

Project Chariot: Nuclear Legacy of Cape Thompson

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The following presentation originally appeared in the *Proceedings of the U.S. Interagency Arctic Research Policy Committee Workshop on Arctic Contamination*, Session A: Native People's Concerns about Arctic Contamination II: Ecological Impacts, May 6, 1993, Anchorage, Alaska

Author's note: Much of the information presented in this report is derived from unpublished materials contained within the files of the Bureau of Land Management (BLM). Many of the unreferenced quotations presented here are taken from letters and other correspondence found within these BLM files.

Abstract

In 1957, the U.S. Atomic Energy Commission (AEC) established the Plowshare Program to "investigate and develop peaceful uses for nuclear explosives." In early 1958, the AEC selected a site at the mouth of Ogotoruk Creek near Cape Thompson and began developing plans for an experimental harbor excavation to be called "Project Chariot." Late in 1962, after extensive scientific studies, the AEC announced that it "would defer further consideration of the proposed Chariot experiment," due in part to public criticism.

One of the studies performed was called the "tracer experiments in which radioactive materials were applied to selected small plots in the Ogotoruk Creek basin. These materials were presumably diluted and buried in a single mound at the conclusion of the experiment.

Introduction

In July of 1945, in the hot, arid desert near Alamagordo, New Mexico, a new age of man began. History might call this the Atomic Age, or The Age of Cybernetics, the Age of Science, or whatever. This new age has brought man the power to move mountains, excavate enormous canals, change the channels of huge watercourses, exert meteorological controls, modify weather by technological activity, create vast reservoirs or destroy them, or bring death to millions of our fellow man in a blinking of an eye.

The late President Kennedy spoke to the National Academy of Sciences in October of 1963, saying, in part, "Science today has the power for the first time in history to undertake experiments with premeditation which can irreversibly alter our biological and physical environment on a global scale.... The Government has the clear responsibility to weigh the importance of large scale experiments to the advantage of knowledge or to the national security against the possibility of adverse and destructive effects ..." (Wilimousky and Wolfe, 1966:VII).

The dropping of atomic bombs on Hiroshima and Nagasaki brought a dramatic ending to the war between the U.S. and Japan. The invention of these nuclear weapons set a thousand scientific minds into motion, not the least of which was Edward Teller, the inventor, or "Father of the H-Bomb."

Edward Teller toured the territory of Alaska in the summer of 1958 to promote his dream of "engaging in the great art of geographic engineering, to reshape the earth to your pleasure." He told the curious Alaskans that they were "the most reasonable people," that the atomic scientists had "looked at the whole world" for just the right location to test their technology. He flattered them, saying that "Anything new that is big needs big people in order to get going...., and big people are found in big states." He boasted that the Atomic Energy Commission (the predecessor to the Energy Research and Development Administration, and now the Department of Energy) could "dig a harbor in the shape of a polar bear, if required." He further boasted that "If your mountain is not in the right place, just drop us a card." (Coates, 1989).

In mid-1958, with worldwide pressure building to ban nuclear weapons testing, the AEC announced the "Plowshare Program." Plowshare would attempt to harness the nuclear beast and transform it into a peacetime workhorse. The first operation of Plowshare would be "Project Chariot," an experiment "to provide scientific and engineering data for excavation projects." The AEC hoped the experiment would be a prelude to the excavation of a new, sea level Panama Canal. The "harbor" would be used to transport coal from deposits on the north side of the Brooks Range. The logistics of this proposal were not a concern to Edward Teller. Alaskan business leaders pointed out that the harbor would be ice-locked by the frozen Chukchi Sea for nine months of the year. Teller replied that the warehouses would be built to store the coal until the shipping season. When they asked how he planned to get the coal to the harbor, he said a railroad would be built. George Rogers, a long-time Alaskan and Harvard-educated economist, recording this conversation, was astonished at Teller's answers to these questions. Rogers remembers asking Teller if he had any idea what such a project would cost, whereupon Teller abruptly changed the subject and inquired as to where he might buy souvenirs (O'Neill, 1989b:30-31). This motive aside, the AEC was seeking specific information on 1) cratering laws; 2) the effects of raw charges in the nuclear yield range; and 3) the effects of radioactivity, air blast and seismic shock on the environment near the site (AEC, 1963).

The environment of the site was a subject in and of itself. By the conclusion of Project Chariot in August, 1962, more than 40 bioenvironmental studies had been carried out. These studies represented the most comprehensive assessment of a single area ever done as a prelude to a proposed project. According to O'Neill (1989b:35), the compilation of these studies, titled Environment of the Cape Thompson Region Alaska (Wilimousky and Wolfe, 1966) was the first genuine environmental impact statement.

Edward Teller and the AEC drew on the popular image of Alaska as a barren wasteland. They referred to the future harbor site as

"located in the wilderness, far away from any human habitation." The Anchorage Daily Times editor, Robert Atwood, agreed and said, "It is a wilderness with no trees, no nothing! Nobody would want to live there." It would be two years until the AEC bothered to actually talk to the people who would most be affected by Project Chariot, the residents of Point Hope - an Eskimo village just 30 miles from ground zero (O'Neil, 1989a).

Physical Geography of the Ogotoruk Valley

The site chosen by the AEC for Project Chariot was at the mouth of Ogotoruk Creek, located at latitude 68° 06' N. & longitude 165° 46' W. The site is about 100 miles north of the Arctic Circle, and about 125 miles northwest of Kotzebue. The Chukchi Sea, adjacent to the site, is shallow. The Chukchi Sea is part of the margin of the Arctic Basin extending southward between the continents of Asia and North America. Northward flow of water through the Bering Strait has shaped many of the coastal features and controls the distribution of sediments. The temperature and salinity conditions in this area are determined by the properties to the south of the strait, and the same general statement applies to many of the marine plants and animals. In the summer, inshore temperatures reach 50 F. (Wilimousky and Wolfe, 1966:701-702).

The Ogotoruk Valley is about two miles wide at its lower end. The ridges that form its walls rise to elevations of more than 700 feet, with high points rising another 100 feet and more. The valley extends into the Chukchi Sea along the same axes, and is called the Ogotoruk Seavalley. The Seavalley gradually narrows to about 1 1/2 miles wide at a depth of 85 feet, and can be traced for a distance of 15 miles to a depth of 135 feet. Both valleys are primarily cut into relatively soft siltstone flanked by more resistant rocks (Wilimousky and Wolfe, 1966:789-791).

The Chariot site lies entirely in mudstones of the Ogotoruk Formation of the Jurassic or Cretaceous Age. The site is underlain by permafrost extending from within one foot of the surface to depths of about 1,165 feet inland and 945 feet near the coastline (Wilimousky and Wolfe, 1966:85).

Ogotoruk Creek is the major creek in Ogotoruk Valley and, except for Tumi Creek, all of the creeks that rise in the valley are tributary to it. Ogotoruk Creek is 11 1/4 miles long and rises at about 800 feet on the west flank of Sigrikk Ridge. Like many of the small creeks that flow into the Chukchi Sea, the mouth of Ogotoruk Creek is closed occasionally by a barrier bar of beach gravel moved by alongshore currents during offshore storms. A lake forms behind the barrier bar, and water percolates through the permeable gravel into the sea. When an onshore storm occurs, the runoff of the creek fills the lake until the barrier is breached by the rising water. The creek stays open until sealed by another storm (Wilimousky and Wolfe, 1966:55).

The Ogotoruk Valley is an exceptionally windy area. The topographic features of the valley channel cold air from the northeast around the western end of the Brooks Range, and this results in lower precipitation and lower temperatures than those at Cape Lisburne to the north. This cold-air channeling, combined with the frequent northerly winter gales, prevents heavy snow accumulation. The cool waters of the Chukchi Sea depress summer warming of the air and soil and thus help to keep the level of permafrost at shallow depths, especially in the lower parts of the valley. Temperature extremes range from the mid-70's (F) in the summer to the -40's (F) in winter (Wilimousky and Wolfe, 1966:45).

Flora and Fauna of the Ogotoruk Valley

The valley floor is covered with tussock heath vegetation and occasional groups of low willows. There are no trees; it is an area of true tundra. There are broad wet meadows, dry fell-fields, talus slopes, precipitous cliffs, rock outcrops, gravel bars and benches. These habitats support about 300 species of vascular plants, 100 bryophytic species, 81 lichens, and an undetermined number of fleshy fungi (Wilimousky and Wolfe, 1966:277).

The marine mammals of the area migrate within just a few miles from where Ogotoruk Creek empties into the Chukchi Sea. Various species of seal and whale, as well as walrus and polar bear are established. Most Eskimo subsistence hunting takes place in the spring between Point Hope and Cape Thompson (Wilimousky and Wolfe, 1966:880-881).

The Chariot site is situated just outside the northward limit of the area of important salmon production on the arctic coast of Alaska. Ogotoruk Creek has a very small salmon population; a gill net used in the sea in front of the creek during the 1960 studies caught chum, pink, sockeye, and a single chinook salmon. The destination of these fish can only be speculated upon (Wilimousky and Wolfe, 1966:871-873).

The sea cliffs in the Cape Thompson area support over 400,000 sea birds. Crowbill Point, the sea cliff adjacent to the Chariot site, is residence to almost 7,000 sea birds, which include cormorants, gulls, murres, guillemots, and puffins (Sowls, 1992).

The terrestrial-mammal fauna of the Ogotoruk Creek-Cape Thompson region consists of 21 known species. These include shrew, bear, wolf, fox, ermine, weasel, wolverine, squirrel, marmot, vole, muskrat, lemming, porcupine, moose, and caribou. Coyote, mink, river otter, and lynx are also known to occur in the area (Wilimousky and Wolfe, 1966:519-523).

Because the Ogotoruk Valley is so windy, which keeps the ground relatively clear of snow, the region is a very important wintering area for caribou (Wilimousky and Wolfe, 1966:557).

Man and the Ogotoruk Valley

The permanent settlements nearest to the Chariot site are Point Hope to the north, and Kivalina, about 45 miles southeast. The length of time that Kivalina has been occupied is not known; Point Hope, from archaeological evidence, appears to have been a site of Eskimo occupation for almost 2,000 years. The Eskimo name for Point Hope is Tigaraq, which means index finger. It remains a strategic point for the hunting of whales as they migrate through the Bering Strait.

The Ogotoruk Valley has never been the site of a permanent Eskimo population, although it has been seasonally occupied for thousands of years by Eskimo hunters. There are four obvious reasons for this intermittent occupation: (1) There is no lagoon large enough to allow sealing or fishing to become important activities, (2) the creek itself is of insufficient size to act as a major salmon

spawning stream, (3) the valley, while an important wintering ground for caribou, is too small to support large numbers of caribou for extended periods of time, and (4) its proximity to the village of Tigaraq (Point Hope) (Wiliamsky and Wolfe, 1966:964).

The Ogotoruk Valley, while relatively insignificant as a settlement in itself, can be equated with the outlying fields of a large farm. A hunting, fishing and gathering economy requires a very extensive area of production. The presence of bird cliffs continues to draw Tigaraq and Kivalina villagers seeking murre eggs, as does the presence of the migrating caribou.

Archaeological remains present in the Ogotoruk Valley were investigated in 1959-60 in the order of their proximity to the crater that would result from the proposed nuclear explosion. Two of structures were houses which had been occupied so recently that their former owners were known: Wilfred Lane of Point Hope and Charles Jensen of Kotzebue.

Wilfred Lane was born on August 5, 1940 at Point Hope. His affidavit, in conjunction with his application for a native allotment in 1972 for the Chariot site, states that he had been going to the Ogotoruk Valley with his father since he was 4 or 5. His father had a reindeer herd and built the aforementioned sod igloo "house" at the site. Wilfred gathered eggs and hunted caribou there every year as he got older. He also caught "salmon or whitefish in that stream," and hunted ducks. He would make two to four trips a month, "staying about two to three days each time."

His affidavit further reads: "When the government first began building on my land, all the people from Kivalina and Point Hope complained about the project. I didn't specifically complain that it was my land, since we all were fighting together. Of course the government went ahead and did the building anyways. After I moved to Kotzebue (when he was 21), I used the land less, but I still used it every year. I go to Pt. Hope whaling every year, and on the way back in April, I stop and go hunting at my land. I often go back egg hunting in the summer. When I heard about the Native Allotments, I chose this land because it had always been my family's land before me and because I always used it. That is very good hunting land still."

Project Chariot and the "Tracer Experiment"

On June 9, 1958, the Bureau of Land Management received an application from the AEC to segregate lands in northwestern Alaska to "conduct extensive environmental studies." Notice of the Proposed Withdrawal was published in the Federal Register three months later. In February, 1959, a public land order (PLO) was drafted and went through sunnaming, but was never signed or published. The Notice of Proposed Withdrawal was amended on April 30th of that year, upping the acreage to 1,024,000. Three weeks later, the AEC requested a permit to enter the area so that they may begin conducting their studies. The permit was approved on June 1, 1959 and was valid for 18 months. The AEC began immediately constructing housing for laboratories, sleeping and eating quarters for a staff of almost 90 people. Five of the buildings were of a permanent frame type, and the rest were of the "Jamesway" variety. Three gravel airstrips were also constructed, the largest of which was 2,200 feet long (AEC, 1959).

On December 21, 1960, the AEC requested a 3-year extension of their permit. By this time, Alaska had been a state for almost two years. Public opinion on Project Chariot was greatly divided. The Fairbanks Daily News-Miner editor, George Sundberg, wrote "We think the holding of a huge nuclear blast in Alaska would be a fitting overture to the new era which is opening for our state." On the other hand, the scientists, many from the University of Alaska at Fairbanks, were learning that the Eskimos, who were dependant on hunting caribou in the huge test area that was Project Chariot, were inexplicably showing high levels of harmful radionuclides in their bodies. The Caribou, and the Eskimos who ate them, appeared "to be higher in Sr 90 (Strontium 90) content than any other group in the world." Worldwide nuclear testing, it was shown, was causing fallout that was being absorbed by lichen, a rootless tundra plant that derives its mineral nutrition from airborne dust. As the caribou grazed on the lichen, they g leaned fallout from many acres and retained it in their tissues and bones. When an Eskimo ate several caribou each year, he further concentrated in his body the Strontium and Cesium once scattered over miles of tundra (O'Neill, 1989b).

Some of the scientists now voiced opposition to the Project. Two individuals were subsequently relieved of their positions, while others were blacklisted from working in their fields elsewhere. But together with the residents of Point Hope and a handful of dedicated conservationists, they raised to an unacceptable level the political cost of proceeding with the detonation of nuclear bombs at the Chariot site. It was then decided to conduct the cratering test in the Nevada desert in July of 1962 (O'Neill, 1989a).

Since the AEC couldn't explode their bombs at Ogotoruk Valley, it was decided to bring fresh radioactive fallout to the valley. Piper (1963) estimated that 26 milliCuries (mCi) of isotopes and mixed fission products were transported to the Chariot site. This included a maximum of: 10 mCi of mixed fission products from a site in Nevada (described below), 6 mCi of Cesium 137, 5 mCi of Iodine 131, and 5 mCi of Strontium 185. This was to be an "experiment related to the dispersal, in an hydrologic environment, of radioactive products from a buried nuclear explosive" (USGS, 1962). The experiment would answer a question the AEC had posed to the United States Geological Survey (USGS): Would the bombs contaminate local drinking water? USGS scientist, A.M. Piper, answered the AEC in a report in November, 1961, concluding that "under some situations, effects...could be substantial and a serious handicap to Man's activities." The AEC wanted proof, and they assigned Piper to conduct experiments at the Chariot site (Magdanz, 1992).

The design of the experiment was this: Scientists from USGS would apply known amounts of radioactive fallout to measured plots of ground at Ogotoruk Valley. They would water the plots, to simulate rainfall if it wasn't raining at the time, and catch the water as it trickled off. In the lab, they would measure how much radioactivity was in the water. A USGS Professional Paper containing a complete description of the experiment was published in 1966 (Piper, 1966).

To acquire radioactive fallout, a USGS chemist from Denver, V.J. "Vic" Janzer, travelled to Nevada to where the cratering test, called "Project Sedan," was being conducted. He placed a ring of trays in a one mile radius around ground zero, and collected them 24 hours after detonation. He brought 17.5 pounds of this radioactive fallout - sediment, sand, and dust - to Ogotoruk Valley on August 20, 1962 (Oral comm. James Magdanz, 1992). In addition to this 17.5 pounds of material were small segregated quantities of Iodine 131, Strontium 85, and Cesium 137 mixed with sand (Oral comm. Dan O'Neill, 1993).

On August 21, a windy Monday, four men including Janzer, left the Ogotoruk Creek camp in one of the half dozen "weasels." They drove across the tundra to the first tributary, Snowbank Creek. They set up a gasoline-powered pump near the creek bed, and attached several garden hoses equipped with plastic spray nozzles.

By Thursday, they had completed seeding and watering 10 square plots, varying in size from 24 x 24 inches to 60 x 81 inches. These plots were located at various elevations along Snowbank Creek. At Site #116 a soil infiltration and seepage experiment was p

erformed, and at site #117, located along a tributary of the creek, "tracer" material was actually injected directly into the stream, and water samples were gathered at 20, 40, and 60 feet downstream to show dispersal (Piper, 1962).

At the conclusion of the experiments, they collected the beakers, boards, and plastic and carried them to a burial site midway between plots 113 and 114 at the lower end of Snowbank Creek. The contaminated soil, rocks, and plants, totalling about 15,000 pounds, was removed from the 11 plots, placed in 55 gallon drums and transported to this same burial site, where the drums were emptied. The resulting spoilage pile was approximately four feet high and occupied an area of about 400 square feet. An additional layer of dirt approximately four feet thick was placed over the contaminated soil using a bulldozer (Baker, 1963).

The bottles of run-off and any left over radioactive material were flown to Denver for analysis (Piper, 1963). This represented about 2% of the originally introduced material. The sites were inspected five days later, and the verdict was that neither the cleared plots nor the mound posed any health risk. However, there were "possible items of non-compliance." (Magdanz, 1992)

The scientists had used Iodine 131, Strontium 85, and Cesium 137 which were not permitted according to the USGS license, and the quantities of radioactive isotopes buried in the mound were larger than permitted. Perhaps as much as 1,000 times more strontium and cesium as allowed by federal regulations (Piper, 1963 and Magdanz, 1992). Also, the BLM permit to the AEC did not allow the use of radioactive materials (Magdanz, 1992).

These charges were eventually leveled at the acting Director of the USGS in Washington, D.C., Arthur Baker. Baker argued in a letter to the AEC dated February 28, 1963, that the radioactive material had been dispersed to harmless background levels, and "the extreme cold coupled with the permafrost in the area causes disturbed ground to freeze solid early in the winter and to remain frozen. (Author's note: The top one to two feet thaws in the summer and freezes again in the fall.) It is believed from previous experience in the area that the dispersal mound is now frozen solid and that the portion of the burial mound containing the waste material will remain solidly frozen and inaccessible for many years, barring a drastic climatic change." Also, "The Chariot Base Camp is the only facility in the region that could possibly be affected by leakage from the spoilage pile..." and "any radioactive material released would be carried to the creek by surface run-off and then to the sea. " "It is our opinion that . . . this material does not constitute a hazard." A memo dated April 10, 1963 from the AEC's Director of Special Projects in San Francisco stated that the AEC felt..."satisfied that the radioactive waste mound at the Chariot site does not represent a health and safety problem...it can be abandoned," which it was.

A letter from the Assistant Secretary of the Interior, John A. Carver, Jr., to the Chairman of the AEC, Glenn T. Seaborg, dated May 14, 1963, stated in part, "We note that you have supplied the Manager with maps showing where these areas (tracer experiment plots) are located. To the extent that the nature of the use to which the study plots are being devoted, may not be readily apparent to members of the public, we suggest that they be appropriately posted." The burial mound was finally posted by U.S. Fish and Wildlife Service employees in the winter of 1992.

Epilogue

The AEC came to the village of Point Hope on May 14, 1960, and played an 11-minute film for the curious residents showing a stylized representation of the lower Ogotoruk Valley before and after the simultaneous detonation of one 1-megaton, and two 200-kiloton thermonuclear bombs buried at shallow depth. The bombs were arranged in a "keyhole" shape, and the clouds of debris resulting from the explosion would rise to an estimated 30,000 feet. The blast would be equal in energy to 160 Hiroshima bombs. It was shown in this dramatic film, that the sea would rush into this keyhole-shaped crater, creating an instant harbor (O'Neill, 1989b). The villagers would not only be invited to watch the blasts, but would be employed as coal miners, railroad and harbor operators. The AEC was trying to entice them into cooperating with Project Chariot. They were told that all the people living in Point Hope, Kivalina, and Noatak would be temporarily relocated to Kotzebue or Nome for a year or so after the blast. They would then be relocated again, not back to their original homes, but to modern dwellings near the brand new harbor in the Ogotoruk Valley (Rock, 1962). The now very concerned residents of these native villages began their vocal opposition to Project Chariot. The strong leadership led the way to Native political organization. The first-ever meeting of the Alaska Eskimos convened in Barrow in 1961 as a direct result of Project Chariot. That same year, the first statewide Native newspaper, The Tundra Times, was established, with Howard Rock as editor. The Point Hope villagers also sent a protest to President Kennedy, saying that Chariot is too close to our homes at Point Hope and to our hunting and fishing areas." (Coates, 1989). This flurry of activism marked the beginning of an era of political maturity for Alaska Natives which led to a successful resolution of their land claims in Congress in 1971.

The handful of Alaskans who rallied together and spoke out against Project Chariot achieved the first successful opposition to the American nuclear establishment. According to O'Neill (1989a), it marked one of the first battle victories of the new "environmentalism" era. This perhaps was the most significant result to come out of all four years of studies performed in conjunction with Project Chariot. In August of 1962, after the "tracer" experiments had been completed and after spending \$3 million on Chariot, the AEC announced its decision to defer a recommendation to the President that the project proceed. They also decided that they no longer needed the over 1 million acres asked for in the original withdrawal application. In January of 1963, they formally requested that only the 96,000 acres which surrounded the Ogotoruk Valley, be withdrawn. However, in April of that year, they changed their mind and decided to withdraw their application, with the understanding that the AEC may wish to re-file in the future, in the event a decision is made to carry out Project Chariot. The letter stated that "The bioenvironmental studies as related to Project Chariot were phased out on 9/01/62" but that "long range studies of the effects of worldwide fallout on the arctic ecology will continue (Seaborg, 1963)." In the end, Chariot had failed for want of horses to pull it.

That September, the BLM requested from the AEC an exact description of land-use sites for future protection of the Government's interest. Additional requests to the AEC were made, but no response was ever received.

In December of 1966, the Department of the Navy assumed control of all the AEC improvements in the Ogotoruk Valley and obtained a BLM Special Land Use Permit (SLUP), effective for five years. 4,700 acres became identified as the Cape Thompson Naval Site. In 1966, the USGS published the results and conclusions derived from the tracer experiments of 1962 (Piper, 1966). A.M. Piper, analyzing the effects on local water supplies wrote: "All villages of the area are outside the fallout sectors of the foregoing appraisal; accordingly; their established water sources would be exposed only to stream-transported or wind transported fission products from Project Chariot. Two of the villages, Kivalina and Noatak, definitely would be so exposed." Also, "However, trail-side water sources should be considered "off limits" until proven otherwise by adequate radiochemical analysis, especially in the basins of Ogotoruk Creek, Nasorak Creek, and the several small streams southeastward to Cape Seppings" (Piper, 1966:33).

The site was used as a logistical support base for the Naval Arctic Research Laboratory (NARL). The Navy maintained the buildings at the old Project Chariot base camp, and utilized them as living quarters, shops, garages, and generator facilities. The three airstrips were also re-worked and improved.

When the Special Land Use Permit expired in December of 1970, the Ogotoruk Valley fell into a very intermittent use status. Wilfred Lane (1983) wrote, "...it seemed like the Government had abandoned the site. No one uses that land except for me and occasionally my brothers."

In March of 1972, the entire township containing the Project Chariot base camp was withdrawn by Public Land Order 5179, subject to "valid existing rights" concerning addition to or creation of units of a National Park, Forest, or Wildlife Refuge. One month later, Wilfred Lane formally filed his native allotment application for 160 acres surrounding the Project Chariot base camp, including the airstrips.

Two years later, the Navy filed an application for withdrawal for the 4,700 acres located within their former SLUP. The Alaska Native Claims Settlement Act had already been signed into law, and the BLM asked the local Native Regional Corporation if they intended to select these lands. The Arctic Slope Regional Corporation formally filed their selection for the Ogotoruk Valley in March of 1975.

In October of that year, the Navy indicated that they assumed control of the 4,700 acre portion of Project Chariot and the camp. The Navy considered the area to be "an important off-site component of NARL," and that they were "interested in continuing arctic coastal and beach studies as they pertain to coastal and inshore warfare and research programs..." They also indicated that "Old diesel oil spills at Cape Thompson have, for example, given ecologists the opportunity to study the effects of oil spills on the structure and functioning of arctic tundra ecosystems." The Navy indicated that they strongly supported segregation of these lands from Native selection. Rather, they supported the proposal that after withdrawal by the Navy had been accomplished, the 4,700 acres would become a "National Environmental Research Park" (Kermes, 1975). By this time, the AEC had become the Energy Research and Development Administration (ERDA). A letter from the ERDA to Dave Fauske of the Arctic Slope Regional Corporation (ASRC) explained the concept of this "research park." "Of primary importance to the definition and operation of one of these research parks is the fact that it is a pristine undisturbed virgin environment held forever inviolate from man's disturbance like Mount McKinley National Park." And "Just as our research park at Savannah River studies the impacts of operating nuclear reactors and waste burial grounds, so a similarly designed park in the arctic region could study the environmental impacts of oil or natural gas wells, coal or mineral mining or deep water port developments" (Brisbin, 1975). Apparently, as late as October of 1975, the scientists at ERDA had still not given up the idea of excavating a "deep-water port" at the Ogotoruk Valley.

In March of 1976, an agreement between ASRC, the Tigara Corporation (Point Hope Village Corporation) and the Secretary of the Interior, outlining the establishment of this "National Environmental Research Park" was drafted. It has never been signed.

On December 2, 1980, the Alaska National Interest Land Claims Act was passed, and the Ogotoruk Valley was included in an area designated the Cape Thompson Subunit of the Chukchi Sea Unit of the Alaska Maritime National Wildlife Refuge. The Fish and Wildlife Service (FWS) would now have jurisdiction over much of the old Project Chariot lands, although the Navy application for withdrawal of the lands, the ASRC land selection, and Wilfred Lane's Native Allotment application were still valid and remained active.

In February of 1982, the State of Alaska filed a general purposes grant selection for lands in the Ogotoruk Valley including the Project Chariot base camp. Meanwhile the FWS formally requested that the U.S. Army Corps of Engineers investigate and report on the need for cleanup of hazardous waste within the Cape Thompson Subunit. Site visits were conducted by the Corps in September of 1985 and 1987. They reported that "hazardous toxic waste is present at the site (U.S. Army Corps of Engineers, 1987). Environmental and archaeological studies were also conducted during the visits. Building materials suspected of containing asbestos were collected during the 1987 site visit. Friable asbestos is present at the site." In addition, "sampling results have identified petroleum, oils, and lubricants (POL's) at the site which exceed environmental and health standards criteria." The petroleum products and abandoned oil drums were cleaned up by the Corps in 1990.

In the March of 1984, a letter from the Navy to the BLM stated that "The Navy has no record of any Navy-owned improvements ... and has no interest in any equipment or improvements on ..." the Project Chariot site. This was in sharp contrast to their extreme need for withdrawal of the area just nine years earlier.

Wilfred Lane's native allotment for the Chariot Site was approved in January of 1987, and was subsequently surveyed. His patent was issued in 1990, and easements reserved to the U.S. were for a trail along the beach through the allotment, a trail from the beach to the main camp and camp airstrip, and for the large runway on the east side of the allotment. In August of 1992, Dan O'Neill, a University of Alaska Fairbanks researcher, who is writing a book about Project Chariot, obtained recently de-classified documents and letters under the Freedom of Information Act. The government archives described the burial of soil contaminated with radioactive material in August of 1962, in conjunction with the Project Chariot scientific studies (Blucher, 1992). The disco very came at a time of increasing concern over disposal of radioactive waste in the Arctic. Although the FWS has jurisdiction over the property, the Department of Energy has assumed responsibility for the clean up (Phillips, 1992b).

On September 15, 1992 Governor Walter Hickel and Senator Frank Murkowski visited Point Hope and the burial mound just north of the abandoned Project Chariot base camp. They were accompanied by Wilfred Lane and Richard Parrish, a contaminants specialist from the Army Corps of Engineers. Both Hickel and Murkowski promised immediate action and indicated that any residual waste would be removed and the site cleaned up by March 1993 (Phillips, 1992b).

When the Army Corps of Engineers first investigated the site five days earlier, they first flew over the area taking radiation readings with a sensitive radiation counter. With no unusual indications of radiation from the air, they landed. But two days later, in a two-foot-deep hole on the mound believed to be the burial mound, radiation counters began to detect low levels of radiation. The officials retreated, and Point Hope and North Slope Borough leaders called for immediate action to secure the site and remove the radioactive materials. They hired a private consultant to advise them (Phillips, 1992a).

The natives of Point Hope have experienced a high rate of cancer related deaths in the last 30 years. It was immediately assumed that the tracer experiments performed and the burial of radioactive waste 31 years ago is a possible cause of these deaths. The eight cancers that were diagnosed in Point Hope residents from 1984 to 1989 included two cases of lung cancer, two cases of cervical cancer, and one case each of stomach, bone, colon and testicular cancer. The common types of cancers associated with rad

iation exposure among Hiroshima and Nagasaki bomb survivors and others with known radiation exposure have included thyroid cancers, leukemia, multiple myeloma, and breast cancer in females. None of these cancers was noted among Point Hope residents from 1984 to 1989 (Chandler and Middaugh, 1992).

The State of Alaska Department of Health and Social Services released a report in November of 1992 titled "Health Risk Assessment of Radioisotopes at Cape Thompson, Alaska." This report completely rebukes any notion of potential hazard of visiting, let alone living near, the Project Chariot site at Cape Thompson. Among the concerns the report addresses is that the radioactive material may enter the food chain of Native Subsistence hunters and their families through uptake by plants growing atop the burial mound which are in turn eaten by caribou grazing at the site. The report states that "... the material is located well below the roots of the surface plants, precluding its introduction into the food chain." Other issues presumably put to rest by this report, include the assumption that the material buried in the mound is still radioactive. "Of the 24.3 millicurie of material buried in 1962, there remains a maximum of 11.3 millicurie of radioisotopes in 1992, assuming that the Sedan Fallout material has an extremely long half-life, and none of the material has undergone disintegration. Assuming that the Sedan Fallout disintegrates with a half-life of 30 years, only seven millicurie would remain at present." (Chandler and Middaugh, 1992).

The report gives a lot of weight to the "very effective shielding" provided by the soil, "... demonstrated by the fact that there was no increase in radiation readings above background levels directly atop the disposal site in 1962, and as expected, none was detected in 1992."

The report also gives "worst cases scenarios, such as "... if an individual were to have remained atop the burial site 24 hours per day for a full year, the most radiation he could receive from the site over and above background would be 10.5 milliRoentgen. This radiation is equivalent to about one millionth of a routine chest x-ray or to the exposure a person receives in nine hundredths of a second in a jet plane at cruising altitude." Also, "one would have to live at the site for approximately 500 years to reach the minimum exposure level associated with possible increased risk of cancer."

But what if the radioactive material were eaten? "...in order to exceed maximum permissible quarterly ingestion limits for Cesium, one would have to consume over 16 cubic feet of the disposal material every three months. One would become sick from eating din long before ingesting enough Cesium to experience any short-term or long-term radiation-related health problems."

The known amounts of radionuclides from the Sedan Fallout have only recently been de-classified. The information released is consistent with the findings presented by the Alaska Department of Health and Social Services.

On February 10, 1993, the headlines of the Anchorage Daily News read "Feds tap \$3 million to clean up nuke site." Tom Gerusky, Department of Energy spokesman said that even though the DOE is "99 percent sure" that it poses no risk to people, "it's that 1 percent that we can't be sure of." The cleanup plan calls for 25 workers to dig up the contaminated area and pack it in barrels. The barrels will be barged to a hazardous waste dump in Hanford, Washington. The cleanup work is expected to begin in July and be finished in September.

The mayor of Point Hope, Jessie Kaleak, quoted in *We Alaskans* believes this action is the very least the government can do. The plan, he says, "doesn't address health issues and the monitoring of our oceans and land and marine mammals. That is something we pushed for and we are not going to give up on it." (Magdanz, 1992)

The nuclear legacy of Cape Thompson is still being written.

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