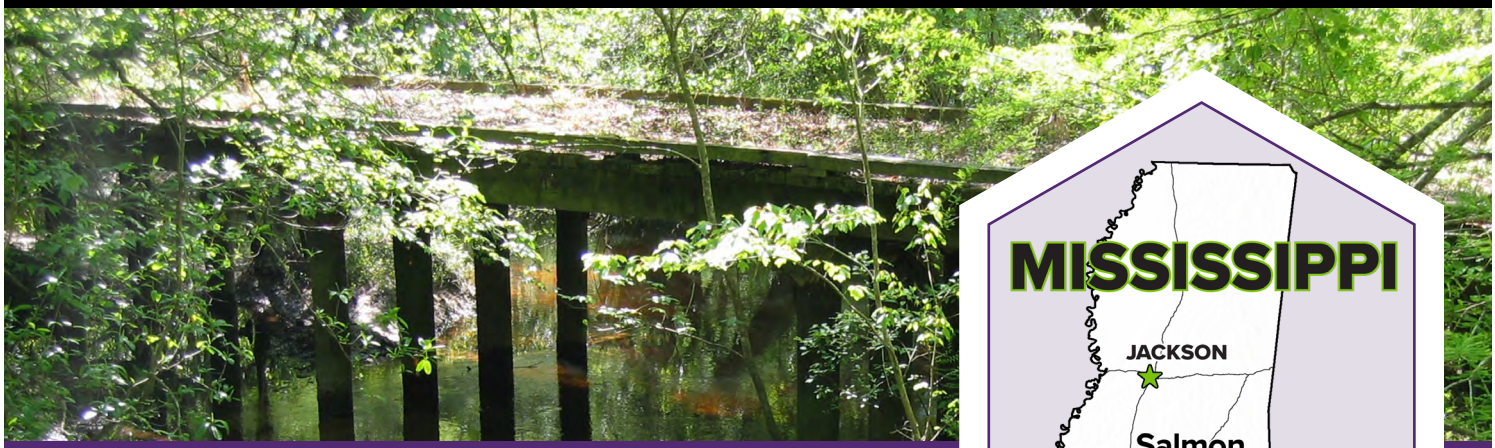
Fact Sheet

U.S. DEPARTMENT OF ENERGY | Legacy Management



Salmon, Mississippi, Site

A Vela Uniform Site/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 and is known by Mississippi Forestry Commission as the Jamie Whitten State Forest Management Area. Elevations in the area range from about 240 to 350 feet. The site lies over a salt formation called the Tatum Salt Dome. Land around the Salmon site has residential, industrial, and commercial use. No one lives within the site boundary.

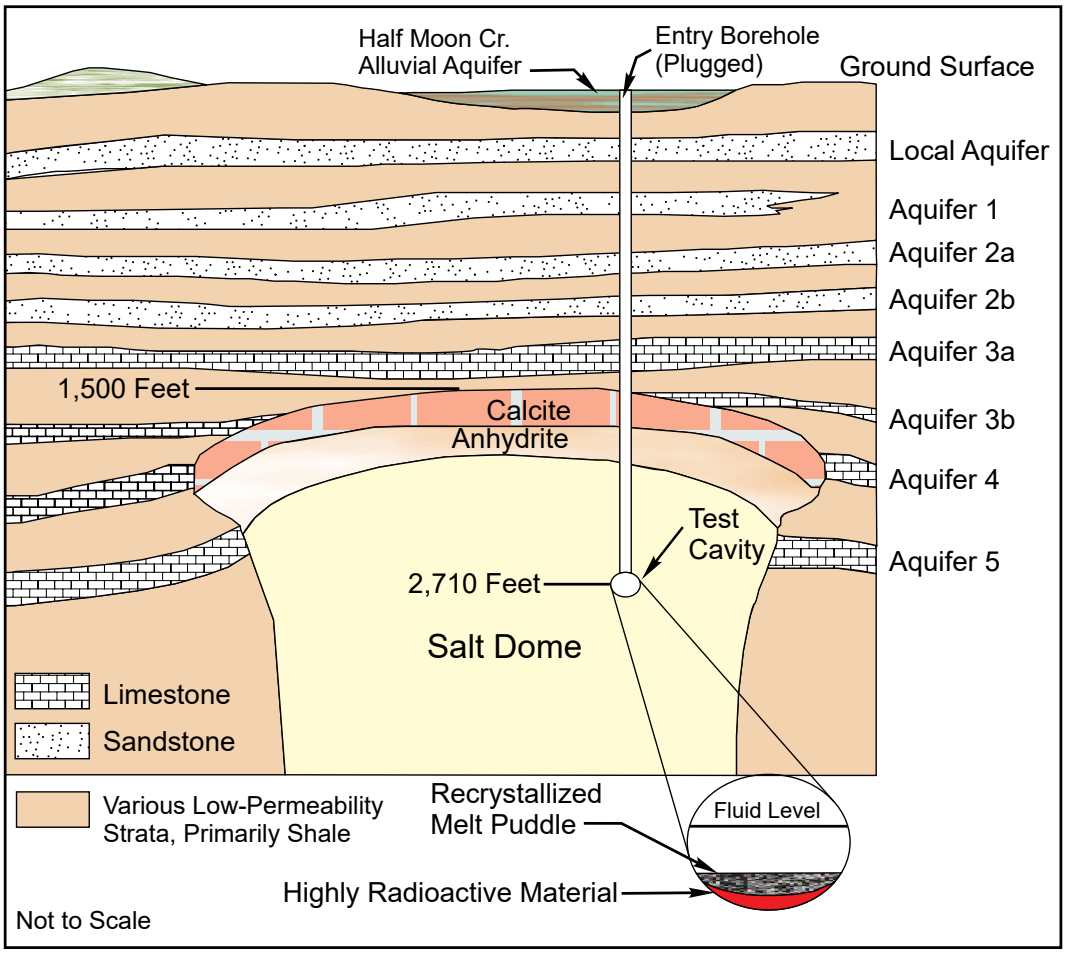
In the early 1960s the U.S. Atomic Energy Commission (AEC), a predecessor agency of the U.S. Department of Energy (DOE), investigated and developed alternative sites or "Offsites" to the Nevada National Security Site (formerly known as the Nevada Test Site) for underground nuclear testing. It was during this time that AEC and the U.S. Department of Defense (DOD) conducted two underground nuclear tests, called Project Dribble, at the site. These tests were part of a larger program known as the Vela Uniform program. DOD also conducted two gas explosion tests, called Project Miracle Play, at the site. Vela Uniform was part of a DOD research and development program intended to make it easier to detect, monitor, and identify underground nuclear detonations. As part of the Vela Uniform program, DOD conducted nuclear tests 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 find out if the country could effectively interpret seismic signals from underground nuclear detonations in salt (the Tatum Salt Dome). This was important to determine whether we could 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 Oct. 22, 1964, at a depth of 2,710 feet, which is about 1,200 feet below the top of the salt dome. This 5.3-kiloton-yield test created an underground cavity at the depth of the detonation (see cross section). The second, smaller test, Sterling, conducted on Dec. 3, 1966, detonated a 380-ton-yield nuclear device suspended in the cavity created by the Salmon test. DOD set off two methane-oxygen explosions in the Salmon cavity — one (named Diode Tube) on Feb. 2, 1969, and the other (named Humid Water) on April 19, 1970. Each test had a yield of about 315 tons.

The salt dome fully contained all 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 (see cross section). Following each of the tests, personnel drilled re-entry holes into the test cavity to collect scientific data and to place devices. This drilling 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. Personnel tore down contaminated buildings and shipped the debris, along with contaminated equipment, to the Nevada National Security Site for disposal; they mixed contaminated soils with fresh water and other liquid materials and disposed of the slurry in the underground test cavity. Remediaton staff injected liquid wastes from the Salmon re-entry work into



Cross section of Salmon, Mississippi, Site.

a deep brine aquifer (known as Aquifer 5 — see cross section). They solidified liquid wastes from the Sterling re-entry operations and shipped them to Oak Ridge, Tennessee, for burial. Personnel buried miscellaneous sanitary wastes on-site in shallow pits made by digging for soil to replace contaminated soil. They covered these pits with clean soil and graded them. A high water table kept remediation staff from completely digging up and removing contamination at surface ground zero and the shallow mud pit less than 100 meters away. They backfilled the mud pit with clean soil and reseeded it. Cleanup and decommissioning activities officially ended June 30, 1972.

There is still radioactivity in the rubble in the test cavity in the salt structure. The salt is nearly impermeable and doesn't transmit water much or at all, so the salt structure geologically isolates the radioactivity to prevent it from migrating.

In 1992, DOE began a series of studies to verify site conditions and investigate whether leftover contamination was still at the site. Soil samples collected during the investigation showed that some radioactivity (tritium) and hydrocarbon contamination was still in the shallow sediments near surface ground zero. DOE decided that the contamination didn't threaten existing or future land users, but that there should be institutional controls for the site. DOE completed the studies and issued the *Salmon Site Remedial Investigation Report* (DOE/NV-494-Vol.1/Rev. 1, 1999). DOE strengthened institutional controls for the site in 2005 with a deed restriction that prohibits access to subsurface materials. Later in 2005, the Mississippi Department of Environmental Quality approved the *Salmon Site Completion Report and Long-Term Stewardship Plan* (DOE/NV--917/Rev. 1, 2005) as final.

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 kept the rights to the subsurface of the Salmon site and will continue monitoring surface water and groundwater to make sure people and the environment are safe.

Institutional Controls

Institutional controls are in place to protect people and the environment. DOE has placed a deed restriction on the land, which prohibits digging, drilling, or removing material without prior approval from DOE. Angle drilling from outside the property boundary to inside the property boundary is also prohibited.

Long-Term Hydrologic Monitoring Program

From 1972 to 2014, surface water and groundwater were monitored annually at the site. From 2014 to 2019, DOE took samples every 18 months, and in 2019 the sampling frequency changed to every two years. The sampling currently includes 32 on-site wells, 10 surface locations, and three off-site municipal wells. The water samples are analyzed for radionuclides, organic compounds, and metals. No contamination from the tests has been found at any of the off-site sample locations, but some contamination remains near surface ground zero and at the detonation depth. The state of Mississippi participates in the DOE sampling program and does its own sampling at the site as well.

Regulatory Setting

The state of Mississippi owns 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 its predecessor agencies at the site. DOE owns 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 is carrying out a site-specific Long-Term Surveillance and Maintenance Plan and is responsible for establishing and maintaining institutional controls. LM-scheduled groundwater and surface-water monitoring is ongoing to verify that near-surface contaminant levels are decreasing as expected. LM's other 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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