

Nevada National Security Site Groundwater Program

safety ❖ performance ❖ cleanup ❖ closure



The goal is to develop an advanced, reliable monitoring network that ensures the long-term protection of the public.

Background

From 1951 to 1992, the United States government conducted 828 underground nuclear tests at the Nevada National Security Site. About one-third of these tests occurred near, below, or within the water table—the very top portion of the groundwater layer where rock and soil are completely saturated with water. As a result, some groundwater was contaminated.

The U.S. Department of Energy (DOE) began exploring the effects of groundwater contamination in the 1970s. Though contamination from underground testing has never been detected on public land, the DOE was committed to developing an advanced, reliable monitoring network that ensures the long-term protection of the public. An intensive groundwater investigation program was launched in 1989.

Program Approach

Understanding contaminant movement at the Nevada National Security Site is a challenge, given the geologic complexity and sheer magnitude of the site. Risks associated with contamination remain low, however, due to the immobility of some contaminants and the extremely slow movement of others. Scientists considered these and other factors when designing the groundwater approach, which integrates the following elements:

Drilling and sampling – Dozens of groundwater characterization wells have been drilled throughout the site. “Characterization” refers to the process of testing well samples to gauge groundwater chemistry, pressure levels, temperature, and geologic properties.

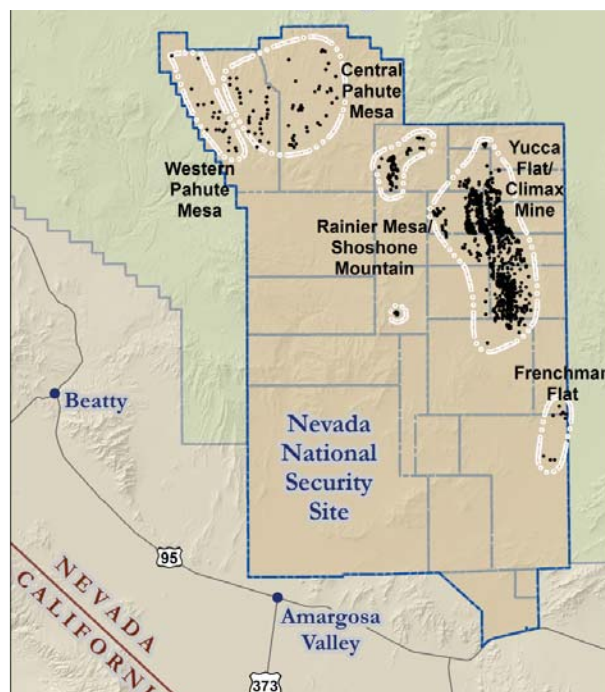
Data interpretation – Samples are sent to Nevada-certified, independent laboratories for analysis. Results become data points in a highly sophisticated computer database.

Computer modeling – When experts gather enough data points from sampling, the database can start building a computerized model – a three-dimensional representation of the Nevada National Security Site subsurface.

Monitoring – Groundwater characterization wells supplement an existing network of more than 60 water supply locations on and off the site that are part of routine monitoring activities.

Underground Test Areas

Scientists explored groundwater flow patterns on a regional scale before focusing on specific underground test areas, grouped by geographic location (see map). Groundwater experts are creating computerized contaminant flow and transport models at each of these underground test areas. The models help experts make projections about where contaminants are moving and how quickly.



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Agreement with the State

The objectives of the Nevada National Security Site groundwater program are outlined in an agreement between the DOE and the State of Nevada Division of Environmental Protection. Under this agreement, work will proceed over a period of years following a phased strategy:

Year 1989 **Investigation Stage** - Drill wells; gather new data to build transport models for each of the historical underground test areas; review results; and supplement as necessary.

Decision/Action Stage - Develop a model evaluation plan to challenge and refine model projections; use model evaluation plan to identify location for new wells.

Year 2030 **Closure Stage** - Negotiate use restrictions and regulatory boundary; establish institutional controls and requirements; and initiate long-term closure monitoring program (to remain in place for the foreseeable future).

Status

The State of Nevada has accepted the flow and transport model for the Frenchman Flat underground test area, which has now moved on to the Decision/Action Stage. The remaining underground test areas are progressing within the Investigation Stage as scheduled.

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Field personnel collect groundwater samples at a Yucca Flat well.



Peer Reviews

Over the years, the Nevada Field Office has maintained an open-minded approach, often seeking the input of industry experts. Feedback from two independent peer reviews of the Frenchman Flat approach helped DOE scientists build greater confidence in model results. A Yucca Flat Peer Review is currently underway.

Public Involvement

To encourage an open dialogue with the public and share the program's most recent results, the Nevada Field Office invites community members to attend regular groundwater open house events in rural Nevada. In addition, groundwater-focused tours of the Nevada National Security Site are offered on a periodic basis.

Stakeholders may apply to be a member of the Nevada Site Specific Advisory Board, which provides recommendations directly to the groundwater program. The Board has been influential in decisions relating to peer reviews as well as the selection of a well location in Pahute Mesa.

For more public involvement opportunities, educational resources and social media links, visit www.nnss.gov.

For information on all Nevada Field Office Environmental Management activities
visit: <http://www.nnss.gov/pages/programs/em/Environmental.html>

