

# **An Overview of the U.S. Department of Energy's Yucca Mt. High-Level Nuclear Waste Repository**

**Barbara Byron  
California Energy Commission  
November 9, 2007**

- 1. The U.S. Department of Energy is proposing to construct, operate, and monitor and eventually close a geologic repository at Yucca Mountain in southern Nevada for the permanent disposal of "spent" or "used" nuclear fuel and high-level radioactive waste (waste from reprocessing).**
- 2. The waste is currently being stored in 31 states across the U.S. Most of the commercial reactors are located in eastern states. Some of these commercial reactor sites are exceeding their capacity for storage and have constructed Independent Spent Fuel Storage Installations (ISFSI) or dry cask storage facilities. All of the commercial reactors in California (Diablo Canyon, San Onofre, Humboldt Bay, Rancho Seco) have built or are building dry cask storage facilities to store waste onsite.**
- 3. Potential impacts in California from the proposed Yucca Mt. project include transportation impacts and potential groundwater contamination in the Death Valley region.**
- 4. The national policy for the disposal of spent nuclear fuel from nuclear reactors was set by Congress in the Nuclear Waste Policy Act (NWPA) of 1982, as amended in 1987.**
  - The NWPA calls for spent nuclear fuel and high-level waste to be disposed of permanently in a geologic repository beginning in 1998; DOE was not able to meet this deadline and the nuclear utilities have filed lawsuits against DOE to recover the costs of extended storage of spent fuel at the reactor sites.**
  - The NEPA amendment passed in 1987 established Yucca Mt. Nevada as the sole site for scientific evaluation. Previously there had been nine other sites in the U.S. under consideration including possible sites in Texas, Washington, Louisiana, Mississippi, and Utah. This list was later narrowed to three sites: Deaf Smith Co., Texas; Hanford, Washing, and Yucca Mt., Nevada.**
  - In 1998, DOE completed a viability assessment of Yucca Mt., as required by Congress, to provide Congress, the President and the public a progress report on the Yucca Mt.**

**Site Characterization project. Based on this viability assessment, DOE believes that the Yucca Mt. site is a promising site for a geologic repository. However, others consider the site is flawed because of its seismic activity, volcano risks, and porous rock formations. The site only meets two of the four criteria established by the International Atomic Energy Agency for permanent high-level waste repositories.**

- **Federal agencies responsible for developing and licensing the proposed high-level nuclear waste repository include: The U.S. department of Energy (overall project design, project development and license application), the U.S. Environmental Protection Agency (sets the radiation protection standard for the repository), and the U.S. Nuclear Regulatory Commission (reviews the license application for the facility and implements the EPA radiation standard)**

**5. The current schedule for the proposed repository is:**

- **DOE submits license application to the U.S. Nuclear Regulatory Commission in June 2008**
- **DOE opens the repository in 2017 (at the earliest)**

**6. California's review of the Yucca Mt. Project and potential impacts in California has been a cooperative, interagency effort.**

- **In 1988, we formed an Interagency High-Level Waste Task Force to evaluate DOE's Site characterization Plan for Yucca Mt., to address concerns regarding potential impacts in California from the proposed repository.**
- **In 1989 this interagency group, coordinated by the Energy Commission, prepared comments on the DOE's Site Characterization Plan.**
- **Under the direction of the Secretary for Resources Mary Nichols, the Energy Commission in 2000 reactivated this working group as well as a separate transportation working group to review and comment on the Draft Environmental Impact Statement for the Yucca Mountain Project.**
- **The California agencies participating in these reviews include experts in groundwater hydrology, the National Environmental Policy Act requirements, transportation, emergency response, geochemistry, geology, and radionuclide chemistry.**
- **Agencies participating include the Department of Conservation Geologic Survey (formerly Mines and**

**Geology), Energy Commission, Lahontan Regional Water Quality Control Board, Department of Water Resources, State Water Quality Control Board, Fish and Game, Parks and Recreation, Public Utilities Commission Railroad Safety Branch, Health Services, Office of Emergency Services, California Highway Patrol, Department of Toxic Substances Control, and the Department of Transportation.**

- 7. The U.S. selected a deep geologic repository to dispose of its spent fuel and high-level waste. Currently no repository for disposing of high-level waste exists anywhere in the world.**
  - The concept of geologic disposal is to place packaged waste in excavated tunnels in geologic rock formations. A series of barriers, natural and man-made, are designed to isolate the waste for tens of thousands of years to minimize the amount of radioactive materials that can reach the environment.**
  - Water is the primary means for radionuclides from a repository reaching the environment and causing human health effects. The major function of natural and engineered barriers is to keep water away from the waste to limit corrosion of the waste containers and possible release of radionuclides into the groundwater.**
  - The design of the repository has been evolving: DOE is now relying upon man-made barriers – titanium drip shields – to prevent water from reaching the buried waste containers and corroding them; originally the plan was to rely more upon geologic barriers.**
  - The repository would be constructed about 1,000 feet below the surface and about 1,000 feet above the water table (unsaturated zone).**
  
- 8. The Supplemental Environmental Impact Statement (SEIS) is an assessment of the environmental impacts of developing and operating the repository, transporting nuclear waste to the site, using the new Transportation, Aging and Disposal (TAD) containers, and eventually closing the repository.**
  - The SEIS did not identify any potential environmental impacts that would be a basis for not proceeding with the licensing, construction and operation of the repository.**
  - The SEIS has been heavily criticized for failing to identify and analyze the routes to the repository and not evaluating the impacts on states along transportation corridors.**

- **California has criticized DOE that, whereas California has two operating commercial nuclear reactors, two shut-down commercial plants and several research reactors storing spent fuel, and will be heavily impacted by shipments to the repository as well as having potential groundwater impacts, only one hearing was held in California in Lone Pine.**

**9. Potential impacts in California from the proposed repository include transportation and groundwater impacts.**

- **Inyo County, California, which is adjacent to the Yucca Mt. site, has received federal funding to conduct an independent evaluation of impacts from the proposed project.**
- **The Timbisha Shoshone tribe in California has also just received status as an affected tribe and will receive funding from DOE to participate in DOE's Yucca Mt. proceedings.**
- **Inyo County identified the following deficiencies with the Yucca Mt. environmental impact statements: (1) inadequate evaluation of transportation impacts associated with transporting 77,000 tons of radioactive waste to the repository, (2) lack of thorough consideration of risks to regional groundwater, and (3) uncertainties regarding the long-term performance of the repository due to recent changes in the repository design.**
- **Critics of the repository note the potential dangers of a release of radioactive material following a train or truck accident or terrorist incident involving these shipments.**
- **The most probable rail routes identified by Nevada for waste shipments would impact Sacramento, the Los Angeles area, San Luis Obispo, Santa Barbara, San Bernardino, Fresno, Bakersfield, Barstow and other smaller cities and communities.**
- **DOE has selected rail as the preferred shipment mode for these shipments and plans to use dedicated trains. The West's major urban centers grew around rail centers; thousands of spent fuel shipments would pass through these areas' most heavily populated areas.**
- **Maps developed by Nevada showing likely routes to the repository are available at <http://www.state.nv.us/nucwaste/trans/images/18p1b.gif>**

**10. The State of Nevada opposes the Yucca Mt. repository, although Nye County (site of the repository) supports it.**

- Nevada said the Draft EIS fails to identify spent fuel and high-level waste shipping modes and routes in a way that permits people in affected communities to participate in the review and public comment process.
- Nevada is concerned about the potential economic impacts the Yucca Mt. project would have on the State of Nevada, particularly Las Vegas and its tourist economy.
- Nevada also noted that the EIS ignores locally generated data on population demographics, highway accident rates, road conditions, emergency preparedness conditions and socioeconomic conditions.
- Nevada has stated that it has been proven that surface water has penetrated the repository depths at the site in less than 40 years at Yucca Mt. and that this violates the earlier criterion for the site that such water migration must take more than 1,000 years.
- In 1996, Nevada found evidence in Yucca Mt. rocks of chemical remnants from atmospheric nuclear testing, which they consider to be an indication that water had seeped to the level of the proposed repository within 40-50 years.
- Nevada officials have said that their research shows that even with man-made barriers, the Yucca Mt. will not isolate the waste for 10,000 years.
- The U.S. Environmental Protection Agency has not yet issued the final radiation protection standard for the repository. Nevada has charged that it is premature for DOE to apply for a license for the repository before EPA has finalized the standard.
- The State of Nevada has filed multiple lawsuits and will continue file them making it unlikely that, even if DOE receives a license from the Nuclear Regulatory Commission to begin construction, the repository likely cannot be built before the early 2020s at the earliest. The NRC will likely take four years to review the license application.