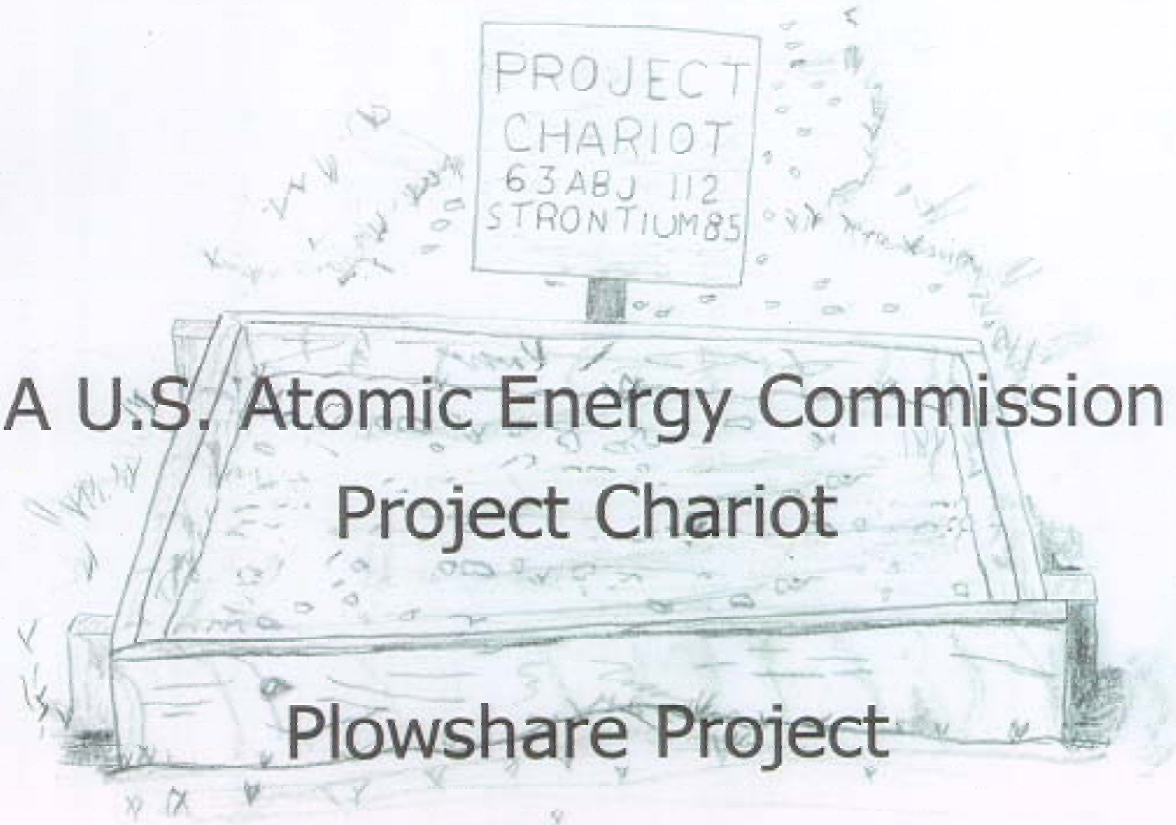
Radioactivity

Past and Present Contamination

- The Arctic terrestrial system are more vulnerable to radioactive contamination than temperate areas.
- The major sources of anthropogenic radionuclides in the Arctic are global fallout from nuclear bomb tests, releases from European nuclear fuel reprocessing plants, and fallout from the Chernobyl accident.
- Discharges from Russian reprocessing plants, underground and underwater nuclear detonations, stores of spent fuel, and dumped waste have contaminated local areas, but have not yet been identified as contributing anthropogenic radionuclides to the Alaska Arctic.
- Levels of radionuclides in the Arctic attained their peak values in the 1960s, primarily as a consequence of atmospheric nuclear weapons tests. Arctic people receive their major radiation dose from previous weapons explosions, the fallout from which is ingested through terrestrial and freshwater pathways.
- In some areas of Fennoscandia and western Russia, Chernobyl fallout contributes a comparable dose to that of weapons fallout, but that was not the case in Alaska.
- People with a diet high in terrestrial and freshwater foodstuffs receive the highest radiation exposures, from both natural and anthropogenic radionuclides. These foodstuffs include caribou/reindeer, freshwater fish, berries, mushrooms, and lamb.
- People who eat mostly marine foodstuffs have the lowest doses.
- Polonium from caribou/reindeer dominates the natural radiation dose.
- Cesium-137 from an array of terrestrial food sources is the most important anthropogenic radionuclide.



A U.S. Atomic Energy Commission Project Chariot

Plowshare Project

USGS Conducts a Study 1962

Figure 1-2: USGS Researcher Simulating Rainfall on a Plot at the Chariot Site - 1962

Figure 1-3: USGS Researchers at a Plot Site Near Snowbank Creek - 1962

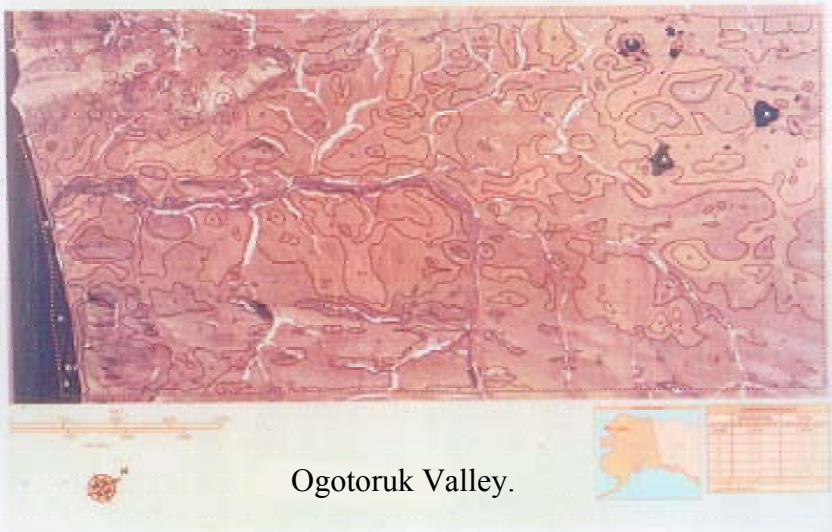
USGS Leaves a Legacy

1962

Figure 1-4: Bulldozer Covering the Radioactive Tracer Material at the Chariot Site – 1962.

Figure 1-2: Boards and Radioactive Tracer Material Being Buried Chariot Site – 1962.

DOE Conducts an Environmental Assessment 1993



Ogotoruk Valley.

Figure 4-6: Havahart Live Trap Setup for Ground Squirrels at the Mound – 1993.

DOE Conducts a Cleanup 1993

Figure 3-3: Excavator Removing the Surface Vegetation Getting Ready to Start the First Lift – 1993.

Figure 3-4: Sodium Iodide Detector and Multi-Channel Analyzer on a Mound Lift – 1993.

A Harbor for the North

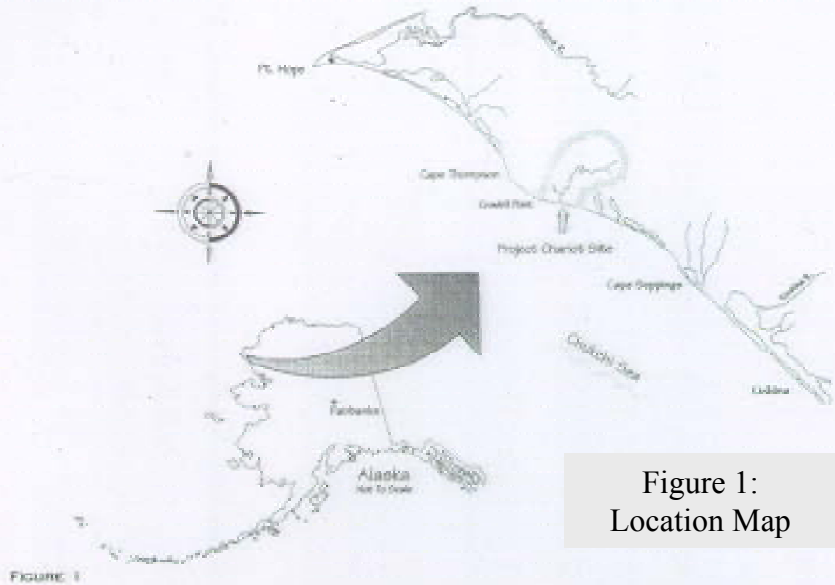


Figure 1:
Location Map

ADEC Project Chariot Remediation Report Executive Summary.

Amchitka Island, Alaska Perspectives on Underground Nuclear Tests

- **Total Yield of US Underground Nuclear Tests around 37 MT.**
  - **Amchitka tests account for approximately 16% of this total.**
- **Amchitka contains a significant amount of radioactive debris.**
  - **Several 100,000 curies of radioactive Cesium and Strontium**
  - **Millions of curies of tritium**
- **Radioactive contaminants in groundwater can migrate over longer distances than originally thought (American Chemical Society 1998).**

Amchitka Underground Nuclear Test Area

- Unique among all of the DOE nuclear test sites in the continental U.S. because of the uncontrolled pathways allowing radionuclides from the underground tests to enter the marine environment and food web.

- Leakage of radionuclides from the underground test cavities into the Bering Sea and North Pacific Ocean is a serious concern. These are two of the most productive commercial fishing grounds in the world.

- Amchitka lies along the migratory pathways of many subsistence food species used by the Aleut Natives.

Site History

- Amchitka Island, the southernmost island of the Rat Island Group of the Aleutian Islands, was the site of three underground nuclear tests:

Test	Year	Est. Yield	Depth (m)	Purpose
Long Shot	1965	80 kt	700	Seismic testing
Milrow	1969	1 Mt	1,220	Seismic calibration
Cannikin	1971	5 Mt	1,790	Device testing

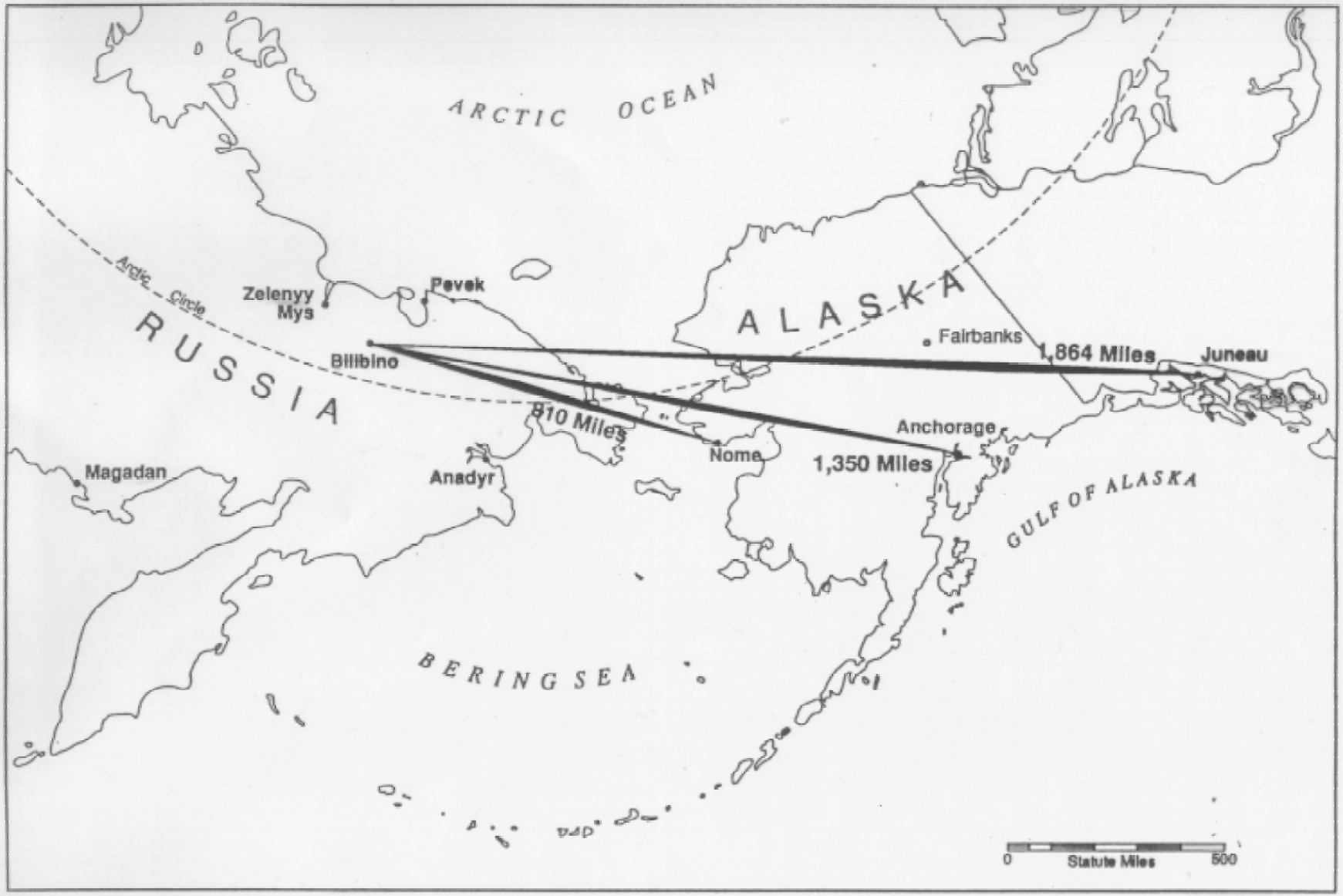


Figure 1. Geographic Relationship of Bilibino, Russia to Alaska.