

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001



June 29, 2001

Mr. Lake H. Barrett, Acting Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy, Headquarters
1000 Independence Avenue, S.W.
Washington, DC 20585

Dear Mr. Barrett:

As you know, the U.S. Department of Energy (DOE) published a notice of availability, in the Federal Register on May 4, 2001, of a supplement to its draft environmental impact statement (DEIS) (hereafter referred to as the SDEIS), for a proposed geologic repository for the disposal of spent nuclear fuel and other high-level radioactive waste (HLW) at Yucca Mountain in Nevada. In the context of the Nuclear Waste Policy Act (NWPA), as amended, DOE is the lead agency for developing the proposed repository and considering potential environmental impacts. For its part, NRC is to adopt DOE's final environmental impact statement (FEIS), to the extent practicable, as part of any potential NRC licensing action related to the repository.

Consistent with its NWPA responsibilities and its role as a DEIS commenting agency, the NRC provided comments to DOE on its DEIS in a letter dated February 22, 2000. NRC's comments on the recently published SDEIS are enclosed. The enclosed comments and NRC's February 2000 comments on the DEIS are provided to ensure that the FEIS is more complete.

Please contact Charlotte E. Abrams, of my staff, if you have any questions about this letter or the enclosure. Ms. Abrams can be reached at (301) 415-7293.

Sincerely,

Martin J. Virgilio, Director
Office of Nuclear Material Safety
and Safeguards

Enclosure:

"U.S. NRC's Comments on U.S. DOE'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"

cc: Dr. Jane R. Summerson

See attached list

Enclosure

Letter to L.H. Barrett from M. Virgilio dated: June 28, 2001

cc:

R. Loux, State of Nevada

S. Frishman, State of Nevada

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A. Johnson, Eureka County, NV

R. Massey, Lander County, NV

J. Pitts, Lincoln County, NV

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J. Shankle, Mineral County, NV

L. Bradshaw, Nye County, NV

M. Murphy, Nye County, NV

J. McKnight, Nye County, NV

B. Price, Nevada Legislative Committee

D. Weigel, GAO

W. Barnard, NWTRB

I. Navis, Clark County, NV

E. von Tiesenhausen, Clark County, NV

L. Lehman, T-Reg, Inc

R. Holden, NCAI

A. Collins, NIEC

R. Arnold, Pahrump County, NV

J. Larson, White Pine County

R. Clark, EPA

F. Marcinowski, EPA

R. Anderson, NEI

R. McCullum, NEI

S. Kraft, NEI

J. Kessler, EPRI

D. Duncan, USGS

R. Craig, USGS

W. Booth, Engineering Svcs, LTD

N. Rice, NV Congressional Delegation

T. Story, NV Congressional Delegation

J. Reynoldson, NV Congressional Delegation

A. Remus, Inyo County, CA

S. Joya, NV Congressional Delegation

M. Yarbrow, Lander County, NV

J. Pegues, City of Las Vegas, NV

2001-04-09

U.S. NUCLEAR REGULATORY COMMISSION'S 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"

This enclosure provides comments, by the U.S. Nuclear Regulatory Commission (NRC) staff, on the May 2001 supplement to the draft environmental impact statement (DEIS) (hereafter referred to as the SDEIS) prepared by the U.S. Department of Energy (DOE) for a proposed geologic repository for the disposal of spent nuclear fuel (SNF) and other high-level radioactive waste (HLW) at Yucca Mountain (Nye County), Nevada.

In its review of the SDEIS, NRC has four comments, as noted below, that address the following areas: identification of a Proposed Action; impacts from the design options; new or modified facilities associated with the Science and Engineering Report (S&ER) flexible design; and the assessment of radiological impacts associated with the S&ER flexible design.

Comment No. 1

Consistent with its February 2000 comments on the DEIS, the NRC staff believes that DOE's final environmental impact statement (FEIS) should more clearly define a Proposed Action for each component of the proposed activity.

Basis:

The environmental impact statement development process is intended to address a wide range of possible impacts of this complex geotechnical project. A significant amount of information, including multiple options for key components of the Proposed Action, was presented in the August 1999 DEIS (U.S. Department of Energy, 1999). However, as noted in its February 2000 comments on the DEIS, the NRC staff continues to believe that DOE's final environmental impact statement (FEIS) should more clearly define a Proposed Action comprised of: (i) a preferred option for each component; or (ii) a bounding analysis that provides a better understanding of the potential impact of each component, as well as their combined impacts. NRC recognizes the utility of DOE's preserving, to the extent possible, repository design flexibility, as outlined recently in the S&ER supporting the DEIS and the SDEIS. However, the DEIS did not identify a preferred option for each component of a possible geologic repository and the SDEIS does not define a preferred option for the design of a repository. Consequently, it is not clear that environmental impacts that could arise from a repository have been bounded.

Recommendation

In the interest of improving the focus of its National Environmental Policy Act analysis in its FEIS, DOE should prepare an appropriate analysis of a clearly defined Proposed Action, or provide sufficient information and analysis of the various operational approaches to demonstrate that the environmental impacts of the proposed repository are bounded.

Enclosure

Comment No. 2

The SDEIS provides several new design and operational features proposed to meet thermal criteria. DOE should ensure that sufficient information is provided to enable assessment of the direct, indirect, and cumulative impacts.

Basis

In the SDEIS, DOE describes two thermal operational approaches to control temperature at the drift pillars and the waste package surface. For the high-temperature operation mode, at least some portion of the drift pillars would have temperatures above the boiling point of water. The low-temperature operating mode is designed to ensure temperatures below the boiling point at all times and waste package surface temperatures below 85 degrees Centigrade. To achieve either temperature scenario, DOE describes five potential operational approaches: increased drift spacing, increased preclosure ventilation, surface aging of commercial fuel, fuel blending, and variable line loading. Depending on the approaches selected, the operational and monitoring period may extend beyond 300 years, with as long as 50 years allowed for waste emplacement.

NRC recognizes the value of maintaining flexibility in selecting operational approaches to enhance repository performance. However, many combinations of the operational approaches are likely to achieve the overall thermal goals, and each combination is likely to have a different set of impacts. For example, lower rates of ventilation may require larger spacing between waste packages, which may, in turn, lead to a larger repository with a greater volume of excavated rock and an expansion of the repository closer to key features such as the high ground-water gradient area to the north and across an additional fault zone. Similarly, the flexible pre-closure ventilation design could increase radon release through the use of forced ventilation. Without a clear description of the preferred option or without estimating impacts explicitly for each option, there is no basis for concluding that the full range of impacts has been presented in the DOE analyses.

Several of the flexible design operational approaches include new features not considered in the DEIS. In some instances, the SDEIS analyses multiply DEIS impacts by a proportionality constant to obtain impacts associated with the S&ER flexible design. Because many of the impacts cited in the SDEIS are the result of new design features (e.g., surface-aging facility, titanium drip shields) and altered time frames in the various flexible operational approaches, an adequate technical basis is required for use of the proportionality constants. For example, it is not clear that the thermal effects imposed by the flexible design would be linear and therefore amenable to quantification based on a proportionality constant. Similarly, impacts from constructing and operating the surface-aging facility may be spread over as many as 50 years, and include the construction of concrete pads covering 200 acres, and fabricating and placing up to 4500 dry-storage canisters and casks on these pads (Mattsson, 2000; U.S. Department of Energy, 2001a, Table 3-11). These new features are substantive modifications of the DEIS design and individual and cumulative impacts may not scale in a linear fashion.

The full range of impacts of the new operational approaches are not addressed. Waste package emplacement is discussed in detail in the SDEIS (Section 2.3.3.3), but certain potential activities are not discussed. They include, for example: (i) loading dry storage canisters and casks for the SNF aging facility; (ii) removing pallets and waste packages for repair and re-emplacment; (iii) maintaining drifts, waste packages, and other engineered barriers; (iv) moving waste packages to adjust thermal load; (v) retrieving waste packages; (vi) installing and maintaining drip shields; and (vii) constructing and using performance-confirmation drifts. It is also not clear whether the impact assessments include off-normal

events, accidents, or other events outside of the base case. For example, the impacts from manufacturing and shipping as much as 60,000 metric tons of fabricated titanium drip shields are not fully addressed, nor is the potential for worker injury or exposure during drip-shield emplacement. The drip shield is a new design feature and is not addressed in the offsite impact analyses included in the DEIS.

Recommendation

The FEIS should include an analysis of impacts associated with all potential operational activities related to a preferred design option. As an alternative, the FEIS could estimate impacts separately for a suite of proposed operational approaches. The specific environmental concerns associated with each primary impact indicator should be identified. The FEIS should also provide a technical basis to demonstrate that the full range of direct, indirect, and cumulative impacts has been included in the analyses. In addition, the FEIS should improve the technical justification for the use of linear thermal load proportionality factors.

Comment No. 3

The S&ER flexible design includes new or modified facilities, land uses, and changes in infrastructure. Environmental impacts from construction and operation of these repository features are not included in the SDEIS. A more thorough impact assessment is necessary for major changes incorporated in the S&ER flexible design.

Basis

The SDEIS (Table S-2) indicates that environmental impacts associated with the S&ER flexible design include potentially significant changes in ground use, radon release, peak electrical power requirements, fossil fuel requirements, construction and demolition debris, and waste generation. Although the SDEIS provides a relatively thorough description of the different approaches to the potential design and operating bounds of the proposed S&ER flexible design, a detailed description of these new facilities and analyses of their environmental impacts has not been included.

Foremost among the new facilities is the proposed separate, at-surface fuel-aging area. As part of the lower-temperature, flexible-design operating mode, DOE has proposed placing younger fuel in a surface-aging area, to allow heat dissipation before underground disposal, as a method of controlling repository temperatures (U.S. Department of Energy, 2001a, p. 2-8). This facility would age as much as 40,000 MTHM (metric tons of heavy metal) of SNF (or about 60 percent of repository-destined waste) over a 50-year period (Id.). Aging time is directly related to potential impacts associated with surface storage of SNF; however, only limited impact analysis of this new design feature has been provided in either the SDEIS or the S&ER. There is a similar concern regarding the proposed blending pool in the waste-handling building with a proposed design capacity of 5000 MTHM (p. 2-15). It is not apparent that DOE has prepared an impact analysis of this major new design feature.

Other examples of new design features that lack adequate descriptions and impact assessments (i.e., land and water use, impact on ground-water quality) include the solar power generating facility, and the wind farm. The environmental impacts of all features of a proposed design, as well as alternatives, need to be identified and evaluated.

Recommendation

DOE should expand the description and environmental impact analyses for major new features of the S&ER flexible design in the FEIS.

Comment No. 4

Estimates of the radiological impacts of the flexible design require additional technical basis.

Basis

The SDEIS (U.S. Department of Energy, 2001a, Section 3.1.7) states that "[e]xposed workers include both radiation workers and some general employees.... DOE used the total number of exposed worker-years to estimate potential impacts from the radiation dose received from this exposure, namely the number of latent cancer fatalities...." The SDEIS does not define the number of general employees, the lengths of their exposures, or the exposure levels associated with different phases of operation that were applied in estimating latent cancer fatalities.

In addition, the lower-temperature design option may require preclosure ventilation for a period beyond 300 years. Ensuring that the emplacement drifts remain clear and unobstructed from rockfall or drift collapse during this period is therefore important. The SDEIS does not appear to address the impacts of drift support system maintenance on worker exposure.

Recommendation

The FEIS should provide a more complete assessment of the radiological impacts of the flexible design, including maintenance activities associated with an extended preclosure period.

References

Mattsson, C.G., "Repository Surface Design Engineering Files Letter Report – Non-Boiling Repository Surface Facilities Conceptual Design," Letter from C.G. Mattsson (Civilian Radioactive Waste Management System Management and Operating Contractor) to K.J. Skipper (DOE/Yucca Mountain Site Characterization Office), July 21, 2000.

U.S. Department of Energy, "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, North Las Vegas, NV: Office of Civilian Radioactive Waste Management, U.S. Department of Energy, 1999.

U.S. Department of Energy, "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, North Las Vegas, NV: Office of Civilian Radioactive Waste Management, U.S. Department of Energy, 2001a.

U.S. Department of Energy, "Yucca Mountain Science and Engineering Report: Technical Information Supporting Site Recommendation Consideration. DOE/RW-0539. Washington, DC: Office of Civilian Radioactive Waste Management, U.S. Department of Energy, 2001b.

U.S. Nuclear Regulatory Commission, "U.S. Nuclear Regulatory Commission's Comments on 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," Washington, DC: U.S. Nuclear Regulatory Commission, 1999.

UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

February 22, 2000



Dr. Ivan Itkin, Director
Office of Civilian Radioactive Waste Management
U.S. Department of Energy, Headquarters
1000 Independence Avenue, S.W.
Washington, DC 20585

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION COMMENTS ON THE U.S. DEPARTMENT OF ENERGY 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

Dear Dr. Itkin:

On August 13, 1999, the U.S. Department of Energy (DOE) published a notice of availability in the Federal Register of its draft environmental impact statement (DEIS) for a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain, Nye County, Nevada. In the context of the Nuclear Waste Policy Act, as amended, DOE is the lead agency for considering the environmental impacts for the proposed repository, and the U.S. Nuclear Regulatory Commission (NRC) is to adopt the DOE Final Environmental Impact Statement (FEIS) to the extent practicable as part of NRC's licensing actions for the repository. Consistent with its responsibilities, the NRC has promulgated, in 10 CFR Part 51, criteria it will use to adopt the FEIS. With respect to the DEIS, the NRC is a commenting agency. The NRC comments are enclosed.

In reviewing the DEIS, the NRC based its comments on its judgment regarding environmental issues, guided by: 1) the Council on Environmental Quality (CEQ) regulations (40 CFR Part 1500) implementing the National Environmental Policy Act; 2) guidance prepared by CEQ and the U.S. Environmental Protection Agency; and 3) NRC's criteria in 10 CFR Part 51 for adopting the FEIS.

The enclosed staff comments are organized into three categories. The first category is comprised of four comments that the NRC believes should be addressed by DOE to make the FEIS complete. These four comments concern broad issues in the DEIS, specifically: integration of the Proposed Action, cumulative impacts, transportation, and mitigative measures. When DOE submits an application for a license for the repository, the FEIS should contain sufficient information to allow a reasonable evaluation of the environmental impacts of that Proposed Action.

The remaining comments apply to more specific topical areas within the DEIS. The second category of comments (comments 5 through 8) also addresses issues related to completeness, albeit less directly than those in the first category. Those four comments have less significance than the first four comments, but DOE should address all eight comments to make the FEIS

I. Itkin

complete. The final five comments (9 through 13) are offered for DOE's consideration. In preparing the FEIS, NRC also requests that DOE consider relevant technical comments previously submitted by the NRC. The NRC has provided such technical comments in reports on specific technical issues and in comments on DOE's Viability Assessment in June 1999.

The comments on the Viability Assessment also address the issue of quality assurance (QA). DOE's application of a rigorous and effective QA program is crucial to its ability to demonstrate the validity of its findings and analyses in any license application. The NRC staff will continue to evaluate DOE's efforts to implement an effective QA program.

We are available to meet with your staff to discuss our comments and recommendations. Please contact Charlotte Abrams, Team Leader, Environmental Review Team, if you have any questions regarding this letter or the enclosure. Ms. Abrams can be reached at (301) 415-7293.

Sincerely,



William F. Kane, Director
Office of Nuclear Material Safety
and Safeguards

Enclosure: U.S. NRC's Comments on U.S. DOE'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

cc w/encl: See attached list

Wendy R. Dixon, EIS Project Manager
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Letter to Ivan Itkin, U.S. DOE dated: 2-22-2000

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**U.S. Nuclear Regulatory Commission's Comments on
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**

This enclosure provides comments by the U.S. Nuclear Regulatory Commission (NRC) staff on the draft environmental impact statement (DEIS) prepared by the U.S. Department of Energy (DOE) for a geologic repository for the disposal of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) at Yucca Mountain, Nye County, Nevada. The DEIS addresses a wide range of possible impacts of this complex project. A significant amount of information, including multiple options for key components of the Proposed Action, is presented in the DEIS. The NRC believes it to be desirable that DOE more clearly define a Proposed Action comprised of a preferred option for each component or a bounding analysis that gives a better understanding of the potential impact of each component. The NRC recognizes the utility of DOE's preserving, to the extent possible, repository design flexibility. Nevertheless, in the interest of improving the focus of its National Environmental Policy Act (NEPA) analysis, the NRC requests DOE to prepare, in the final environmental impact statement (FEIS), an in-depth analysis of a clearly defined Proposed Action, or, at the least, to provide sufficient information and analysis of the various options that it has retained as to demonstrate that the environmental impacts of the repository are bounded. A number of the attached NRC comments relate to the value in defining an integrated Proposed Action.

The assessment of long-term radiological impacts is based on the results of site characterization and the development of models describing repository performance. NRC and DOE have had extensive pre-licensing consultations concerning site characterization and NRC staff has provided comments on these matters. Staff's comments in these areas were provided to DOE in reports on specific technical issues (e.g., Issue Resolution Status Reports for Key Technical Issues) and in comments on DOE's viability assessment (VA). These technical comments should be considered during the development of the FEIS.

The enclosed staff comments are organized into three categories. The first category is comprised of four comments that the NRC believes should be addressed by DOE to make the FEIS complete. These four comments concern broad issues in the DEIS, specifically: integration of the Proposed Action, cumulative impacts, transportation, and mitigative measures. When DOE submits an application for a license for the repository, the FEIS should contain sufficient information to allow a reasonable evaluation of the environmental impacts of that Proposed Action.

The remaining comments apply to more specific topical areas within the DEIS. The second category of comments (comments 5 through 8) also addresses issues related to completeness, albeit less directly than those in the first category. Those four comments have less significance than the first four comments, but DOE should address all eight comments to make the FEIS complete. The final five comments (9 through 13) are offered for DOE's consideration. In preparing the FEIS, NRC also requests that DOE consider relevant technical comments previously submitted by the NRC. The NRC has provided such technical comments in reports on specific technical issues and in comments on DOE's Viability Assessment in June 1999.

COMMENTS

Category 1 -- Comments That Should be Addressed to Ensure the Completeness of the FEIS

INTEGRATION

1. **Comment:**

The DEIS discusses five components relating to: 1) construction of the repository and waste handling facilities; 2) preparation of SNF and HLW at 77 sites for transport; 3) transportation of the SNF and HLW to Yucca Mountain by use of a National transportation network and a transportation network in the State of Nevada; 4) repository operations, including packaging, waste emplacement, monitoring and closure; and 5) mitigation and monitoring. The NRC recognizes the utility in DOE preserving, to the maximum extent practicable, design flexibility and therefore understands why DOE has presented a number of options for public consideration for each of these components. However, the DEIS does not identify a preferred option for each component. Further, it does not provide an integrated description of a clearly defined Proposed Action (comprised of the various components) and of the direct, indirect, and cumulative environmental effects of the integrated action. As a result, it is not clear that DOE has bounded the environmental impacts that could arise from the repository. As it prepares the FEIS, we request that DOE prepare an in-depth analysis of a clearly defined Proposed Action, or, at the least, to provide sufficient information and analysis of the various options that it has retained as to demonstrate that the environmental impacts of the repository are bounded.

Basis:

The DEIS describes numerous options for the various components of the repository system. For example, in Appendix F, two potential configurations of waste packaging for shipment were analyzed: uncanistered and canistered. In Chapter 6, two "National-level" transportation scenarios were analyzed (mostly truck and mostly rail) and eleven Nevada transportation alternatives were considered. Additionally, three potential thermal load scenarios and three waste volume options for the repository were considered in Chapters 4 and 5.

Given the number of components and options within those components, the repository system could consist of one of the numerous possible permutations. The DEIS does not select among the various options to identify a single, integrated Proposed Action. Moreover, the DEIS does not present an integrated overall description and impact assessment of any complete combination for the Proposed Action, and it is not clear that the analyses of the various components presented in the DEIS bound the impacts that could result from the Proposed Action, once one is selected. Instead, descriptions and impacts are treated separately, discussed separately, with conclusions drawn separately. Although NRC recognizes the importance of DOE's retaining flexibility to make changes in its design, and of obtaining public input in the selection among the available options, the FEIS should contain sufficient information and analysis of the

various options to cover the Proposed Action that is ultimately selected and to allow a reasonable assessment of the impacts of that Proposed Action.

Concerns identified in this comment are linked to comments on cumulative impacts (see Comment 2), transportation in Nevada (see Comment 3), and mitigation (see Comment 4).

Recommendation:

In the interest of improving its analyses, the NRC recommends that, to the extent choices among options have been refined, DOE identify its Proposed Action in the FEIS. Further, the NRC suggests that DOE use its refined description of the Proposed Action to complete the assessment of the direct, indirect, and cumulative effects of the Proposed Action, making bounding assumptions when necessary or appropriate. At the least, if DOE chooses to retain flexibility in the FEIS, it should show that the indirect, direct and cumulative impacts of the eventual selection have been bounded by the assessments presented in the FEIS.

CUMULATIVE IMPACTS

2. **Comment:**

The assessment of cumulative impacts in the DEIS does not fully address the impacts associated with past, present, and reasonably foreseeable future actions relating to groundwater use, land use, and cultural and biological resources.

Basis:

A "cumulative impact" is an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions (40 CFR 1508.7). A complete cumulative impacts assessment would provide an understanding of whether the Proposed Action (see Comment 1) might push a resource, ecosystem, or human community beyond a critical threshold and preclude sustainability (CEQ, 1997, page 7). Therefore, the FEIS should assess the additional, incremental impacts from the action at hand when added to impacts from past, present, and reasonably foreseeable future actions (40 CFR 1508.7).

Section 4.1.3 (Environmental Consequences of Repository Construction, Operation and Monitoring, and Closure — Impact to Hydrology) acknowledges that repository construction and operation will impose water demands on the available supplies at Yucca Mountain and the surrounding area. Similarly, Section 6.3.2.1 (Impacts Common to Nevada Branch Rail Line Implementing Alternatives) acknowledges that water withdrawal will be required to support construction of a branch rail line. These demands could create impacts on water resources, particularly in light of other possible future uses. Creation of a Timbisha Shoshone Tribal Homeland with agricultural water rights is a reasonably foreseeable action that could contribute to exceeding the sustainable yield in the Death Valley National Park region (Buquo, 1999, p. 25). Further, it is foreseeable

that the continued growth of Clark, Nye, and Lincoln Counties and Las Vegas, Pahrump, and Beatty will impact available groundwater resources. An increased cumulative demand for water, particularly when coupled with reduced water supplies resulting from land withdrawal and Federal land acquisition, could lead to aquifer overdrafting, increased pumping costs, and associated socioeconomic impacts. The cumulative impacts on groundwater resources stemming from the Proposed Action and these other actions are not adequately considered in the DEIS.

The cumulative impacts assessment also needs to further evaluate combined impacts to other specific resources (e.g., the desert tortoise, land use, cultural resources). The cumulative impacts of a Proposed Action, coupled with other Federal actions in the area (e.g., activities at NTS, Nellis Air Force Range (AFR)) and impacts from extensive growth in Nye, Lincoln, and Clark Counties, on the ranges and habitats of local fauna, such as the desert tortoise, should be documented. In addition, land withdrawal by DOE in conjunction with Department of Interior limitations on land use in Ash Meadows may result in cumulative impacts related to land use that have not yet been fully assessed. Similarly, the impact that private projects such as the Cortez Gold Mine Pipeline projects and the Apex Bulk Commodities Intermodal Transfer Station have on resources (e.g., biological and cultural resources) may not have been fully considered.

Recommendation:

DOE should complete its analysis of cumulative impacts for resources, ecosystems, and human communities by augmenting analyses already performed for individual components for the proposal. The analysis should consider all past, present, and reasonably foreseeable future actions, both Federal and non-Federal, within appropriate spatial and temporal boundaries.

References:

Buqo, T.S. *Nye County Perspective: Potential Impacts Associated with Long Term Presence of a Nuclear Depository at Yucca Mountain, Nye County, Nevada.* June 1999.

Council on Environmental Quality, *Considering Cumulative Effects Under the National Environmental Policy Act*, CEQ, January 1997.

TRANSPORTATION

3. Comment:

In the absence of a preferred route and mode of transportation, it is unclear whether the non-radiological impacts related to transportation of SNF and HLW within Nevada, including impacts from construction and operation of intermodal transfer stations and rail lines, have been bounded.

Basis:

The DEIS identifies the transportation of SNF and HLW as one of the components necessary for a repository. As such, transportation is a connected action (40 CFR 1508.25(a)(1)) and should be considered an integral part of the Yucca Mountain project. The NRC understands that DOE would like to benefit from public input, through comments on the DEIS, when considering preferred transportation modes and routes. However, an integrated impact assessment that connects transportation to disposal needs to be included as part of any evaluation of the Proposed Action in the FEIS.

The current analysis for transportation within the State of Nevada provides a general discussion of impacts, but does not fully assess the non-radiological impacts. Further, it is not apparent that the transportation analysis in the DEIS bounds the non-radiological impacts (e.g., socioeconomic impacts and impacts to air quality, cultural and biological resources, and land and water use). Moreover, although DOE has identified a number of options, it has not clearly defined which options (e.g., rail line construction, mode of transportation, need for intermodal transfer stations, preferred routing within the State of Nevada, and type of trucks) it will use to support the Proposed Action.

As noted in Comment 1, the FEIS should show that, once decisions on transportation routes and modes are made, no new information or circumstances exist that could result in significant changes to the impacts assessed in the FEIS.

Recommendation:

Transportation impacts (including non-radiological and cumulative impacts) should be discussed in sufficient detail to support selection of a Proposed Action. The FEIS should contain either a complete, integrated assessment of the connected transportation actions or sufficient information and analyses on the various options to show that the impacts of the Proposed Action have been bounded.

MITIGATION OF ACTIONS

4. **Comment:**

The DEIS does not include a thorough discussion of mitigative measures or of long-term environmental monitoring to measure the impacts on the environment.

Basis:

As noted in Comment 1, the DEIS does not identify what options will be combined for a Proposed Action. Public comments on the DEIS can be used by DOE to help in the selection of those options that will form the Proposed Action, refine its analysis of environmental impacts, and evaluate the need for particular mitigative measures. In this connection, it is important to ensure that all environmental impacts have been identified or bounded in order to provide a basis for decisions for mitigative measures. Mitigative strategies currently address dust suppression, the desert tortoise, and occupational health and safety. In addition, the FEIS needs to evaluate the need for mitigative

strategies for water use, economic, social, cultural, biological, or public health and safety impacts.

For example, the discussion in Chapter 9 (Management Actions to Mitigate the Potential for Environmental Impacts) of the DEIS does not fully address mitigative measures for Native American interests, including several measures presented by the AIRD (American Indian Writers Subgroup, 1998), such as ways to alleviate the severity of the effects on Native American cultural, religious, subsistence, recreational, ceremonial and associated uses of Yucca Mountain. The suggested mitigation actions in the AIRD include providing emergency preparedness training, establishing emergency medical facilities, and providing controlled access to sacred or ceremonial areas or resources.

Further, it is not apparent that a complete monitoring program for mitigative strategies has been clearly defined. The FEIS should include monitoring as a way of evaluating the effectiveness of any mitigative measures, such as measures to reduce impacts from transportation or waste handling at intermodal or site surface-based facilities (40 CFR 1505.2(c)).

Recommendation:

The FEIS should provide reasonable mitigative strategies to address potentially significant adverse impacts from the Proposed Action. Mitigative measures which comprise these strategies should be implementable and effective in reducing environmental impacts. Moreover, the FEIS should discuss monitoring to assess the environmental impacts and the effectiveness of planned mitigative measures. As appropriate, this monitoring could be integrated with DOE's long-term performance confirmation monitoring.

References

American Indian Writers Subgroup. *American Indian Perspectives on the Yucca Mountain Site Characterization Project and the Repository Environmental Impact Statement*. American Indian Resource Document MOL 19980420.0041. Las Vegas, NV: American Indian Writers Subgroup, Consolidated Group of Tribes and Organizations. 1998.

Category 2 --- Additional Comments Related to Completeness

ENVIRONMENTAL JUSTICE

5. Comment:

The DEIS discussion of the impacts on minority and low income communities is restricted to the Bureau of the Census block group data. The discussion does not provide sufficient specificity with respect to community locations within the relevant census block groups or adequately identify potentially unique community characteristics. This information would facilitate the assessment of any potential for disproportionately

high and adverse human health and environmental effects of the Proposed Action upon these communities.

Basis:

The discussion of Environmental Justice in the DEIS does not specifically identify where minority or low-income communities are located within each census block group. This problem is compounded by the relatively large geographic size of the Nevada census block groups analyzed in the DEIS. Determining the specific locations of the potentially affected communities in each relevant census block group would facilitate evaluation of the disproportionate impacts of the Proposed Action. DOE may find that state, local, and tribal governments possess demographic information relevant to the location of these communities.

DOE's conclusion that the Proposed Action will have no significant impact on the general population, and thus no significant impact on minority and low-income communities, appears not to address the possibility that cultural, social, historical, or economic factors associated with minority and low income communities may amplify the effect of the Proposed Action and produce disproportionately high and adverse impacts upon these communities. The FEIS should discuss whether such factors exist and whether the consideration of such factors leads to the identification of significant effects that would otherwise be diluted by examination of the general population. This information could also be useful in identifying appropriate mitigative measures to address any disproportionate impacts resulting from the Proposed Action.

The NRC also notes that Section 3.1.13 (Environmental Justice) of the DEIS identifies Native Americans as having concerns about disproportionate impacts. The NRC's analysis of census data has found that there may also be African American and Hispanic minority groups in the affected area. It is not clear from the analysis in the DEIS whether these other minority groups were considered in determining if the Proposed Action has a potential disproportionate impact upon these communities.

Recommendation:

The FEIS discussion of environmental justice should identify the location and unique characteristics of minority and low income communities with sufficient specificity to enable a complete assessment of any disproportionate impacts upon those communities resulting from the Proposed Action.

WATER USE

6. **Comment:**

DOE should correct areas of discrepancy in water use data and provide clarifying information regarding the potential for and impacts from overdrafts of groundwater in the FEIS.

Basis:

Table 3-11 notes that the figures for current water appropriations do not include Federal reserved water rights (FRRs) for the NTS and Nellis AFR. These FRRs should be added to the total appropriations for a more accurate measure of committed resources.

Table 3-11 and DEIS Section 3.1.4.2.1 (Affected Environment - Regional Groundwater) suggest that ample water is available for new appropriations to support the Proposed Action because average annual withdrawals (actual use) are well below the appropriation limits. Although the use of average withdrawals may be appropriate, it is possible that this could be misleading because users are entitled to withdraw or sell their full appropriations.

When discussing the water demands expected during performance confirmation in Section 4.1.3.1 (Environmental Consequences of Repository Construction, Operation and Monitoring, and Closure - Impacts to Hydrology from Performance Confirmation) the DEIS omits mention of NTS and Nellis AFR wells in the area. The pumpage from those wells should be added to that from J-11 and J-12 and the C-well complex in the proposed land withdrawal area for an improved estimate of the water demand. The wide range in the perennial yield figures (880 to 4000 acre-feet for Area 227a) should be explained. The perennial yield and committed resources figures for Area 227a in Nevada Division of Water Planning (1992) do not agree with Table 3-11. DOE should provide additional justification for the perennial yield figures, considering the variance from information in other sources, to support its assessment of potential overdraft in the region.

The discussion of water demand during construction, operation and monitoring, and closure in Section 4.1.3.3 (Environmental Consequences of Repository Construction, Operation and Monitoring, and Closure - Impacts to Groundwater from Construction, Operation and Monitoring, and Closure) of the DEIS also should be clarified. This discussion should make clear where the water will be obtained to meet the combined water demand for the repository, the NTS, and Nellis AFR. Under one scenario, the perennial yield of Area 227a would be exceeded. The text should be clarified to explain the impacts of any possible overdraft.

The discussion in DEIS Section 4.1.3.3 (Environmental Consequences of Repository Construction, Operation and Monitoring, and Closure - Impacts to Groundwater from Construction, Operation and Monitoring, and Closure) includes at least one scenario where the Jackass Flats basin would be in overdraft status. In addition, Table 3-11 presents the Amargosa Desert Area 230 in a potential overdraft situation. DOE (1996) confirms that historic data show that DOE withdrawals at Yucca Flats have annually exceeded the perennial yield. The potential impacts of these overdrafts should be discussed.

Recommendation:

DOE should correct discrepancies in water-use discussions and data in the FEIS. The evaluation of groundwater use during construction, operation, and monitoring should include a discussion of the potential for overdrafts.

References:

Nevada Division of Water Planning. *Nevada Water Facts, 1992*. 241353. Carson City, NV: Nevada Division of Water Planning. 1992.

U. S. Department of Energy. *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada*. DOE/EIS-0243-F,239895. Las Vegas, NV: U. S. Department of Energy. 1996.

LAND USE

7. **Comment:**

Although flexibility exists in the amount of land that is to be withdrawn for the geologic repository operations area and the post-closure controlled area, the extent of the land withdrawal influences the type and magnitude of impacts that should be considered in the impact statement. The DEIS does not provide a clear basis for determining the extent of the proposed land withdrawal nor does it assess the full range of impacts associated with the land withdrawal (e.g., socioeconomic, water use, cultural).

Basis:

According to DEIS Section 1.4.1 (Purpose and Need for Agency Action—Yucca Mountain Site), the area needed for development of the surface repository is approximately 3.5 km² with up to approximately another 600 km² set aside as a buffer zone. However, the severity of impacts is dependent on the area to be withdrawn.

The FEIS should include an assessment of the potential impacts of removing a large area (e.g., 600 km² is used as the size of the potential land withdrawal on pages 2-1 and 2-2 of the DEIS) from other possible uses. The withdrawal would preclude or limit use of the land at any time for other purposes by the public or by Native Americans. Development of water resources on this land by private individuals, businesses, industry, or the State of Nevada might also be prohibited. These impacts are not fully assessed in the DEIS.

Recommendation:

The impacts associated with the land withdrawal should be discussed systematically in the FEIS, including impacts on cultural resources and land use.

BIOLOGICAL RESOURCES

8. Comment:

The DEIS may not adequately bound the uncertainty in the predictions of heat generated from radioactive decay during long-term repository performance and the potential effects of this heat generation on fauna.

Basis:

Although most vertebrate species have genetically fixed sex determination, it is now known that chelonians (tortoises and turtles) undergo temperature dependent sex determination (TSD). Spotila (1994) shows that the desert tortoise (*Gopherus agassizii*), a federally listed threatened species of the Mojave Desert, is subject to this effect. Research shows that the temperature that produces a 50:50 sex ratio is 31.8 °C. Desert tortoise eggs have good hatching success between 28 and 33 °C, but suffer high mortality at temperatures below 26 or above 35.3 °C. Temperatures between 26.0 and 30.6 °C produce mostly males (temperatures 28 °C and below produce 100 percent males) and temperatures between 32.8 and 35.3 °C produce mostly females (temperatures above 33 °C produce 100 percent females) (Spotila et al., 1998). Lewis-Winokur and Winokur (1995) confirm that the pivotal temperature is between 31 and 32 °C and indicated that a lowering of 1.6 °C (from 31 to 29.4 °C) resulted in all male hatchlings.

The modeling of surface soil temperature for the proposed site produces uncertain results. TRW Environmental Safety Systems, Inc. (1999, page 44) states "...current predictions are somewhat uncertain due to uncertainties in the thermal properties of the soil, particularly thermal conductivity and, hence, thermal diffusivity." This source further states that "analyses based on conventional soil heat-conduction models indicate that the original time scale of the measurements collected at the site (weekly to monthly) could not be used to accurately estimate the soil thermal conductivity for the sampling depths chosen (15, 30 and 45 cm)." However, substantial temperature effects on desert tortoise sex determination have been shown to occur within a range of plus or minus 3 °C. Therefore, it is important for the FEIS to clarify the range of soil temperatures associated with the geologic repository and discuss impacts, if any, on protected or endangered species.

Recommendation:

The assessment of the contribution of thermal loading on increased soil temperature should be refined in the FEIS. Soil temperature modeling should take into account the substantial uncertainties in thermal conductivity in Yucca Mountain soils thereby enabling an assessment of the potential impacts to the desert tortoise from increased soil temperatures.

References:

- Lewis-Winokur, V., and R.M. Winokur. *Incubation temperature affects sexual differentiation, incubation time, and posthatching survival in desert tortoises [Gopherus agassizi (sic)]. Canadian Journal of Zoology* 73(11): 2091–2097. 1995.
- Spotilla, J.R., L.C. Zimmerman, C.A. Binckley, J.S. Grumbles, D.C. Rostal, A. List, Jr., E.C. Beyer, K.M. Phillips, and S.J. Kemp. *Effects of incubation conditions on sex determination, hatching success, and growth of hatchling desert tortoise, Gopherus agassizii. Herpetological Monographs* 8: 103–116. 1994.
- TRW Environmental Safety Systems, Inc. *Impact of Radioactive Waste Heat on Soil Temperatures*. BA0000000–01717–5700–00030. Revision 0. Las Vegas, NV: TRW Environmental Safety Systems, Inc.: 37–44. 1999.

Category 3 -- Less significant Issues

DOCUMENTATION OF QUALITATIVE JUDGMENTS ON IMPACTS AND INCONSISTENCIES

9. Comment:

Additional documentation or analysis should be provided in the FEIS to support the characterization of impacts and the description of environmental parameters in some areas of the FEIS.

Basis:

Additional documentation or analyses would be useful in the following areas:

- The DEIS assessments of impacts on faunal resources in Section 4.1.4 (Environmental Consequences of Repository Construction Operation and Monitoring and Closure—Impacts to Biological Resources and Soils) that are classified as “low,” “very small,” or “minimal and largely undetectable” are not supported by quantitative data. Individuals of a population that occur near the edge of its range (e.g., desert tortoises in the vicinity of Yucca Mountain) are living in marginal conditions, and therefore environmental stressors caused by the Proposed Action might have amplified effects in these edge areas.
- Section 4.1.6.2.1 (Environmental Consequences of Repository Construction, Operation and Monitoring, and Closure—Impacts to Employment), page 4-41 states “[i]f the present economic growth continued in the region of influence, it could absorb declines in the repository workforce.” To assess the adequacy of this statement, the assumptions used to generate the Regional Economic Models, Inc. (REMI) (Treyz et al., 1992) baseline results should be provided. The conclusion appears to require the assumption that the skills of displaced workers are compatible with the employment growth and needs of other sectors.

- Section 6.3.2.2.1 (Environmental Impacts of Transportation—Caliente Rail Corridor Implementing Alternative—Socioeconomics) states “[t]he projected length of the corridor—513 kilometers—is the most important factor for determining the number of workers (560) that would be required.” This statement is repeated for all corridors, but more specific information is needed to support this conclusion. Terrain and other factors might have significant impact, because productivity per worker (km/worker) varies considerably by route (e.g., 1.04 km/worker on the Carlin route, 0.53 km/worker on the Jean route).
- Section H.2.1.3 (Potential Repository Accident Scenarios: Analytical Methods and Results—External Events) of the DEIS concludes that 3 cm is the maximum thickness of volcanic tephra that could be deposited on repository facilities from a basaltic volcano that erupts within the area around the proposed repository site. The basis for this conclusion is a statement (DOE, 1998) that 3 cm of volcanic tephra is the worst-case event being considered. The conclusion appears not to be supported by data or analyses.

Recommendation:

The FEIS should improve the documentation and support for qualitative conclusions or assumptions related to impacts, as appropriate.

References:

- Treyz, G.I., D.S. Rickman, and G. Shao. The REMI economic-demographic forecasting and simulation model. *International Regional Science Review* 14(3): 221–253. 1992.
- U. S. Department of Energy. Viability assessment of a repository at Yucca Mountain. *Volume 2: Preliminary Design Concept for the Repository and Waste Package*. DOE/RW-0508. Washington, DC: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. 1998.

CULTURAL RESOURCES

10. **Comment:**

Documentation and analyses for the assessment of impacts to cultural resources are incomplete.

Basis:

Some DEIS conclusions regarding cultural resource impacts lack supporting analyses or reference material. Moreover, methods used to conduct the analyses and reach conclusions are not presented. The following are examples:

- Section 3.1.6.1 (Affected Environment—Archeological and Historic Resources) states that a field survey of a 44-km² (11,000 acres) parcel was conducted.

Clarifying information needs to be provided, including (i) the type of survey (e.g., walk-over); (ii) the percentage of coverage for the 44-km² area; (iii) the relationship of the survey area to the entire land withdrawal area; (iv) the relationship of this survey to the "additional archaeological surveys" conducted in Midway Valley, Yucca Wash, and lower Fortymile Canyon; (v) the extent and techniques used for these additional surveys; (vi) specification of the total survey area; and (vii) the extent to which sites have been identified for the complete land withdrawal area.

- Section 3.1.6.1 (Affected Environment—Archeological and Historic Resources) of the DEIS states that "826 archeological sites have been discovered in the analyzed land withdrawal area." This statement requires clarification. It is not clear whether the entire 600 km² parcel has been surveyed or whether the number of sites is on a smaller parcel of land. It is difficult to assess site density and cultural resources impacts without knowing the extent of the land area that has been surveyed.
- Section 3.1.6.1 (Affected Environment—Archeological and Historic Resources) states that limited test excavations were conducted at 29 sites. Clarification is required regarding the criteria used to select sites for testing and the representativeness of these sites for the potentially affected area.
- The Western Shoshone occupied the Yucca Mountain region into historic times and were engaged in mining, ranching, and other activities. The DEIS is unclear whether any of the historic sites are associated with the Western Shoshone or Paiute peoples or whether these sites are considered to be related only to non-Native American occupation activities.

Recommendation:

The FEIS should provide additional data and descriptions of methods used to assess impacts on cultural resources, including a description of the area of study used in assessing the distribution and types of cultural resources. If the entire land withdrawal area or the entire potential disturbed area was not surveyed for cultural resources, the rationale for not doing so should be presented.

LONG-TERM REPOSITORY PERFORMANCE

11. **Comment:**

The methodology for estimating the environmental impacts from the release and transport of toxic materials should be well documented in the FEIS. The estimates should incorporate the current waste package materials and design.

Basis:

The release and transport of toxic materials (chromium (Cr) and molybdenum (Mo)) from waste package corrosion to a receptor group was modeled using the EQ6

geochemical speciation code (Figure I-1). It is unclear how this code was used to estimate the corrosion products or the corrosion rate for toxic materials.

The assumed dissolution rates and mineral formation kinetics are critical to substantiating the claim that release and eventual exposure of a receptor group to the potentially toxic waste package corrosion products (e.g., chromate, molybdate) is minimal as stated in Section 5.6 (Environmental Consequences from Long-Term Repository Performance—Consequences from Chemically Toxic Materials).

We understand that DOE is expected to select Enhanced Design Alternative II (EDA-II) for the potential license application in the near term (TRW, 1999). EDA-II includes an outer overpack of 5 cm thick Alloy-22. The DEIS design includes a 2 cm thick inner overpack of Alloy-22, so the quantities of Alloy-22 will more than double, even assuming constant numbers of waste packages, if the EDA-II design is used. Because Alloy-22 is approximately 56 percent Ni by weight, the volume of Ni present in the repository is considerably more than the amount of Cr and Mo present. In addition, nickel (Ni) will also likely dissolve at roughly the same rate as Cr and Mo during corrosion. The FEIS should document that Ni does not pose a health risk.

Recommendation:

The discussion of toxic materials should be consistent with the current waste package design at the time of the FEIS. DOE should provide the technical basis for waste package corrosion rates, and should provide technical support for claims that exposure to potentially toxic materials released by waste package corrosion is minimal.

Reference

TRW Environmental Safety Systems, Inc. *License Application Design Selection Report*. B00000000-01717-4600-00123. Revision 01. Las Vegas, NV: TRW Environmental Safety Systems Inc. May 28, 1999.

REPOSITORY CONSTRUCTION, OPERATION AND MONITORING, AND CLOSURE

12. **Comment:**

Inconsistencies concerning the appropriate range for ^{222}Rn concentration should be remedied and impacts of thermal loading on radon release and worker safety should be explained in the FEIS.

Basis:

The median and range of ^{222}Rn concentrations used for radiological impact calculations are not consistent throughout the DEIS. Sections 3.1.8.2 (Affected Environment—Radiation Environment in the Yucca Mountain region) and F.1.1.6 (Human Health Impacts Primer and Details for Estimating Health Impacts to Workers from Yucca Mountain Repository Operations—Exposures from Naturally Occurring Radionuclides in the Subsurface Environment) of the DEIS report that radon

concentrations in the Exploratory Studies Facility (ESF) during working hours (with active ventilation) range from 0.22 to 72 pCi/L, with a median concentration of 6.5 pCi/L. Sections 4.1.2.2.2 (Environmental Consequences of Repository Construction, Operation and Monitoring, and Closure—Radiological Impacts to Air quality from Construction) and G.2.3.1 (Air Quality—Release of Radon-222 and Radon Decay Products from the Subsurface Facility) of the DEIS report that radon concentrations in the ESF during working hours with the ventilation system on range from 0.65 to 163 pCi/L, with a median concentration of 24 pCi/L. The difference is a factor of 2-3 in the range and a factor of approximately 4 for the median.

Section 4.1.7.3.1 [Environmental Consequences of Repository Construction, Operation and Monitoring, and Closure—Occupational Impacts (Involved and Non-Involved Workers)] of the DEIS states that “radiological health impacts to surface workers would be independent of the thermal load scenarios.” However, it is not apparent whether there was any consideration of higher heat loadings increasing the radon release rate from the wall surfaces. Table G-48 of the DEIS reports that the annual average radon releases during the 24-yr operation period are expected to be 880 Ci, 1000 Ci, and 1900 Ci for the high, intermediate, and low thermal loads. It also appears that these source terms did not take into account the relative volume of the repository under each heat loading alternative.

Recommendation:

The FEIS should explain or address inconsistencies related to the appropriate range for ²²²Rn concentration. The FEIS should also discuss the effects of the various heat loading scenarios on total radon release and provide a technical basis for the conclusion that radiological health impacts are independent of thermal load scenarios.

NO ACTION ALTERNATIVE

13. **Comment:**

The DEIS presents two scenarios, both of which DOE recognizes as unlikely, as a baseline to address the uncertainty associated with the management of SNF and HLW in the absence of a Yucca Mountain repository. Scenario 1 is a status quo of maintaining storage facilities continuously for the next 10,000 years. Scenario 2 proposes that these storage facilities would be maintained for 100 years, after which the 77 sites would be left without further management. Scenario 2 is not reasonable and, therefore, DOE should explain that it includes this scenario only to allow comparison with the analysis of the postclosure performance of the potential repository, which similarly is based on the highly unlikely and unreasonable assumption that institutional controls will be maintained only for 100 years.

Basis:

Scenario 2 assumes that, after a 100 year period, the Federal Government would permit SNF and HLW to be abandoned. This is not a reasonable assumption. The Federal

Government would continue to control licensed material and HLW under its authority for as long as necessary for public health and safety considerations.

Recommendation:

DOE should explain the basis for its identification of Scenario 2 as a potential no-action alternative: