



Salmon, Mississippi, Site

A Nevada Offsite

This fact sheet provides information about the **Salmon site**. Long-Term stewardship responsibilities for this site are managed by the **U.S. Department of Energy Office of Legacy Management**.

Site Information and History

The Salmon, Mississippi, Site, also called the Tatum Dome Test Site, is a 1,470-acre tract of land in Lamar County, Mississippi, 21 miles southwest of Hattiesburg. The nearest town is Purvis, about 10 miles east of the site.

The site is in a forested region known as the longleaf pine belt of the Gulf Coastal Plain. Elevations in the area range from about 240 to 350 feet above sea level. The site overlies a salt formation called the Tatum Salt Dome. Land around the Salmon site has residential, industrial, and commercial use. No one lives within the boundary of the site itself.

The U.S. Atomic Energy Commission (AEC), a predecessor agency of the U.S. Department of Energy (DOE), and the U.S. Department of Defense (DOD) conducted two underground nuclear tests at the site under the designation of Project Dribble, part of a larger program known as the Vela Uniform program. Two gas explosive tests, designated Project Miracle Play, were also conducted at the site.

The Vela Uniform program was part of a DOD research and development program intended to improve the capability of detecting, monitoring, and identifying underground nuclear detonations. As part of the Vela Uniform program, nuclear tests were conducted near Fallon, Nevada (Project Shoal), on Amchitka Island, Alaska (Project Long Shot), and near Hattiesburg, Mississippi (Salmon and Sterling).

The Salmon and Sterling tests were designed to evaluate the country's ability to effectively interpret seismic signals from detonations in a salt medium (the Tatum Salt Dome). This was

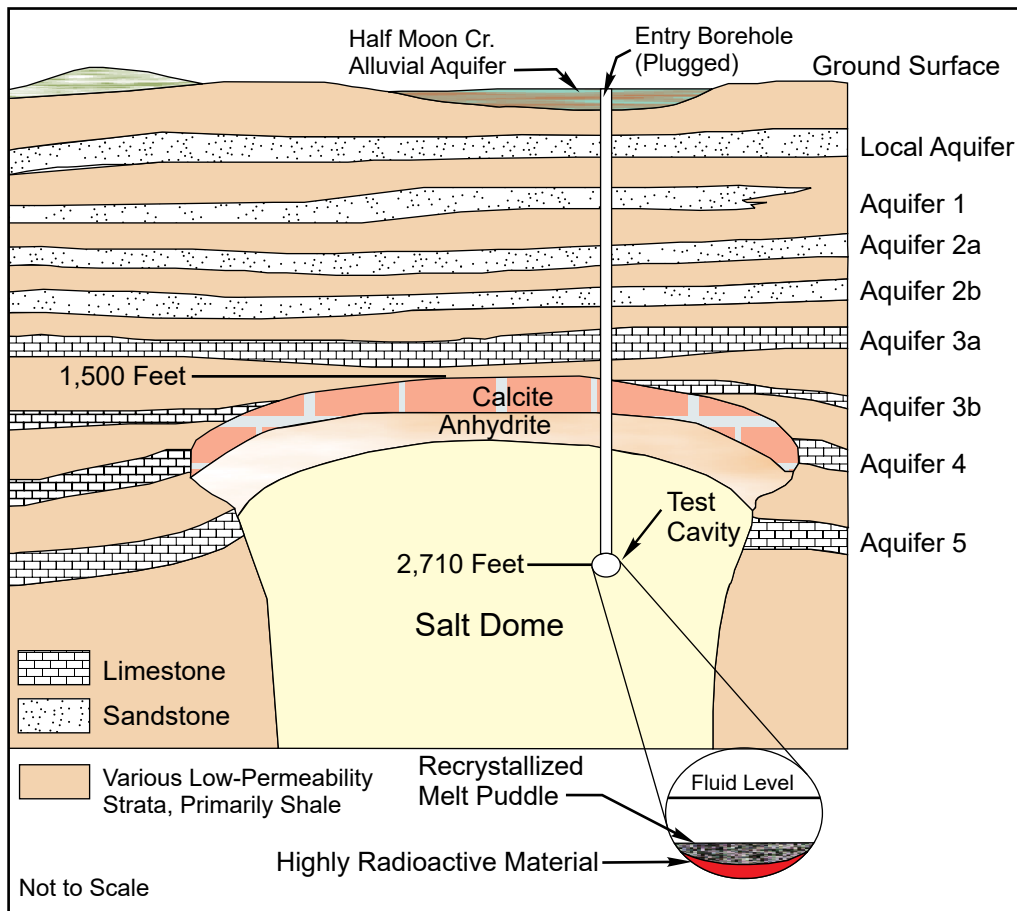
important in determining our ability to recognize if the testing treaty was being followed. The Salmon and Sterling tests were the second and fourth nuclear tests in the program. The Salmon test took place on October 22, 1964, at a depth of 2,710 feet below ground surface, which is approximately 1,200 feet below the top of the salt dome. This 5.3-kiloton-yield test created an underground test cavity at the depth of the detonation. The second, smaller test, Sterling, conducted on December 3, 1966, consisted of the detonation of a 380-ton-yield nuclear device suspended in the cavity created by the Salmon test.

Two methane-oxygen explosions were conducted in the Salmon cavity – one (named the Diode Tube) on February 2, 1969, and the other (named the Humid Water) on April 19, 1970. Each test had a yield of approximately 315 tons.

The salt dome fully contained all of the products of the detonations, and no radionuclides were released to the surface. Radioactive fission products and other materials generated during the tests are contained in the glass-like material left behind by the detonation and in the salt near the cavity. Following each of the tests, re-entry holes were drilled into the test cavity to collect scientific data and to emplace devices. These drilling operations generated waste, which included contaminated drill cuttings and drilling fluids. In addition, support operations generated other contaminated materials. Test site support activities required fuel, electricity, sanitation, waste storage, waste disposal, and the use of hazardous materials.

Site Conditions

Site cleanup and decommissioning activities began in 1971. Contaminated buildings and equipment were shipped to the Nevada National Security Site (formerly Nevada Test Site) for disposal; contaminated soils slurried with fresh water and



Cross Section of Salmon, Mississippi, Site.

other liquid materials were disposed of in the underground test cavity. Liquid wastes from the Salmon re-entry operations were injected into a deep brine aquifer (known as Aquifer 5) for disposal. Liquid wastes from the Sterling re-entry operations were solidified and shipped to Oak Ridge, Tennessee, for burial. Miscellaneous sanitary wastes were buried on-site in shallow pits excavated for soils to replace contaminated soils. These pits were subsequently covered with clean soil and graded. A high water table elevation prevented complete excavation and removal of contamination at ground zero, and the shallow mud pit less than 100 meters away. The mud pit excavation was backfilled with clean soil and reseeded. Cleanup and decommissioning activities officially ended June 30, 1972.

Radioactivity remains in the rubble in the test cavity that is within the salt structure. The salt is nearly impermeable and has little or no capacity to transmit water. Therefore, the salt structure provides geologic isolation to prevent the radioactivity from migrating.

Shortly after the creation of DOE's Environmental Management program in 1989, concerned citizens, the state of Mississippi, and congressional leaders raised questions about the site. In 1992, DOE initiated a series of studies to verify site conditions and investigate whether residual contamination remained that had not been detected in previous investigations. The studies were completed and

issued in the *Salmon Site Remedial Investigation Report* (DOE/NV-494-Vol.1/Rev. 1, 1999).

Results confirmed that decommissioning of the surface resulted in conditions protective of human health and the environment. Analysis showed that the detonation products were not migrating and the deep aquifer was not a source of exposure.

Soil samples collected during the remedial investigation indicated that some residual contamination exceeded levels considered suitable for unrestricted use, particularly in the vicinity of surface ground zero. However, the human health risk assessment concluded that recreational visitors and workers in the area (e.g., park rangers) would not be subject to unacceptable risks. Furthermore, the assessment indicated that at least 95 percent of the residual site risk is due to naturally occurring radioactive material and not site-related contamination.

In 2010, DOE transferred surface ownership of the Salmon site to the state of Mississippi so that the site could be used as a wildlife refuge and working demonstration forest. DOE retains the rights to the subsurface of the Salmon site property and will continue the monitoring of surface water and groundwater to ensure protection of public health and the environment.

Institutional Controls

Institutional controls are in place to ensure protection of human health and the environment. DOE has placed a deed restriction on the land parcel, which prohibits excavation, drilling, or removal of material without prior approval from DOE. Angle drilling from outside the property boundary to within the property boundary is also prohibited.

Long-Term Hydrologic Monitoring Program

From 1972 to 2019, surface water and groundwater were monitored annually at the Salmon site. From 2014 to 2019 sampling was conducted at 18-month intervals. In 2019 the sampling interval was increased to every two years. Water samples are collected for analysis of signature radionuclides from the nuclear detonations. Monitoring wells near areas of buried drilling fluids are also sampled for organic compounds and metals that may remain contained in pockets of the buried material. The state of Mississippi participates in the DOE sampling program and is on-site during sampling events.

Regulatory Setting

The state of Mississippi holds title to the Salmon site surface real estate. However, DOE owns the subsurface real estate, including mineral rights, and is responsible for the radioactive and other hazardous materials generated by DOE and predecessor agencies at the site. DOE possesses the radioactive material at the Salmon site under the authority of the Atomic Energy Act of 1954 (Title 42 *United States Code*, Section 2011, et seq.).

Legacy Management Activities

The DOE Office of Legacy Management (LM) has developed and implemented a site-specific Long-Term Surveillance and Maintenance Plan for the site and is responsible for establishing and maintaining institutional controls. LM-scheduled monitoring of groundwater and surface water is ongoing to verify that concentrations of near-surface contaminants are decreasing as expected. Additional responsibilities include managing site records, implementing and managing existing agreements and programs with regulatory agencies, and responding to stakeholder inquiries.



CONTACT INFORMATION

**IN CASE OF AN EMERGENCY AT THE SITE,
CONTACT 911**

**LM TOLL-FREE EMERGENCY HOTLINE:
(877) 695-5322**

Site-specific documents related to the **Salmon, Mississippi, Site** are available on the LM website at www.energy.gov/lm/salmon-mississippi-site

For more information about LM activities at the **Salmon, Mississippi, Site** contact:
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