

PANEL SESSION
STATUS OF THE YUCCA MOUNTAIN CANDIDATE HLW REPOSITORY

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The Panel provided an overview and update on the status of the Yucca Mountain Project. Topics included the site recommendation process and *Site Suitability Evaluation*, the treatment of uncertainty, the content of Revision 1 of the *Science and Engineering Report*, the *Final Environmental Impact Statement*, and the Department of Energy (DOE) outreach program.

Congress established the framework for DOE to site, license, and operate geologic repositories for disposal of high-level radioactive waste (HLW) and spent nuclear fuel (SNF) in the Nuclear Waste Policy Act of 1982 (the Act). Amendments to the Act in 1987 eliminated all sites other than Yucca Mountain for characterization as a potential repository. The Act established the process for the evaluation, recommendation, and approval of the Yucca Mountain site, including the need for a final environmental impact statement (EIS) as part of the comprehensive basis for a site recommendation. It also established the framework for construction approval and licensing of a Yucca Mountain repository by the U.S. Nuclear Regulatory Commission (NRC).

Consistent with the process laid out in the Act, on January 10, 2002, the Secretary of Energy notified the Governor of Nevada of his intent to recommend the Yucca Mountain site to the President. The Secretary's recommendation and the comprehensive basis for this recommendation that is required by the Act were submitted to the President and made available to the public on February 14, 2002. The President considered the Yucca Mountain site to be qualified for a license application to construct a repository and submitted his recommendation to Congress on February 15, 2002. The Secretary's recommendation was based on a comprehensive technical basis developed from over 20 years of site characterization, evaluation of the suitability of the site based on DOE's site suitability guidelines, consideration of comments received from NRC and the public, national energy policy, and national security.

Revision 1 of the *Science and Engineering Report* provides a general understanding of the repository system, including the geologic setting of the potential repository and the processes occurring in this setting that could affect waste isolation over the next 10,000 years and longer. The report also provides information on the repository design, the waste forms to be disposed of, the waste package design, and the results of the preliminary preclosure safety assessment and the postclosure total system performance assessment (TSPA) conducted to support the evaluation of site suitability. Revision 1 includes information on the flexible repository design to identify potential performance benefits of different temperature and humidity conditions. It also includes results from evaluations performed using a revised supplemental TSPA model. Additional work is now underway to support preparation of a license application for submittal to NRC should the site be designated for repository development. This work includes implementing a strategy for dealing with and communicating uncertainties as part of the safety case for licensing.

The repository system will consist of multiple natural and engineered barriers, consistent with DOE site suitability guidelines and the licensing requirements established by NRC. The repository design concept considered for site recommendation is flexible to allow operation over a range of thermal modes. The design would permit the repository to be maintained and monitored for up to 300 years (or longer) before it is permanently closed, and it would allow SNF and HLW to be retrieved should that become necessary. The Act limits repository capacity to 70,000 metric tons of heavy metal (MTHM) until a second repository is in operation. Current plans are to dispose of 63,000 MTHM of commercial SNF and 7,000 MTHM of DOE SNF and HLW. All waste would be in solid form and disposed of in large, corrosion-resistant metal packages. The median waste package lifetime is estimated to be about 80,000 years, with the first waste package failure estimated to occur at about 50,000 years.

The *Site Suitability Evaluation* is based on technical information from many documents, including Revision 1 of the *Science and Engineering Report*. Site suitability is an evaluation of compliance with the applicable radiation protection standards for the performance of a Yucca Mountain repository both before and after closure using specified methods and criteria that reflect the factors and processes important to repository performance. The results of this evaluation showed that the public and worker doses during the preclosure period would fall below the limits specified by the Environmental Protection Agency (EPA) in its preclosure radiation protection standards for a Yucca Mountain repository. The results also showed that the dose to individuals and the concentrations of radionuclides in ground water for 10,000 years following repository closure would fall below the limits set in EPA's postclosure standards.

Development of the final EIS was consistent with requirements in the Act and the National Environmental Policy Act. Twenty-one public hearings were held on the draft EIS and three hearings were held on a supplement to the draft EIS. The final EIS reflects modifications in response to comments and new analytical tools and information available since the draft EIS was published. The final EIS shows that a repository at the Yucca Mountain site is likely to meet the applicable radiation protection standards. It also shows that potential environmental impacts are too low to be a basis for not proceeding with repository development. The final EIS supported the site recommendation, and would support broad transportation-related decisions if the site were designated for repository development. The EIS should also support adoption by the NRC as part of the basis for a construction authorization, consistent with the requirements of the Act.

As part of its public outreach efforts, DOE maintains three Science Centers in Nevada to provide local access to Project information. The Project also maintains a web site at www.ymp.gov to provide direct access to Project information for a global audience. During the site recommendation process, prior to a decision by the Secretary of Energy to recommend the site, DOE held 66 public hearings throughout Nevada and in Inyo county California. Comments received from the public and from States and other interested parties were considered by the Secretary prior to notifying the Governor and Legislature of Nevada and making the recommendation to the President. With the President's recommendation of the site to Congress on February 15, 2002, DOE must await further actions by the State of Nevada and Congress regarding site designation.