

**STATE OF NEVADA COMMENTS  
ON THE U.S. DEPARTMENT OF ENERGY'S  
SUPPLEMENT TO THE DRAFT ENVIRONMENTAL  
IMPACT STATEMENT FOR A GEOLOGIC REPOSITORY FOR THE  
DISPOSAL OF SPENT NUCLEAR FUEL AND HIGH-LEVEL RADIOACTIVE WASTE  
AT YUCCA MOUNTAIN, NYE COUNTY, NEVADA  
DOE/EIS-0250D-S**

The Nevada Agency for Nuclear Projects (Agency) is an agency of the State, established by the Nevada Legislature to carry out the State's oversight duties pursuant to the federal Nuclear Waste Policy Act, as amended.

The Nevada Agency has reviewed the subject Supplement and is providing the following comments on behalf of the State of Nevada. These comments are being submitted in addition to those already submitted, dated February 28, 2000, on behalf of the State regarding the Draft Environmental Impact Statement (DEIS), and are intended to supplement, and in no way diminish those comments already provided.

As was stated in our comments for the Draft EIS, the State of Nevada asserts that the Draft EIS, and now this Supplemental EIS, is legally and substantively deficient because the document

“fail(s) to appropriately reflect the unique nature and scope of the Yucca Mountain program. It does not adequately assess impacts associated with the repository and related activities, and it is not in compliance with either the letter or spirit of NEPA. The State formally reiterates its assertion that a Programmatic Environmental Impact Statement (PEIS) for the high-level waste (HLW) program should have been, and still should be, prepared. The unique, first-of-a-kind nature, complexity, and unprecedented time scale of the federal HLW program require the preparation of a PEIS, with project-specific EISs for related program elements tiered to the PEIS. The HLW program is simply too massive in scope and overwhelming in complexity for DOE to attempt to use a single EIS as the vehicle for assessing impacts and making programmatic decisions. By preparing a narrowly focused, non-programmatic EIS such as the Draft released for comment (and then indicating that it will be the basis for some program decisions and not for others), DOE is circumventing the intent of the National Environmental Policy Act.”

**GENERAL COMMENTS**

1. The State of Nevada is especially concerned that this Supplement fails to address the major inadequacies that were identified in comments on the DEIS made by the State, local governments, citizens, and others. These deficiencies in the DEIS include, among other things, a fundamentally inadequate assessment of the impacts associated with the transportation of spent nuclear fuel and high-level radioactive waste, both nationally and in Nevada; a complete absence of any sort of meaningful evaluation of socioeconomic impacts of the Yucca Mountain program, in Nevada and in communities along transportation routes; an incomplete and inadequate treatment of cumulative impacts

*Legislative*

associated with the program; a substantively and statutorily deficient evaluation of the “No Action” alternative; and numerous other flaws and insufficiencies.

In the State of Nevada’s comments on the DEIS of February, 2000, we noted that the impacts associated with the proposed high-level radioactive waste repository at Yucca Mountain, thousands of miles distant from the majority of U.S. nuclear power reactors, will affect the State of Nevada as well as at least 42 other states, hundreds of cities, and thousands of communities located along highways and rail lines that would be used for waste transportation. The program that DOE’s NEPA analysis must address is unprecedented for a federal project in its scope, time frame, and the geographical area it encompasses. It is also unique in that the EIS must assess not only the more traditional effects of a large and complex project - impacts to the environment, to public health and safety, to area populations, and to state and local economies - but the EIS must also address those impacts that derive from the highly controversial nature of this activity and the fact that the program involves the handling, movement, storage, and disposal of extremely hazardous nuclear materials. It is the nuclear nature of this undertaking that makes it different from more traditional federal projects and requires an EIS that fully examines a broader range of impacts (including those related to risk, risk perception, and stigma) in Nevada as well as in states and communities through which spent nuclear fuel and HLW must pass en route to a Yucca Mountain repository.

The Draft EIS failed to undertake this type and level of analysis, and the Supplement does nothing to redress the deficiencies. DOE’s continuing “head-in-the-sand” approach to these critical and overreaching issues is made even more offensive to the letter and spirit of NEPA by the Supplement’s resounding silence with respect to these impacts.

Nevada continues to believe that DOE must reconsider its entire approach to NEPA compliance. Schedule pressures and perceived political imperatives should not be permitted to obstruct the implementation of a truly adequate NEPA process and decision documents that must provide justification and guidance for a ten thousand year program.

2. The Supplement, like the Draft EIS, fails to identify the cross-country rail and highway routes evaluated by DOE contractors in Chapter 6 and Appendix J of the DEIS. DOE did not release national maps of these routes until the public hearing in Chicago, Illinois, on February 1, 2000, more than five months after the release of the DEIS. The State of Nevada comments on the DEIS included copies of these maps (attached) and called upon DOE to officially issue these maps as part of the final EIS. These maps should have been reproduced in the Supplement. Instead, DOE has eliminated these maps from its website altogether. DOE’s continued refusal to identify routes in the Supplement is further evidence of intent to withhold this information from the public to suppress public interest in the project and access to necessary information.
3. Pursuant to the Nuclear Waste Policy Act, as amended, the Secretary of Energy’s recommendation of the Yucca Mountain site to the President for development of a

repository must include, as part of the comprehensive basis for recommendation, a Final Environmental Impact Statement. (Section 114(a)(1)(D)). The comprehensive basis for the Secretary's recommendation also must include "a description of the proposed repository, including preliminary engineering specifications for the facility." (Section 114(a)(1)(A)).

The *Science and Engineering Report* (S&ER) flexible design described in the Supplement does not meet the Act's intent that the EIS reflect, at least, real alternative repository design descriptions and preliminary engineering specifications for the facility, as required to be included in the Secretary's basis for site recommendation. This Supplement, instead, describes a broad range of possible design features and operational modes, nearly any combination of which may be selected under two general thermal design modes - above boiling drift wall temperature and below boiling waste package surface temperature.

The only fixed design feature, according to Table 2-1, is the 81 meter drift spacing, and the only fixed operational parameter is the 15 cubic meter per second forced air ventilation rate. Examples of the variability of other design features and operational parameters are as follows: 7 to 17 external ventilation shafts; 24 to 50 years emplacement duration; 4.7 to 10.1 square kilometers of underground area; 4.4 to 8.8 million cubic meters of excavated repository volume; and 11,000 to 17,000 waste packages.

The large variability of design features and operational parameters is reflected in a range of values for expected impacts of the repository. For example, according to Table 3-1, radon releases would range from 170,000 to 800,000 curies, depending on the design and operation mode selected. Newly disturbed area, in addition to that already disturbed during site characterization, would range from 2.8 to 6.6 square kilometers. Hazardous waste generated and requiring disposal would range from 8,400 to 15,000 cubic meters, and sanitary and industrial waste generation would range from 100,000 to 190,000 cubic meters.

Because the Supplement relies on DOE models that indicate there would be no waste container failures during EPA's proposed regulatory period of 10,000 years, the Supplement concludes that there would be zero individual radionuclide dose during that time period, regardless of the repository design. However, it does project peak doses after 10,000 years as an impact indicator, and those expected doses exceed any proposed regulatory standard. The State's position is that the regulatory standard should be applied through the time of expected peak dose.

The DEIS Supplement is insufficient in that it fails to provide a specific description of alternatives for how the Proposed Action, "to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain for the disposal of spent nuclear fuel and high-level radioactive waste," could be accomplished. Instead the flexible design is "representative of a range of foreseeable future design features and

operating modes, and the conservative estimates of the associated potential environmental impacts [that] encompass or bound the potential impacts of foreseeable future repository design evolution.” (Page S-2). The Supplement does not identify specific design alternatives, from which one could be selected, and evaluate and compare their potential impacts. It only provides an update (current as of May, 2001) of design evolution that has taken place since issuance of the DEIS. Furthermore, there is no basis to accept the assertion that the potential environmental impacts are encompassed in the Supplement’s analyses, since the DEIS made the same claim in 1999, and the design continues to evolve, even as we are commenting on this Supplement.

The Supplement states, “Design features will continue to evolve in response to additional site characterization information, technological developments, and interactions with oversight agencies.” The DEIS and this Supplement are the basis for a Final EIS. The Final EIS is required by the Nuclear Waste Policy Act as amended to accompany the Secretary’s Site Recommendation, which is to be made at the completion of site characterization. Therefore, the Final EIS must present the Proposed Action, and specifics of how it is intended to be accomplished, at the time of completion of site characterization. This comment also applies to similar statements in Section 2.2 - Overview of Design Evolution, and Section 2.4 - Potential Future Design and Operational Evolution.

The Supplement states, “DOE invites comments on its intention not to address the Draft EIS design in the Final EIS.” There was no “Draft DEIS design.” In our view, the design information presented in the Draft EIS should be presented in the Final EIS as part of the full scope of the bounding alternatives considered. And the Final EIS must include a preferred design that is derived from among all the alternatives evaluated. The potential impacts of the DEIS design alternatives were presented in the DEIS, and the Supplement advances the analyses of those potential impacts through the use of Primary Impact Indicators, resulting in impact values that, in nearly all cases, are greater than those presented in the DEIS. The DEIS potential impact analyses form the basis of the impact values presented in the Supplement, and must be included in the Final EIS as part of a comprehensive analysis of potential impacts of all design alternatives considered.

4. The Supplement contains an option for the low temperature operating mode of maintaining a fuel blending inventory at the site to allow for blending of hotter spent nuclear fuel with cooler fuel to maintain the waste package temperature at 85 degrees C or less. The surface aging facility for maintaining this inventory is nothing more than a thinly disguised monitored retrievable (MRS) or interim storage facility. The co-location of a repository and an MRS is specifically prohibited by the Nuclear Waste Policy Act.

5. Comments contained in the State of Nevada's response to the Draft Yucca Mountain Environmental Impact Statement<sup>1</sup> that were submitted in February, 2000 are hereby incorporated by reference into these comments on the Supplement.

### **SPECIFIC COMMENTS**

#### Page 1-2: Section 1.2 - Scope

The Supplement states, "Under the S&ER flexible design, DOE could vary other operating parameters such as ventilation rates and the blending of hotter and cooler spent nuclear fuel in the same waste packages." Forced ventilation rate is indicated to be a fixed operating parameter, at 15 cubic meters per second, in Table 2-1 of the supplement. If it is intended to be varied, the extent of the variation must be described and analyzed in the Supplement.

#### Page 2-8: Section 2.2.2.2.2 - Lower-Temperature Repository Operating Mode

The Supplement states, "DOE would consider aging as much as 40,000 MTHM of commercial spent nuclear fuel during a 50-year period." Up to 4500 dry storage casks would be located at the North Portal Operations Area (Figure 2-4) on 200 acres of concrete pads (Page 3-7, Section 3.1.3.2 - Land Area Disturbed). This would be the equivalent of the Independent Spent Fuel Storage Installation (ISFSI) now being considered by NRC for a license at Skull Valley, Utah, with the exception that the pad area there, for the same projected storage capacity is 100 acres. The Supplement does not, but should, evaluate the seismic risk associated with this facility. The earthquake risk in the area of the proposed facility is such that, if it needed to be independently licensed by the NRC, it likely could not meet the required seismicity standards. This, incidently, is a matter of controversy in the Skull Valley proceeding, where the applicant is now seeking an exemption.

#### Page 2-15: Section 2.3.2.1 - Waste Handling and Approach to Fuel Blending

Fuel blending is not discussed in detail in either the DEIS (see Appendix E, Pp. 11-12) nor in the SEIS (p.2-15). The SEIS refers the reader to Section 2.2.1 of the Science and Engineering Report (DOE 2001a). The SEIS should contain a full description of the proposed fuel blending process.

Fuel blending would be a very complex operation. The additional handling of highly radioactive SNF in the pool building will create additional opportunities for accidents such as dropping of assemblies due to grapple failure or operator error. Releases of radioactive materials from accidents may or may not be contained in the pool storage and blending area. The mixing of SNF assemblies of different sizes and different radiological characteristics, from different fuel

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<sup>1</sup> State of Nevada Comments on the U.S. Department of Energy's Draft Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, Volumes 1 and 2 (February 28, 2000).

batches and/or reactors, will create numerous opportunities for errors (e.g., insertion of incorrect assembly in disposal canister, insertion of assembly in incorrect disposal canister cell, etc). Cleanup after accidents will likely increase worker exposures and generate additional streams of LLW, Mixed Wastes, and possibly HLW. Indeed, the very feasibility of large-scale fuel blending is questionable.

Large-scale, daily fuel blending at the surface facilities will be considerably more risky than the base case process described in the DEIS (see discussion of North Portal Operations Area, Pp. 2-16 to 2-20). The proposed capacity of 5,000 MTHM or 12,000 SNF assemblies would be 5 to 10 times larger than the pools currently in operation at U.S. civilian reactors. In addition to the potential for handling accidents, pool storage and blending operations would be vulnerable to a wide range of natural disasters (earthquakes), human initiated events (insider sabotage, terrorist attack), and “normal” accidents (pool contamination resulting from cladding deterioration or undetected cladding pin hole leaks, pool filtration pump failure, pool leakage, loss of electrical power, etc). This may also mean the public’s perceived risk of repository preclosure operations will increase.

Fuel blending requirements for “hotter” SNF could result in more highly radioactive SNF being shipped to the repository during the first two decades of repository operations. The entire concept of geologic disposal as proposed in the 1980 Generic EIS was based on the concept of shipping “oldest fuel first.” The proposal for fuel blending, coupled with the desire of many utilities to ship the “youngest” fuel out of their pools to a Federal facility at the earliest opportunity, could result in large amounts of 5-10 year cooled fuel being shipped to the repository from startup of operations. The DEIS transportation risk analysis assumes an average SNF “age” of 26 years. Shipment of younger SNF would result in considerably higher routine and accident radiological risks during handling, transport, and storage, increased risks which are not addressed in the SEIS.

Fuel blending requirements for “hotter” SNF could result in much greater reliance upon truck transportation for repository deliveries during the first two decades of repository operations. Current rail transport casks are designed to ship fuel SNF older than 10 years. Truck casks can carry fuel as young as 5 years out of reactor. Moreover, if the goal is to maximize “flexibility of operations” at the fuel blending facility by maintaining a diverse inventory of SNF, reliance on truck transport would be further encouraged because of quicker loading, unloading, and overall turn-around times for truck casks. Finally, if the commitment to fuel blending eliminates the previous goal of delivering large, multiple-purpose canisters, sealed and ready for emplacement, then there may no longer be any economic advantage to shipping large canisters by rail, and truck transportation could become the predominant or even sole mode of SNF transport. The SEIS addresses none of these issues. The SEIS fails to address the implications of fuel blending for selection of the preferred mode of transportation or the resulting implications for the number of shipments, risks, and impacts.

The Supplement states, “The S&ER flexible design includes a 3-megawatt solar power generating facility that DOE would use in conjunction with commercially available power to meet the requirements of the repository.” The solar facility would be located near the North Portal Operations Area. The peak electrical demand for the repository operation would be 47 to 57 megawatts, and the addition of the solar power supplement would not alleviate the need to upgrade transmission capacity (Page 3-12). If solar power is to be developed for repository operations, it should be at least sufficient to offset the transmission upgrade need, thus eliminating the impacts of that activity. Doing otherwise would only unnecessarily increase the impacts of repository development and operation, e.g., disturbed land and hazardous waste (resulting from the need to replace the 27,000 solar panels at least once because of the long duration of operation).

Page 2-20: Figure 2-7 - Proposed Action repository layouts for the Draft EIS high, intermediate, and low thermal load scenarios , and the S&ER flexible design operating mode.

The S&ER flexible design operating mode repository layout includes possible extensions of the repository into areas that have not been characterized with the benefit of the Exploratory Studies Facility and the cross drift. The northern extension would bring the waste emplacement area closer to the area known as the large hydrologic gradient, for which a satisfactory explanation of its origin has not been determined (and apparently is not intended to be). The southern extension area has not been investigated for the possibility of its being transected by another NW-SE fault similar to the Sundance Fault. Also, rock characteristics, thickness of formations, and fault offset are known to vary from north to south at Yucca Mountain, all of which require detailed investigation before being included in the models used for performance assessment. Additional data, information, and analysis is needed before the S&ER flexible design repository layout is acceptable for inclusion in the Supplement.

Page 2-23: Section 2.3.4.1 - Waste Package and Drip Shields

The Supplement does not, but should, acknowledge the uncertainty in the corrosion resistance of Alloy-22 and the titanium proposed for drip shields, nor does it acknowledge the uncertainty in the knowledge of the subsurface environment in which these metals are asserted to be “extremely corrosion resistant.”

Page 2-28: Section 2.3.6 - Repository Closure

Because of the possible large number of ventilation shafts (7 to 17) intersecting the repository, the Supplement should provide information on the current state of technology for sealing these shafts in a manner that will not result in creating conditions adverse to long-term repository performance. Ineffective shaft seals could have performance consequences of greater magnitude than inadvertent human intrusion.

Page 3-4: Section 3.1.2.1 - Radiological Air Quality

There is no basis to calculate radon beginning 20 km from the repository, the proposed boundary of the accessible environment for the repository, since the source of the radon is not the radioactive waste to which repository disposal performance regulations are intended to apply. The public exposure should be calculated at points nearest the source, outside the restricted operations area, since members of the public will frequent these areas and be exposed to the released radon.

Page 3-6: Section 3.1.3.1 - Water Use

The Supplement should acknowledge, in this section, and in Section 2.3.2.4.5 - Water Supply, that the assumption that groundwater will be appropriated by the Nevada State Engineer for use at the repository is currently not valid. The State Engineer has ruled that use of the waters of the State for a nuclear waste repository is not in the public interest. This is the operative situation unless it is overturned on appeal. Alternative sources of water, and the associated impacts should be identified and evaluated in the Supplement.

Page 3-11: Section 3.1.8 Accidents

The Supplement has included a storage pool in the waste handling building, with a capacity of approximately 5,000 MTHM, or 12,000 spent nuclear fuel assemblies. This would be the inventory storage pool to support fuel blending to balance the thermal output of individual waste emplacement containers. Section 3.1.8 - Accidents - does not properly account for the risk associated with this pool. The maximum foreseeable accident scenario in the Supplement is the same as in the DEIS, which analyzes a seismic collapse of the Waste Handling Building, with damage to all fuel elements in dry storage in the building. If the inventory pool is built to the same design basis accident specifications as the Waste Handling Building, then the accident analysis must also include the consequences of collapse of the pool, damaging all of the bare fuel, and failure of electrical power to provide cooling for the spent nuclear fuel. The Supplement must analyze the realistic accident scenario conditions, and surely this analysis would not result in the comparative reduction of individual and population doses, as shown in Table 3-7.

Page 3-15: Section 3.1.12.5 Low-Level Radioactive Waste Disposal

The State of Nevada reiterates its contention, originally made in the State's comments on the Draft Yucca Mountain EIS, that low-level radioactive waste (LLW) generated as a result of repository and related operations must be treated as commercial LLW and disposed of in a NRC licensed LLW disposal facility. The LLW disposal site at NTS is for LLW generated as a result of DOE's weapons related activities and clean up only. Commercial LLW cannot be disposed of at NTS, unless DOE obtains the appropriate license for the NTS facility from NRC.

The Supplement indicated that the amount of LLW generated under the S&ER flexible design would be the same as that for the Draft EIS design. This would appear to be inconsistent with the requirement for the operation and maintenance of the expanded blending pools in the

revised design. The Supplement should have specifically evaluated fuel blending and related activities in terms of the expected volumes of LLW that will be generated and compared that to the LLW estimates contained in the Draft EIS.

Page 3-16: Section 3.1.14 - Transportation

The Supplement states that there will be no transportation impacts resulting from the shipment of spent fuel and high-level waste as a result of the options discussed in the Supplement. This is almost certainly not the case. Based on our analysis of the SEIS, any proposal for fuel blending to achieve an elevated repository temperature will require shipments of younger, hotter spent fuel during the early years of repository operation ( as opposed to the average 26-year cooled fuel assumed in the DEIS) and will very likely result in heavy, if not total, reliance on truck transportation during the first 10 years of operation.

The Supplement should have evaluated the impacts associated with spent fuel shipments needed to support the fuel blending operation, as these impacts are manifest both in Nevada and nationally in states and communities affected by Yucca Mountain-related nuclear materials transportation.

Page 3-19: Section 3.2 - Long-Term Impacts

The Supplement has not, but should consider the impact of the long-term release to the environment of hazardous metals, other than radionuclides, from the repository's engineered components, as was done for the design scenarios in the DEIS.

Page 3-20: Section 3.2.3 - Results for Long-Term Performance

The Supplement does not, but should describe and quantify the uncertainty associated with the long-term performance results, and incorporate the uncertainty into Table 3-14 - Primary impact indicators for long-term performance.

Page 3-22: Section 3.3 - Cumulative Impacts

Cumulative impacts should be re-evaluated based on responses to the comments provided above, as some will result in potentially significant changes in the assessment.

## **CONCLUSION**

This Supplement provides nothing that would change our previously stated conclusion regarding the *Draft Environmental Impact Statement for a Geologic Repository for Spent*

*Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada.* We still find the document, including the Supplement, to be legally, procedurally, and substantively deficient, and conclude that it must be withdrawn. The entire National Environmental Policy Act compliance strategy for the proposed Yucca Mountain high-level nuclear waste repository must be reconsidered by DOE. A new scoping process, based on the development of a programmatic environmental impact statement, with tiered EISs to follow, should be implemented when sufficient planning and information are available to support an informed decision by the Secretary of Energy regarding whether to recommend the site to the President for development as a high-level nuclear waste repository.