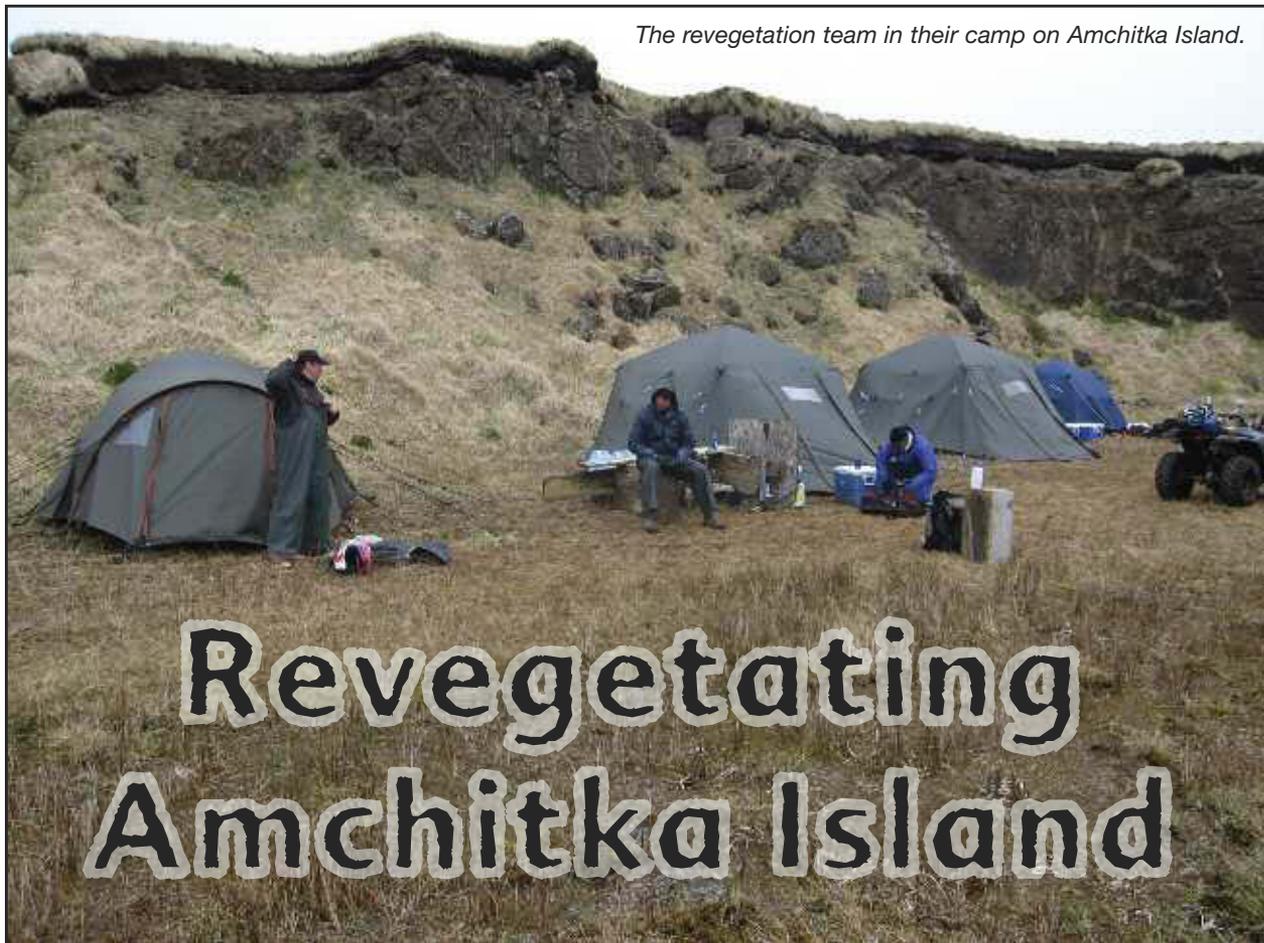


In 2001, the DOE remediated six areas associated with Amchitka nuclear detonations.

In 2008, the DOE and the USFWS took additional action to prevent significant erosion at the sites.



The revegetation team in their camp on Amchitka Island.

Revegetating Amchitka Island

By Mark Kautsky and Paul Darr

Amchitka Island is located near the far west end of the Aleutian Islands, approximately 1340 miles west-southwest of Anchorage, Alaska. From World War II until the early 1990s, the island has been used by multiple U.S. government agencies for a variety of military and research activities. Amchitka is current uninhabited and is part of the Aleutian Islands Unit of the Alaska Maritime National Wildlife Refuge, which is administered by the U.S. Fish and Wildlife Service (USFWS).

Three underground nuclear tests were conducted on Amchitka Island. The U.S. Department of Defense, in conjunction with the U.S. Atomic Energy Commission (AEC), conducted the first nuclear test (named Long Shot, approximately 80 kilotons) to provide data that would improve the United States' capability of detecting underground nuclear explosions. The second nuclear test (Milrow, approximately 1000 kilotons, or 1 megaton) was a

weapons-related test conducted by the AEC as a means to study the feasibility of detonating a much larger device. The final nuclear test (Cannikin, less than 5 megatons), the largest U.S. underground test, was a weapons-related test and was detonated on November 6, 1971. The fission products from the tests remain in and around the subsurface cavities at each test location. In addition to these three sites, drilling was performed at three other sites where nuclear testing was considered but not performed.

The activities at these six sites resulted in 12 drilling mud pits, where the drilling spoils were stored. The large-diameter emplacement boreholes were drilled using methods that employed large quantities of drilling mud—a mixture of bentonite, diesel fuel, and other compounds. The drilling mud was commonly stored near the drill sites in bermed pits excavated to hold large quantities of fluid produced from drilling the emplacement holes and exploratory boreholes.

In 2001, the U.S. Department of Energy remediated



Top: Loading up the grass seed and fertilizer on all-terrain vehicles (ATVs) to take to disposal cells where revegetation work will take place.

Center, Left: Starting off down the "Amchitka Highway" to the disposal cell sites. The gravel highway runs along the spine of the island to the north end. The most distant disposal cell was about 18 miles from the camp, and the trip there took about an hour with the ATVs.

Center, Right: Setting up for work at a disposal cell.

Left: Assembling the battery-powered seed spreader, which actually worked better for fertilizer spreading.



Left: Spreading fertilizer on the disposal cell. Navigating over the seed mesh proved problematic for the ATVs, with the mesh sometimes getting tangled in the vehicle axles.

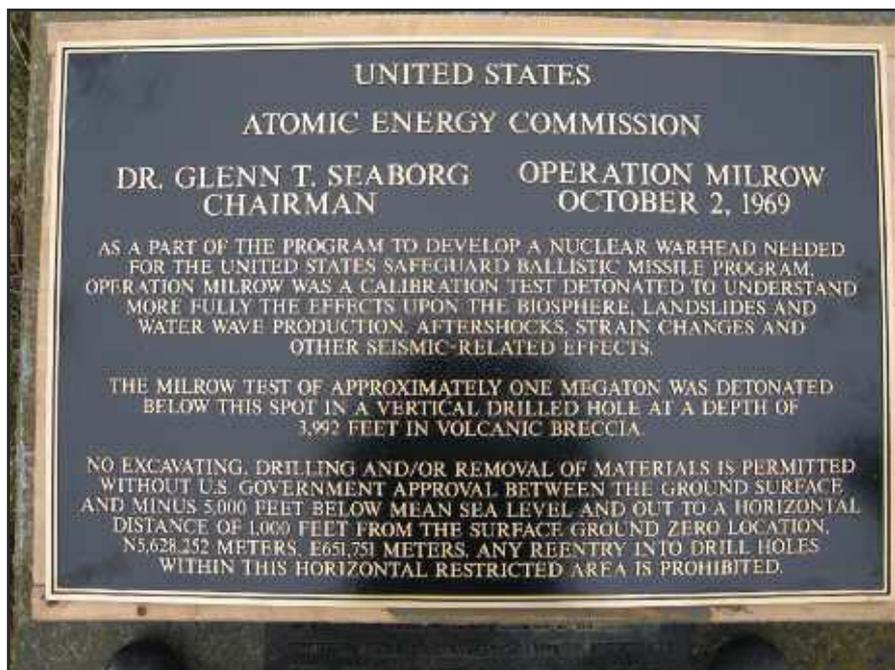
Below: Pouring concrete to place new plaque marking site of Milrow detonation.

Bottom: Photo 14: The new Milrow marker.

six areas associated with Amchitka mud pits release sites. During remediation, each mud pit was stabilized by the removal of standing water and mixing solidification soils into the drilling mud. Once the drilling mud was stabilized, a geosynthetic cap constructed of soil layers and a 30-mil geomembrane cover was installed. All mud pit caps were revegetated using a seed mat product that consisted of a control blanket manufactured with a USFWS-approved seed mix built into the blanket.

To ensure the integrity and effectiveness of the remedial action, the mud pit sites are inspected every five years as part of the DOE's long-term monitoring and surveillance program. In August 2006, the closure caps were inspected. The findings from the 2006 inspection were that total vegetative cover varied inversely with the elevation of the closure cap. The highest total vegetative cover (50 percent) was found on the Long Shot closure cap, and the lowest vegetative cover was found on closure caps located farther north, and higher in elevation, on the island (8.0 and 7.9 percent, respectively).

The USFWS determined that additional action would likely be required to prevent significant erosion at the three sites prior to the next five-year inspection in 2011. In 2007, the DOE and the



The revegetation team beside the new marker: from left, Paul Darr, Mark Kautsky, Kent Sundseth, and Deborah Rudis.



Location of the Cannikin detonation. The lake in the background is Cannikin Lake, formed from the crater left by the underground test.



The remains of a World War II U.S. Army artillery installation on the island.



USFWS agreed to perform the revegetation task in 2008 with the help and support of the USFWS.

In late May 2008, the revegetation team—consisting of the authors plus Kent Sundseth, manager of the Alaska Maritime National Wildlife Refuge for the USFWS, and Deborah Rudis, environmental contaminants biologist for the USFWS—met at Adak, Alaska, to board the *Tiglax*, a USFWS research vessel, for the 20-hour passage to Amchitka Island.

Once on Amchitka Island, the team was required to establish a base camp for a seven-day encampment. All materials, supplies, and camp equipment were disembarked on the island, and the *Tiglax* departed for other USFWS work in the Aleutian Islands. By means of two ATVs and a trailer, some 3500 pounds of fertilizer and 350 pounds of grass seed mixture developed for the climate were transported approximately 18 miles from the base camp and spread over three sites covering an area of approximately seven acres.

The revegetation team also reestablished the permanent monument marking ground zero at the Milrow Site, conducted several bird studies for the USFWS, and performed

soil and surface water sampling at a U.S. Navy sewage lagoon site.

In August 2008, the DOE, the Alaska Department of Environmental Conservation (ADEC), and USFWS signed the Record of Decision for The Amchitka, Alaska, Site Surface Closure. This document addresses the DOE's responsibilities to ADEC and USFWS for the long-term surveillance and monitoring activities of the surface sites. The DOE issued the *Long-Term Surveillance and Monitoring Plan* for the Amchitka Island sites in October 2008. ■

Mark Kautsky is a site manager with DOE-Legacy Management (LM), and Paul Darr is project specialist for S.M. Stoller, DOE-LM Legacy Management Services contractor. For additional information, contact Mark Kautsky at mark.kautsky@lm.doe.gov. This article is based on an item originally appearing in the DOE-LM's Program Update publication for July–September 2008.