineering concepts, satisfactory solution to functional problems, economy of design and construction, attractive architectural appearance, and harmony with the surrounding environment."[110] During the mid-1970s, the media in Alaska also praised Snettisham as "an engineering masterpiece" and "a monumental achievement."[111]

Snettisham's transmission lines, too, reflected the Corps' concern for aesthetics. Green aluminum towers on Salisbury Ridge blended with the trees, and a dull grey finish on the wires further reduced the project's visibility in the forested landscape. In constructing the transmission lines, the Corps conducted operations by air, to avoid disturbing the vegetation with heavy equipment. Owing to these efforts, the Juneau Chapter of the Sierra Club praised the Alaska District for its environmentally conscious designs. Helicopter pilots, however, complained of the project's low visibility from the air, and some residents suggested that the Corps went "too far on the aesthetics."[112]

For all its early promise, the Snettisham Project was beset with difficulties, most of which resulted from the Alaskan winter. The same terrain and climate that made this an ideal location for hydroelectric development also created unique engineering problems and delays in operation.[113] During 1974 and 1975 — the project's first two years — severe winds and ice collapsed the transmission towers, causing power outages in the Juneau area. So strong were the gales blasting Salisbury Ridge that anemometers set to measure their speed were blown away. Observers estimated that the wind gusts exceeded 200 miles per hour. Even minor repairs became impossible during the winter, owing to the inaccessibility of the steep ridge.[114]

Alaska District Engineer Colonel Charles A. Debelius noted that the Corps accepted responsibility for these problems. The transmission lines, he indicated in 1974, were "under-designed" for violent winter conditions.[115] He also explained that a lack of information about weather conditions had hampered the Corps in its construction of the lines. "No expert in this business had ever experienced or even heard of a transmission line subjected to 200-mile-an-hour winds," he pointed out.[116] According to one observer in the area, local residents had warned the Corps about the strong "Taku" winds, but "there were no hard facts to support the warnings."[117]

In retrospect, Colonel Debelius admitted that he "would rather have had a submarine cable." The Alaska District in fact had initially recommended an underground or underwater power line for Snettisham. However, Corps Headquarters in Washington, D.C. determined that the overland method of construction offered a $15-million savings. The Alaska District, moreover, had wished to avoid felling a string of trees to build a submarine cable, which would have affected the view from the Marine Highway into Juneau.[118]

Local residents became exasperated by the power outages. One writer for the *Southeast Alaska Empire*, forced to compose an editorial in the dark, sneered that "we have a fine engineering masterpiece" with "one slight problem — it doesn't work when the wind blows." The article concluded that "the blame rests with Army Corps of Engineer bureaucratic officials in Washington, D.C.," rather than with the Alaska District.[119] Retired Corps economist Charles Welling recalled that environmentalists pressured the agency into placing the power line on Salisbury Ridge.[120] The local media, however, claimed that environmentalists served merely as "scapegoats for the decision which has become known as the 'million dollar mistake.'"[121]

After public discussions in Juneau, the Alaska District selected a lower route for its power line. Once again the Corps attempted to minimize the project's visual impacts, and the new line bypassed bald eagle nests. For the first time in the history of the Alaska District, the Corps required helicopter transportation in the construction contract, to avoid construction of access roads. "This is a unique kind of contract," Colonel Debelius explained in 1976, "and I think its being somewhat of a challenge may attract firms that are not frightened by the unusual — companies that look to the opportunity of proving their mettle in a demanding occupation." Crews removed only those trees that would obstruct the line, and

the timber was airlifted out. All equipment and supplies, including the towers, arrived by helicopter.[122]

For all Alaska's potential for water power, Snettisham remained the state's only hydroelectric project until the 1980s. Many employees regarded its construction as a momentous achievement. "I was quite proud of Snettisham," one Corps economist recalled. It was an "excellent project" that "fit all criteria needed to justify it." As he summed up, "Juneau needed the power, and it needed to be built."[123]

Bradley Lake Project

During the 1950s, the Alaska District studied 19 sites as potential sources of hydropower. Although Rampart Dam received the most press, the Corps also investigated Bradley Lake on the Kenai Peninsula, which would serve the rapidly growing area along Cook Inlet. In the late 1950s, local utilities in this region relied on diesel and steam plants, and the Corps projected power shortages. At that time, demands for electricity increased quickly, owing to industrial development, population growth, and the expansion of the military base at Fort Richardson.[124]

Of the 19 potential sites that the Corps investigated, Bradley Lake appeared the most advantageous for initial development, in part because of its moderate costs. "Bradley Lake is the finest small project in Alaska," concluded Ruben Hack, a hydroelectric engineer with the Corps. He further added that it appeared small only when compared with plans for "gigantic dams" on the Yukon River.[125] Located 25 air miles northeast of Homer, Bradley Lake was also accessible from Kachemak Bay — and the Corps anticipated that its construction would prove easier than the development of the Snettisham Project.[126]

Like Snettisham, Bradley Lake would use water from a perched lake that plunged through a power tunnel and penstocks to a tidewater plant more than 1,000 feet below. It, too, was to have a capacity of 64,000 kW. Construction costs would total approximately $45 million, and once the Corps completed the project, the Bureau of Reclamation would assume responsibility for its operation and maintenance.[127]

With Gruening serving as the project's primary advocate, Congress authorized the project in 1962. To Gruening's mind, development of Bradley Lake represented "one of a series of steps" in realizing the hydropower potential of the Far

North. Despite his interest in Bradley Lake, however, he remained primarily focused on Rampart Dam as Alaska's most important future power source.[128]

Numerous supporters on the Kenai Peninsula advocated the Bradley Lake Project, arguing that its construction was "vital" to the economic development of the area. Some residents of Homer, who complained that they paid the highest electrical rates in Alaska, looked forward to the growth that less expensive power would encourage. Congress, however, deferred funding for the project, owing to the availability of alternative power sources, including oil and natural gas, on the Kenai Peninsula. The oil crisis of 1973 rekindled interest in the project, prompting the Alaska District to conduct additional studies.

Energy Sources in Alaska

In addition to the Corps' role in the development of hydroelectric power in the state, the Alaska District was also involved in other energy-related work. This included an early experimental nuclear energy project, as well as the post-World War II growth of oil exploration, production, and transport in Alaska. This involvement, in turn, ensured that the Alaska District would actively participate in the social and economic maturation of the state. During this process, the line between civil and military projects often became less than distinct, as even strictly military projects, such as the Whittier-to-Anchorage pipeline, became entwined with civil issues.

"Thinking Big" in Alaska

The enormous size and scale of Alaska's natural resources inspired grandiose plans for civil and military development. For promoters in the Lower 48, the remoteness of the Far North and the misperception that the region remained unpopulated also encouraged elaborate ideas for development. One of the most striking proposed projects involved the use of a nuclear blast to create a harbor on Alaska's northwestern coast. Physicist Edward Teller led scientists from the University of California to organize this experiment in the late 1950s. As Teller explained it, Alaska provided an ideal location for such a venture, since the state featured the nation's "fewest" and "most reasonable" inhabitants. Although the team of scientists concluded that the nuclear blast probably would not have harmed the people of Alaska, they did note that it would have killed fish and other wildlife in the vicinity.[129]

Washington Senator Henry Jackson advocated a similar plan, called "Project Chariot," to use thermonuclear explosions to create a harbor 250 miles southwest of Point Barrow. In Jackson's estimation, Project Chariot represented a peaceful use of nuclear power. While critics charged that the true objective of this project was atomic testing in Alaska, some residents supported the plan as a means of attracting federal funds to their state. Phil Morrow recalled that the idea of employing nuclear blasts to create harbors did not seem as outlandish at the time as it would in later years. By 1962, however, the Atomic Energy Commission had decided not to proceed with these projects, in part owing to their expense.[130]

Nuclear Power at Fort Greely

In an August 7, 1959 speech to the Alaska Rural Electric Cooperative Association, Harold Moats, Chief of the Alaska District's Civil Works Planning Branch, described the Corps' nuclear power project at Fort Greely. Although Moats identified the plant as "strictly a military project," he acknowledged that its construction also represented "Alaska's first move into a new power field."[131] While the notion of using uranium fuel rods to produce power certainly belongs in the category of "thinking big" in Alaska, as well as elsewhere, the plant at Fort Greely, because of the efficiency of this type of power production, also signified "thinking small."

Fifty pounds of enriched uranium at the Fort Greely plant could produce the same amount of energy as 60,000 barrels of fuel oil, or 1.4 billion pounds of coal. This amount of uranium was more than enough to produce electricity and to supply heat for a population of 2,000 for an entire year, which, in turn, drastically simplified the logistics of resupplying fuel sources. Justification for the nearly $5 million initially appropriated for this project included the substantial savings in fuel shipping costs alone.[132] Moreover, as historian Peter Coates has observed, during the early years of the Cold War, even ardent conservationists perceived nuclear energy as cheap, clean, and renewable — especially when compared to damming scenic rivers and flooding wilderness in order to build hydroelectric power plants.[133]

By 1954, as part of the Army's nuclear energy research and development program, the Corps had decided to build a nuclear power plant in the field, similar to a prototype at Fort Belvoir, Virginia. In December of 1955, Alaska District Engineer Colonel Carl Farrell received instructions to investigate sites for such a plant in his district. Fort Greely, located approximately 105 miles southeast of Fairbanks, emerged as the best choice. Accessible by both air and

highway, this location satisfied the Army's criteria for an operational test of a nuclear power plant under extreme cold weather conditions.[134]

On April 28, 1958, Secretary of Army Wilber M. Brucker announced the decision to build the plant at Fort Greely. Like the nuclear power plant at Fort Belvoir, this would be an "Army Package Power Reactor," one of several types of nuclear plant designs that the Army was then considering. The name reflected the intent of the design, that is, components of the reactor could be transported as a package by air for installation in power plants located at remote sites.[135] The process of energy production at Fort Greely involved pressurized water circulating through a nuclear reactor where it was heated to more than 400 degrees Fahrenheit. The water then passed to a heat exchanger, where this water heated a secondary water system. The steam from the secondary water system then drove a turbine to produce electricity. To ensure the safety of the nuclear power plant, a vapor container, comprised of an inner shell of concrete and an outer shell of steel and concrete, enclosed the reactor. Power production capacity reached 4,000 kilowatts.[136]

The nuclear power plant at Fort Greely enjoyed a special status: it was the first such plant to be completed by a construction contractor using the Corps' plans and specifications. Previously, nuclear plants had been built by the firms that designed them. In July, 1956, the Alaska District awarded a design contract to Alco Products, Inc. of Schenectady, New York. This company had also held the contract for the Army's nuclear plant at Fort Belvoir. Changes in design for the Fort Greely plant allowed for an increase in capacity and the ability to furnish heat as well as electricity.[137]

In May, 1958, construction work began on the Fort Greely plant. The Alaska District had awarded the nearly $5 million construction contract to Peter Kiewit Sons' Company, an Omaha-based business with previous experience working under Alaskan conditions.[138]

Problems encountered once construction began included frequent difficulties with the timely procurement and delivery of materials. When delicate components of the nuclear core support structure were damaged in transit, the contractor had to suspend work and wait for the delivery of replacement parts. A labor strike during the summer of 1959 caused additional delays. On a lighter note, workers sometimes took a "buffalo break" in order to shoo away buffalo that occasionally wandered onto the site from a nearby range.

Progress on the project often depended on weather conditions during the shortened construction season in the Fort Greely area. Severe weather during construction sometimes damaged the plant itself. On one occasion, winds of 100 miles-per-hour tore pieces of insulation from the outside of the vapor container. Even with these delays and difficulties, construction did not fall too far behind schedule. By spring of 1961, the District had turned the plant over to the Army for further testing and administration.[139]

On March 13, 1962, the nuclear power plant at Fort Greely, also known as SM-1A, "went critical." In the control room, at 12:38 a.m., a "clicking" sound accelerated to a continuous buzz, indicating that a nuclear reaction had occurred. Four years later, however, in June of 1966, having determined that the research mission of SM-1A had been completed, the Army announced that it would shut down the nuclear reactor at Fort Greely sometime in 1968 when its fuel core became exhausted. Rather than dismantling the entire power plant, the turbo-generator would then be connected to existing steam boilers in order to continue providing power for the post. Satisfied that SM-1A had demonstrated that nuclear energy could be used to generate power in an extremely cold environment with a minimum of logistical support, the Army based its decision to close down the reactor largely on the plant's unexpectedly high operating costs. As the *Anchorage Times* reported, "neutron bombardment has weakened carbon steel in the plant's pressure vessel," thereby markedly shortening its life span. Because of the prohibitive cost of replacing this component with a pressure vessel strong enough to withstand "neutron bombardment," the Army ultimately returned to a dependence upon conventional power production at the Fort Greely plant.[140]

OIL DEVELOPMENT

Few single factors would more influence the expansion of postwar Alaska than the exploitation of oil. Historian Mary Reed has suggested that the development of Alaskan oil challenged the "predominance of hydroelectric power in the Pacific Northwest" as a source of energy. She further viewed oil as the last energy resource to be exploited in Alaska. Numerous historians have commented upon the social, economic, and physical impacts resulting from the growth of the oil industry in Alaska.[141] Atlantic Richfield's strike on Prudhoe Bay in January, 1968, promised to deliver an estimated 9.6 billion barrels of oil. That these lands were leased from the state, and that the legislature would soon increase the tax

on oil production to 16.5 percent, translated into an enormous economic windfall.[142]

The Corps' role in Alaskan oil development stemmed from wartime exigencies. During World War II, the Corps had been involved in the construction of the CANOL (Canadian Oil Line) project (for additional information see Chapter 3). Consisting of four pipelines and a reassembled Texas refinery, the system had been justified by the need to provide fuel to Alaskan military installations from Imperial Oil's Norman Wells fields on the Mackenzie River some 1,200 miles north of Edmonton, Alberta. Construction began in May, 1942. CANOL 4, the three-inch pipeline that carried oil the 596 miles from Whitehorse, Yukon Territory, to Fairbanks, was operational by February, 1944.[143]

The conclusion of World War II and the return to peacetime curtailed support for CANOL. In November, 1946, the newly established Alaska District assumed responsibility for the custody of the now largely inactive system. Components of CANOL 1, which had extended from the Norman Wells oil fields to Whitehorse, had been sold for scrap and removed from the area by the winter of 1947-48. But later in 1948, the need to continue transporting fuel to the posts near Fairbanks became apparent. In response, the Alaska District arranged through its Resident Engineer at Whitehorse to resume operations of CANOL 2, which extended from Skagway to Whitehorse, and of CANOL 4. This fuel delivery from tankers at Skagway to Fairbanks did not require using the remaining line, CANOL 3, which had carried oil for a short time from Carcross to Watson Lake, Yukon Territory.[144]

By July, 1950, the Alaska District had received instructions to return control of the CANOL system to the Army. Accordingly, in November of that year, the District transferred properties at Ladd and Richardson to the Army's Alaska General Depot and post engineers. This post-World War II use of the CANOL pipeline system continued to demonstrate the feasibility of delivering large amounts of fuel over extremely long distances at a substantial savings when compared to other means of transport.[145]

ALCANGO

The economic transport of oil made possible by the CANOL lines stimulated ongoing interest in developing another pipeline. Also influential was the onset of the Korean War. The need to move even greater quantities of oil and fuel to the interior of Alaska prompted the decision to build a larger pipeline to traverse

the distance from Haines to Fairbanks. Construction of this pipeline, known as ALCANGO (Alaska-Canada-Gas-Oil), began in 1953.

Eight inches in diameter, which was more than twice the size of CANOL 4, the ALCANGO pipeline stretched for 626 miles from Haines to Fairbanks. When completed in 1955 at a cost of over $40 million, its daily carrying capacity reached 16,000 barrels of petroleum products. The Alaska District and U.S. Army personnel, with the approval of the Canadian government, jointly determined its course, which roughly paralleled the route of CANOL 4. From sea level at Haines, the route took the ALCANGO over the 3,700-foot-high Chilkat Pass, through Canadian territory, and back down to the 450-foot elevation at Fairbanks. In order to lessen the chance of breakage, designers of this route attempted to avoid areas known to be frequented by landslides, avalanches, and washouts.[146]

In October, 1953, the Alaska District awarded the construction contract to an American-Canadian joint venture: Williams Brothers of Tulsa, Oklahoma; McLaughlin, Inc. of Great Falls, Montana; and Marwell Construction Company of Vancouver, British Columbia. An Anchorage firm, Oaks Construction Company, subcontracted to clear a 50-foot right of way. The project also involved constructing terminal docks, pumping stations, and a large tank farm at Haines. Additionally, other storage facilities and stations were built at Border, Haines Junction, Donjek, and Tok.[147]

Terrain and climate conditions varied greatly along the ALCANGO line. These ranged from the more moderate, wet shoreline of Southeast Alaska to the rocky, high, snow-covered Mount St. Elias and Coast Range and the flat tundra of the interior. Permafrost covered significant portions of the route. Also, the pipeline had to be "snaked" to accommodate the lateral motion of seismic activity.[148]

In an article for *Army Information Digest*, District Engineer Colonel William C. Gribble, Jr. ranked the ALCANGO pipeline from Haines to Fairbanks among the "major achievements of the Engineers' civil works program."[149] At dedication services commemorating the pipeline's completion, held at Haines on October 12, 1955, Alaska Commander in Chief Lieutenant General J. H. Atkinson commented on ALCANGO's "economic and strategic significance." Hoping that the military would never need to use the pipeline "as a tool of war," Atkinson noted that, because of projected savings in transportation costs, ALCANGO would pay for itself in 10 years.[150] Like the postwar use of the CANOL system, the ALCANGO

pipeline blurred the distinction between military and civil projects. In Alaska, stimulating economic development and building a permanent defense establishment went hand in hand; the Alaska District's role in both processes ensured its active involvement in the state's maturation.

In 1962, the District oversaw a project that doubled the capacity of the ALCANGO pipeline. This additional work involved the construction of six more pumping stations at Blanchard River, Destruction Bay, Beaver Creek, Lakeview, Sear Creek, and Timber. Because other facilities at these locations were negligible, the project also included building small towns to support the pumping stations. Completed between April and November of 1962, the ALCANGO expansion cost approximately $3 million.[151]

Predating the more organized environmentalist movement of the late 1960s and early 1970s, ALCANGO's planning and construction faced little environmentalist opposition and needed to answer few, if any, public inquiries. Government regulations regarding pipeline construction and operations had also not yet become prevalent. Spills of petroleum products, however, did occur along the ALCANGO line. In 1956, just after completion of the first construction phase, a de-icing job proved necessary when water remained in the pipe after hydrostatic testing had been conducted in late 1955. According to a February 17, 1971, Army retrospective report, 28 cuts were required at different points in order to free the line, resulting in the spilling of "significant quantities" of oil. Between 1964 and 1968, when corrosion of a portion of the buried pipe near Haines caused a rupture, 3,000 feet of line had to be replaced. Also in 1968, twelve miles of pipe needed to be reconstructed after an estimated 4,000 barrels of diesel fuel spilled, again because of corroded portions of pipe. Much of this fuel flowed into Dezadeash Lake in Canada's Yukon Territory.[152]

Whittier Pipeline

Initial proposals for the Whittier-to-Anchorage pipeline date from late 1963. One of the project's earliest proponents was Brigadier General Benjamin Talley. The need to deliver increasing amounts of jet fuel and other petroleum products more efficiently and reliably to Elmendorf Air Force Base prompted the pipeline's construction. The capability to refuel large jets at the base was fast becoming essential, and military officials feared that the Port of Anchorage would prove unable to accommodate the attendant increases in fuel delivery, especially during the winter.[153]

Although the 61-mile pipeline was built specifically to meet military needs, the Corps' direct involvement in its planning and construction engaged the agency in controversy with civil authorities. Two issues sparked the dissension. First, Port of Anchorage authorities, arguing that the pipeline was unnecessary and would rob the port of tanker business, tried to block approval of the project. Second, once Congress had allocated emergency funding for the pipeline, City of Anchorage officials and Borough Assembly representatives worried about the line's placement in the Campbell Creek drainage, a sensitive watershed area that provided part of the city's domestic water supply. Both of these controversies reflected, by the mid-1960s, Alaska's increased social and economic development, in part made possible by the large, ongoing military presence in the state. The second issue clearly demonstrated the emerging influence of environmentalism.

In January of 1965, a preliminary design for the eight-inch-diameter pipeline met with approval, during the following summer, however, Congress eliminated funding for the project from the defense appropriations bill and requested further study.[154] The Port of Anchorage Commission lobbied heavily against construction of this pipeline. Other opponents included Anchorage Mayor Elmer Rasmuson, and City Manager Robert Oldland. The city stood to lose $50,000 in annual revenues from military use of the municipal port. Opposing the pipeline on economic grounds, and desiring to retain the profitable fuel delivery business, these officials contended that current port and rail facilities could handle the projected increase in fuel transports. In early December, 1965, the Anchorage Port Commission voted formally to oppose the construction of the Whittier pipeline. Counterarguments posed by officials of the Alaskan Command just one month earlier had not persuaded members of the commission to alter their long-standing opposition. The military viewpoint stressed that the need for aviation fuel had risen by 100 per cent within the last year, and that increased military activities in the Anchorage area would only serve to further boost the civilian economy. The Alaskan Command's position also noted that the military would continue to use port and rail facilities, in addition to the pipeline, for fuel delivery.[155]

In response to the commission's rejection of the project, military liaison officer Colonel James Shaver pointed out that ice conditions and depth of the dredge at the Port of Anchorage, as well as heavy snowfall at Whittier, limited transport either by water or rail during the winter months. Commenting upon the proposed pipeline's capacity to deliver much larger quantities of fuel, especially

when compared to boxcars, Colonel Shaver quipped that "trying to ship our supply by rail is like trying to fill a bathtub with a teaspoon."[156]

Ultimately, the local and state interests who opposed the pipeline lost their bid to prevent its construction. Military exigencies intervened when President Lyndon Johnson began preparations to escalate the war in Vietnam. By January of 1966, Lieutenant General Raymond J. Reeves, Commander in Chief in Alaska, had announced that, in support of accelerated military activity in Southeast Asia, C-141 "Starlifter" operations would soon begin at Elmendorf. Within 18 months, according to Reeves, these huge planes would require 432,000 gallons of fuel daily. General Reeves foresaw little alternative other than building the Whittier pipeline to deliver the increased amounts of fuel to the base.[157]

On March 11, 1966, Congress approved a $13 billion package in emergency funds that President Johnson had requested in order to support escalation of the war in Vietnam. Included in the package was $5.6 million for the Whittier-to-Anchorage pipeline. On July 30, the Alaska District awarded the construction contract to S. S. Mullen, Inc. and Dravo Corporation, both of Seattle.[158]

When finished, the cost of the Whittier pipeline reached nearly $11 million. Adding significantly to the original estimate was the cost of building a tunnel parallel to the railroad tunnel that ran through the mountains between Whittier and Portage. In late June, 1966, the Interstate Commerce Commission ruled that routing the pipeline through the existing tunnel, as original plans had envisioned, posed too great a risk. In response, the Alaska District awarded a separate contract for nearly $5 million to build the 13,100-foot-long, seven-foot-diameter pipeline tunnel. A joint venture, Chris Berg, Inc. and Peter Kiewit Sons' Company, began this work on November 1, 1966.[159]

Also adding to total project costs was the additional expense of $90,000 to dig up the entire length of the pipeline that had been buried in the Campbell Creek watershed area in order to recheck welds. Concern for protection of this watershed from contamination had arisen as early as February, 1966. At that time, representatives of the Corps, including Warren George, chief of the Alaska District's engineering division, began meeting with the Greater Anchorage Area Borough Planning Commission to discuss various means of reducing the risk of environmental damage to the watershed. At a series of meetings, participants considered alternate routes and reviewed certain design features. During the course of these discussions and negotiations with the city, the Corps agreed on a route that avoided a proposed municipal reservoir. Additionally, the Corps

agreed to bury the pipe throughout the Campbell Creek drainage, X-ray all welds, and conduct pneumatic and hydrostatic tests of the pipeline before the start of operations. In turn, on March 21, 1966, the Borough Assembly voted in favor of the project.[160]

By mid-October, 1966, after work on the pipeline began in the Campbell Creek drainage area, the inspection contractor, Alaska Inspection Services and Richardson X-ray, had fallen far behind the pace of construction. On October 25, after this inspection team had repeatedly failed to submit X-ray reports to indicate the quality of the welds, as their contract had stipulated, the Alaska District dismissed them. Soon thereafter, the prime construction contractor, Mullen and Dravo, subcontracted with a Tulsa company, Industrial X-Ray Engineers, to inspect the welds.[161]

Almost immediately following their discharge, representatives of Alaska Inspection Services and Richardson X-ray alleged that the Corps was not correcting defective welds. This charge helped to rekindle fears about possible contamination to the watershed. In response, District Engineer Colonel Clare Farley assured the Greater Anchorage Borough Assembly that the Corps would recheck all welds in the area of concern.[162]

The Alaska District then supervised the job of digging up 30,000 feet of pipe in order to verify the welds in the Campbell Creek drainage. According to William Duynslager, Anchorage's water utility manager, 767 welds were reexamined during this process. Of these, several hundred required rewelding.[163]

Other difficulties that emerged during the construction of the Whittier pipeline reflected the more typical problems frequently faced by the Alaska District. Time constraints compelled workers to continue laying sections of the pipeline even under severe winter weather conditions. Progress at 3,600-foot Indian Summit in the Chugach Mountains, however, had to await the arrival of summer because of excessively deep snowfall that winter. In order to accommodate workers at the remote tunnel site, building a self-sustaining camp also became necessary.[164]

As dedication ceremonies scheduled for early October, 1967, approached, Ot Hampton, a reporter for the *Anchorage Times*, described the Whittier pipeline as "an engineering feat of the first order." Hampton further speculated that it was "the most critically inspected pipeline ever built."[165] When completed, the Whittier pipeline, more than two-thirds of it buried underground, was capable

of carrying 31,000 barrels of fuel to Elmendorf every day. This amount of fuel ensured a reliable and efficient supply for the C-141s and other jets headed for Southeast Asia.

The Corps' Role in the Trans-Alaska Pipeline

The oil transported by ALCANGO and the Whittier-to-Anchorage pipeline arrived at Haines and Whittier via tankers from Outside. By the late 1950s, however, the oil industry had begun to develop Alaskan sources of petroleum, owing to Richfield's oil strike at Swanson River on the Kenai Peninsula. Richfield, in partnership with Standard Oil of California, next found oil at Soldotna in 1960. Offshore gas and oil discoveries in nearby Cook Inlet subsequently followed the Soldotna strike. The January, 1968, Atlantic-Richfield discovery at Prudhoe Bay, however, resulted in at least a ten-fold increase in Alaskan oil production over that of the early 1960s.[166]

On November 16, 1973, President Richard Nixon signed into law the Trans-Alaska Pipeline Authorization bill. The timing of the bill's passage reflected, in large part, the influence of the oil embargo. In early October, Egypt and Syria had invaded Israel, whom the United States continued to support with military and economic aid. In retaliation, the Arab members of OPEC (Organization of Petroleum Exporting Countries) cut their production and imposed an embargo on exporting oil to the United States. The resulting fuel shortages and long lines at gas stations fomented a sense of crisis and a strong desire for a secure, stable, and enlarged domestic oil supply.[167]

In the interim, between the North Slope strike and the passage of the bill authorizing the pipeline, Congress had also passed the National Environmental Policy Act (NEPA). Enacted in 1970, this landmark legislation requires federal agencies to examine the possible environmental impact of proposed projects. Additionally, federal agencies must then file their assessments with the President's Council on Environmental Quality.[168] In order to meet the requirements of NEPA, the Department of Interior submitted its draft Environmental Impact Statement (EIS) on the trans-Alaska pipeline in January, 1971.

The Alaska District's initial involvement in the project was limited to its response to the draft EIS, a task which derived from the Corps' regulatory responsibilities as assigned by the Rivers and Harbors Act of 1899.[169] The experience gained from overseeing the CANOL system, as well as the

ALCANGO and Whittier pipelines, provided the Alaska District with a solid foundation for fulfilling this responsibility.

On February 5, 1971, Acting District Engineer Lieutenant Colonel Paul Bazilwich, Jr., forwarded to the Chief of Engineers the joint review comment of the Alaska District, the North Pacific Division, and the Alaskan Command, evaluating the Interior Department's draft EIS. In his letter transmitting the joint comment, Lieutenant Colonel Bazilwich emphasized that a "project of this magnitude," with the pipeline's "potential" for introducing "environmental change," required a much longer period of review and deeper assessment than had proved possible in the time available. He also stressed the need to adequately define "navigable streams" in an Alaskan context because of the Corps' associated navigational responsibilities.[170]

According to Peter Coates, the Corps proved to be a "powerful critic" in its review of the Interior Department's draft EIS.[171] The substance of that review hit heavily on the draft EIS's failure to consider, as required by NEPA, *all* alternatives to constructing the pipeline, including *not* building it at all. The joint comment also stated that the draft EIS contained plenty of information regarding the "physiography of the pipeline route," as well as other "similar non-controversial matters," but neglected to include sufficient "detailed analyses of the proposed construction and operation of the pipeline." Moreover, the joint comment criticized the draft EIS's conclusions regarding the pipeline's environmental effects as little more than "unsupported opinions." Further, the review comment stressed that the EIS should have re-emphasized that no pipeline construction would be allowed until all responsible agencies had accepted its design features.[172]

The review comment additionally addressed the need for greater study of impacts to Valdez, a subject especially germane to the Corps' navigational responsibilities. The response comment argued that "a marine facility handling from 600,000 to 2,000,000 barrels of oil ... poses different problems than a pipeline on land." The draft EIS, in the Corp's view, had failed to adequately consider social and economic changes to Valdez, given that the small fishing town would likely become a major industrial port. Prophetically, the joint comment criticized the preliminary impact statement for underestimating the job of cleaning up oil spills: "It should be recognized that there are numerous technical uncertainties in cleaning up marine oil spills and that complete recovery of spilled oil is not likely." The draft EIS also should have included, according to

the joint comment, estimates on cleanup costs, and discussion of who would bear them.[173]

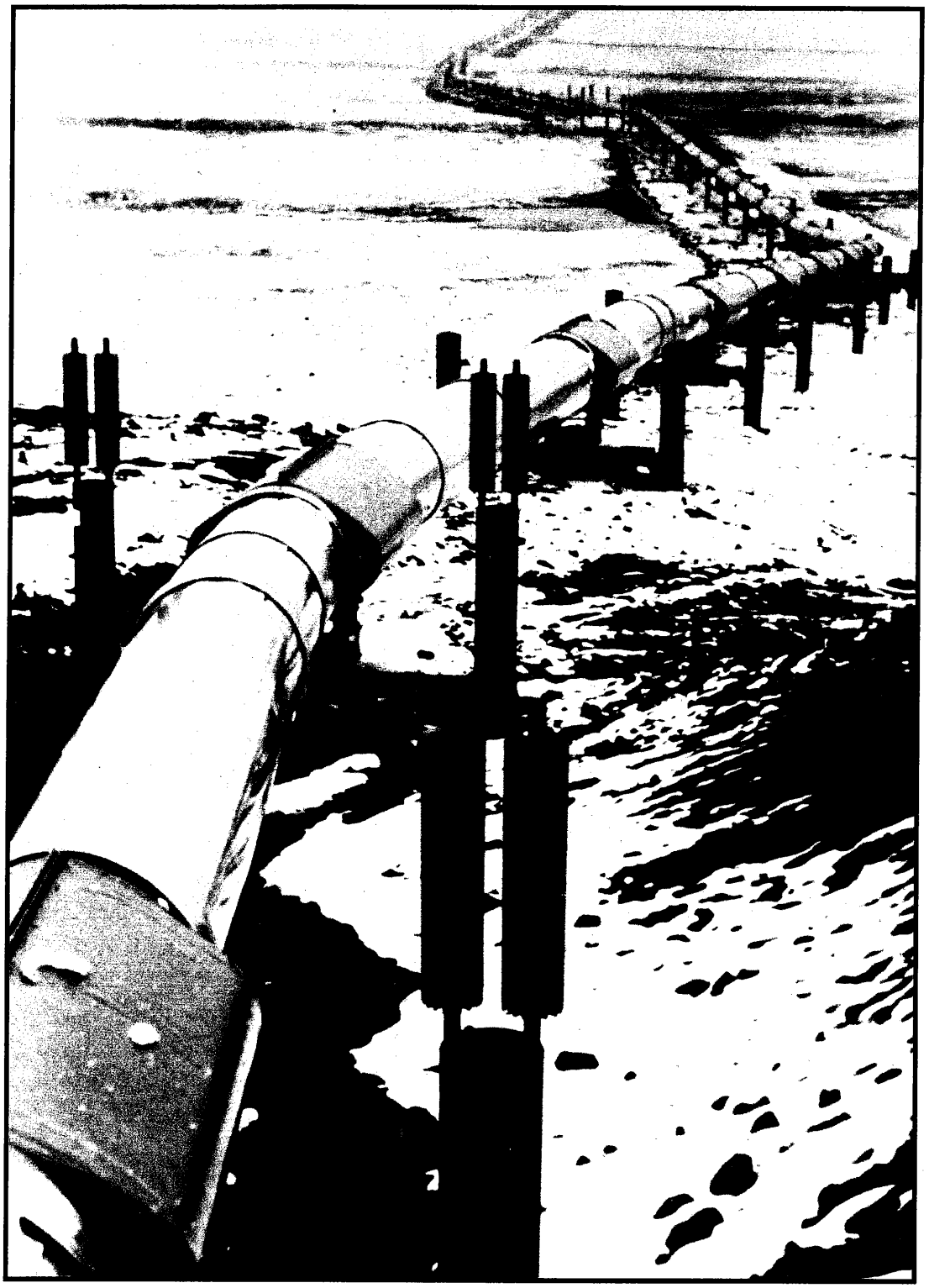
Realizing that the 48-inch-diameter pipeline would cross several navigable rivers on its 789-mile route from the North Slope to Valdez, in addition to altering conditions at the harbor, the review comment sharply denounced the draft EIS as "totally inadequate for use by the Corps in determining the environmental impact of proposed activities under permit in navigable waters."[174] Finally, the joint comment criticized the draft EIS for failing to address, as required by NEPA, significant social and economic impacts to South Central Alaska:

> The development of this major oil field and its allied transportation system to world markets will undoubtedly introduce a major population increase in Southcentral Alaska under boom conditions. The impact statement, by limiting consideration only to the work force for the pipeline construction itself, presents an entirely different impact on population growth and its effect on Anchorage, Fairbanks, and Valdez than most people anticipate.[175]

In sum, the joint comment found that because the Department of Interior's draft EIS had not fully complied with the "letter and spirit of the Environmental Policy Act," it was "quite vulnerable to challenge." Alaskan newspapers, such as the *Anchorage Daily News*, recognized that the Corps could block the pipeline's construction because of the agency's regulatory authority that pertained both to military reservation borders and navigable waters.[176]

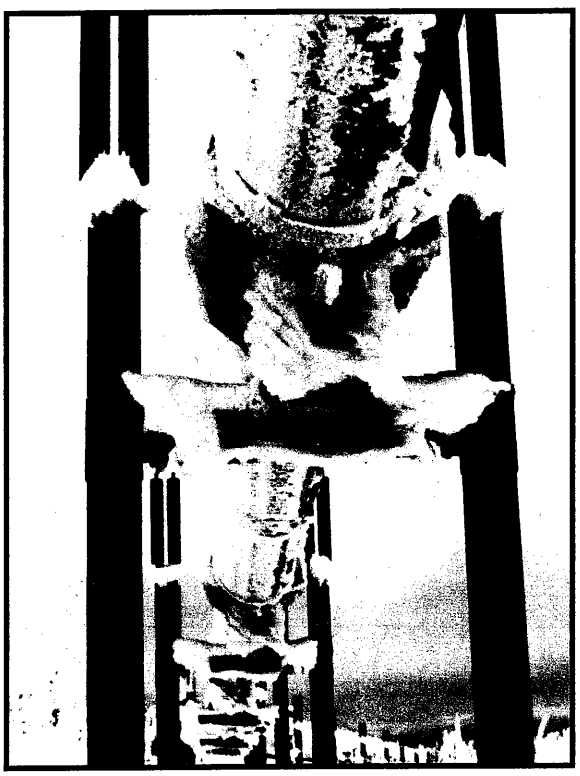
Initially, the Alaska District's response to the draft EIS was not made public. On March 9, 1971, Les Aspin, then the freshman representative from Wisconsin, placed the text of Lieutenant Colonel Bazilwich's forwarding letter and the joint comment in the *Congressional Record*. Aspin accused the Pentagon of trying to suppress the critical comment, noting that Jack Anderson of the *Washington Post* had scooped the story on the attempt to prevent its release.[177] Congressman Aspin, however, may have been mistaken. On March 3, the Department of Defense presented its own critical response to Interior's draft EIS. This document, like the Alaska District's response, sought more consideration of alternatives to the pipeline and criticized the draft EIS's weak analysis of its potential impacts.[178]

One of the problems with the Interior Department's draft EIS was that it was an edited version of an earlier document submitted to various federal agencies and to officials of the Alyeska Pipeline Service Company in December of 1970. According to *Anchorage Daily News* columnist C. Robert Zelnick, the original draft



The Trans-Alaska pipeline.

EIS had been much tougher in its assessment of the ecological impact of the pipeline. The original, as Zelnick explained, had addressed the risk of oil spills to entire watersheds, not just to streams and rivers adjacent to the pipeline. Moreover, the original had discussed the possibility of major oil spills along the entire route as well as the danger of marine oil spills in Prince William Sound. Also deleted from the original version was its mention of the pipeline's possible obstruction of animal migration routes. Missing too from the document was a statement regarding, as Zelnick put it, "the unique value of Alaska's wilderness system."[179]



Detail of H-shaped steel assemblies supporting the elevated pipe.

That the Interior Department would so severely edit its draft EIS, coupled with the possibility that the Defense Department might attempt to withhold the Corps' critical response, revealed the sense of urgency created by the energy crisis that colored this period. A more cynical analysis would charge that, in order to obtain approval for the pipeline, the oil industry exerted its influence in whatever way possible. In any case, political and economic realities ultimately assured the pipeline's construction. By the time Congress voted on the project in November, 1973, the vote was not even close.[180]

Nearly two years earlier, in January of 1972, Federal Judge George Hart had slapped an injunction on the project because the draft EIS did not satisfy NEPA's requirements. In response to this court action, as well as the reams of criticism that the draft EIS had received, the Interior Department poured millions of dollars into further study of the pipeline's likely ecological consequences. In March, 1972, the Interior Department issued its final EIS, a nine-volume document, weighing in at 25 pounds. Among the hazards now discussed in the EIS were permafrost instability; the probability of a major earthquake causing a rupture; oil spills along the route of up to 64,000 barrels before Alyeska could shut the line; both small and large marine oil spills; and, impacts on wildlife.[181]

The Corps' criticisms, among others, were reflected in the final EIS, but the amount of environmental risk delineated in that document was not enough to stop the project.

Ruling that the Interior Department's final EIS now met the requirements of NEPA, Judge Hart lifted his injunction in August, 1972. Shortly thereafter, a new controversy emerged regarding the 100-foot width of Alyeska's proposed right-of-way. This debate, based on the 1920 Mineral Leasing Act, continued to delay the pipeline project.[182]

In late 1973, however, when Congress voted to approve the pipeline in the interest of national security, the federal government overrode the risks so straightforwardly posed in Interior's final EIS, as well as the technical and legal issue pertaining to the right-of-way width. In so doing, Congress agreed that all of the requirements of NEPA had been satisfied, and effectively blocked any further court action on the project. Alyeska could now proceed with construction. Some members of Congress who favored the pipeline in fact blamed the worsening energy crisis on environmentalists who had tried to block the pipeline's progress. During debates in the House on the authorization bill, California Representative Craig Hosmer, for example, argued that "To preserve the 7,680 acres that would be occupied by the pipeline seems an inordinate price to pay for fuel rationing, cold homes, cold schools, and blackmail by the Arab world."[183]

In December of 1973, the Corps' Director of Civil Works, General John W. Morris, met with officers of the Alaska District to discuss the permitting work assigned to the Corps on the pipeline project. Insisting that this process be expedited, Morris instructed the District to issue single permits to cover several stream crossings at given segments of pipeline construction. Reminding those in attendance that the "marching orders" for the pipeline were "Green — Go," Morris stressed that the Corps' internal procedures and administrative policies must not hinder construction progress.[184]

In response, the Alaska District accelerated its permitting practices. Expediting the process meant revising the standard form and issuing permits without North Pacific Division approval. In order to complete the permit work for the pipeline's 38 navigable stream crossings, the Alaska District needed four full-time employees and $150,000. The North Pacific Division instructed the Alaska District to proceed with this work prior to congressional approval of the necessary additional funding.[185]

The Alaska District continued its involvement with oil development in the state by submitting environmental impact statements of its own. The Corps' efforts in this regard primarily focused on offshore gas and oil development in Alaska. As of late 1974, the District had processed six oil permits in Cook Inlet. That year, the Alaska District contracted with the Arctic Institute of North America to prepare a lengthy analysis of the environmental, social, and economic conditions along the state's arctic coast. Entitled "The Alaskan Arctic Coast: A Background Study of Available Knowledge," the exhaustive report also examined possible impacts to the region as a result of gas and oil development. Authors of the study questioned the adequacy of then current levels of technology and expertise to safely conduct year-round development drilling or to engage in offshore production in the arctic seas. Studies like this one helped to form the basis of the Alaska District's environmental impact statements.[186]

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The first 30 years of the Alaska District's history coincided with the postwar resource and energy development of the region. In the evolution of energy production in Alaska during this time, the District gained experience with the embryonic nuclear power plant at Fort Greely, as well as with increasingly sophisticated and large-scale methods of oil transport via pipelines. During this period, as the Corps' support of military installations in Alaska both depended upon, and contributed to, the region's growth, the demarcation between military and civil projects often became blurred. Over the course of these 30 years, as Alaska matured both socially and economically, the Alaska District became more environmentally aware of the price of energy development. In 1966, the Corps had faced angry allegations because of welding problems on the Whittier pipeline. In 1971, no doubt having learned from this experience, the agency strongly argued that a more thorough assessment and a broader vision needed to precede construction of the trans-Alaska pipeline. Political and economic pressures ultimately demanded the pipeline's construction, despite the concerns of the Corps, environmentalist groups, and others. But the Alaska District proceeded thereafter with its own program of environmental assessment, having gained a new appreciation for the complexity and importance of the process.