Mixed Low-Level Waste Management

safety ❖ performance ❖ cleanup ❖ closure

Background

The Nevada National Security Site (formerly Nevada Test Site) played an important role in our nation's historic development and testing of nuclear weapons. Today, the U.S. Department of Energy (DOE) Environmental Management Program is aggressively cleaning up remnants of these activities at the Nevada National Security Site and other sites across the United States. During cleanup activities, mixed low-level waste may be encountered and must be safely and properly disposed.

What is "Mixed" Low-Level Waste?

Mixed low-level waste is a "mix" of both low-level radioactive waste and hazardous waste. These wastes are considered hazardous because they are toxic, corrosive, reactive, ignitable, or specifically identified by the U.S. Environmental Protection Agency (EPA) as "hazardous." The low-level portion of mixed waste contains small amounts of radioactive material and can generally be handled with minimal personal protective equipment. Mixed low-level waste is managed separately from low-level waste because of the hazardous waste component.

The EPA regulates generation, treatment, storage, and disposal of hazardous waste as directed in the Resource Conservation and Recovery Act (RCRA). In Nevada, the EPA delegated regulatory authority of RCRA to the State of Nevada.

Disposal

The DOE, National Nuclear Security Administration Nevada Site Office operates a RCRA-permitted Mixed Waste Disposal Unit at the Area 5 Radioactive Waste Management Site located in the southeastern portion of the Nevada National Security Site. This disposal facility features a multi-layer liner and collection system that drains any potential moisture away from the buried waste containers. This technologically advanced cell became operational in December 2010 and replaces the previous mixed low-level waste disposal cell which closed on November 30, 2010.

All mixed low-level waste disposed at the Nevada National Security Site complies with strict waste acceptance criteria, including RCRA land disposal restrictions. Compliance is verified through extensive document reviews and by visually inspecting (viewing waste package contents, using x-ray technology, and/or chemical screening) 5% or more of all mixed low-level waste disposed. Any waste that does not meet all requirements is not accepted.

Workers install one layer of the liner system for the new Mixed Waste Disposal Unit at the Nevada National Security Site.

In addition to Nevada National Security Site Waste Acceptance Criteria, waste accepted for disposal must meet or exceed U.S. Department of Transportation packaging and transportation regulations.

Definitions

Generators: U.S. Department of Defense and U.S. Department of Energy Environmental Management sites that generate low-level and mixed low-level radioactive waste through clean-up activities.

Legacy Waste: Waste generated as a result of historic U.S. nuclear weapons research, development, and testing programs.

Waste Acceptance Criteria: Requirements provided to waste generators that detail acceptable waste forms, characterization methods, waste packaging, and transportation of low-level and mixed low-level waste to the Nevada National Security Site. These requirements are available on-line at www.nv.energy.gov/library/publications/Environmental/DOENV_325.pdf.

Waste Stream: A waste or group of wastes from a process or a facility with similar physical, chemical, and radiological properties.

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Packaging and transportation of approved mixed low-level waste must comply with Nevada National Security Site Waste Acceptance Criteria and U.S. Department of Transportation requirements.

How is Approval Granted for Disposal?

Each generator of mixed low-level waste completes a series of steps prior to shipping waste. A key element of this process is for generators to develop a waste certification program at their site which complies with the Nevada National Security Site Waste Acceptance Criteria. Once the generator's program is approved, profiles detailing the specifics of each waste stream are submitted for review and approval. The approval process includes a comprehensive review of program documents, generator and treatment facility evaluations (i.e., audits, surveillances, and program reviews) and waste verification. These reviews are conducted by experts in the areas of quality assurance, waste traceability, radiological characterization/nuclear criticality, and RCRA characterization, and includes the State of Nevada Division of Environmental Protection.

The RCRA-permitted Mixed Waste Disposal Unit is an excavated facility engineered with a leachate collection system and double-liner with multiple layers of geosynthetic clay, high-density polyethylene, netted fabric, and screened native soil.

Storage of Mixed Low-Level Waste

In addition to the new Mixed Waste Disposal Unit, a RCRA-permitted storage facility is in operation at the Nevada National Security Site to house mixed low-level waste awaiting permanent disposal. Under the permit, which became effective October 17, 2010, any mixed low-level waste shipped to the Nevada National Security Site for storage is subject to the same rigorous waste acceptance criteria as that destined directly for disposal.

Yellow highlighted areas are locations of mixed low-level waste storage at the Nevada National Security Site. Orange highlights the new RCRA disposal cell.

Summary

The Mixed Waste Disposal Unit in Area 5 serves the Nevada National Security Site and the rest of the DOE Complex by providing a sound permanent disposal option for mixed low-level waste generated through nation-wide cleanup efforts. By adhering to strict guidelines and committing to the highest safety standards, the Nevada Site Office ensures that waste disposal is carried out in a responsible manner for the protection of the public, workers, and the environment.

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