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EIS001224

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

February 3, 2000

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Ms. Wendy R. Dixon, EIS Project Manager
Yucca Mountain Site Characterization Office
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
P.O. Box 30307, M/S 010
North Las Vegas, NV 89036-0307

Dear Ms. Dixon:

TVA ENDORSEMENT OF NUCLEAR ENERGY INSTITUTE (NEI) COMMENTS ON THE 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

TVA has reviewed and endorses comments made by NEI on the subject DEIS for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada. Since those comments are being transmitted directly to the Department of Energy from NEI, they are not repeated here.

TVA appreciates the opportunity to review and comment on the proposed DEIS. If you have questions, please contact Chuck Wilson at (423) 751-6153.

Sincerely,

Ralph H Shell
for
Mark J. Burzynski
Manager
Nuclear Licensing

cc: Mr. Steven P. Kraft, Director
Spent Nuclear Fuel Management
Nuclear Energy Institute
1776 I Street, NW, Suite 400
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NUCLEAR ENERGY INSTITUTE

EIS001224

Steven P. Kraft
Director,
Spent Nuclear Fuel
Management

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February 25, 2000

Ms. Wendy Dixon
EIS Project Manager
M/S 010, U.S. Department of Energy
Office of Civilian Radioactive Waste Management,
Yucca Mountain Site Characterization Office
P.O. Box 30307
North Las Vegas, Nevada
89036-0307

SUBJECT: Nuclear Energy Institute (NEI) comments on 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

Dear Ms. Dixon:

The Nuclear Energy Institute (NEI),[1] on behalf of the nuclear energy industry, is pleased to submit these comments to the Department of Energy (DOE) on the Draft Environmental Impact Statement (DEIS) - *Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca, Mountain, Nye County Nevada,* (64 Fed. Reg. 44,200- August 13, 1999).

This document is an important component of the Yucca Mountain decision-making framework. It constitutes the most recent and comprehensive summary of the impressive scientific research effort that DOE has conducted at Yucca Mountain over the past two decades. DOE has thoroughly evaluated the proposed action, which is vital to the national interest, and has found the environmental impacts to be so small as to have essentially no adverse impact on public health and safety. Long term radiation levels associated with the repository are shown to be less than 1% of naturally occurring background. It is also notable that DOE has reached this conclusion with a high degree of conservatism in its research. This is reflected in Appendix K of the DEIS in which DOE states that the impacts of potential radiation doses to the public near Yucca Mountain estimated in the

[1] NEI is the organization responsible for establishing unified nuclear industry policy on matters affecting the nuclear energy industry. NEI's members include all utilities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, nuclear material licensees, and other organizations and individuals involved in the nuclear energy industry.

DEIS "should be viewed as conservatively high; in fact, the uncertainties are such that the **actual level of impact could be zero.**" [emphasis added]
This DEIS should serve to facilitate DOE's continued efforts towards a national policy decision on Yucca Mountain next year as indicated in the DOE's 1998 Viability Assessment of Yucca Mountain, based on a competent technical and scientific analysis.

NEI and the nuclear energy industry have extensively reviewed this DEIS. The enclosed comments are offered to help DOE strengthen its presentation of the compelling scientific evidence, embodied in this document, that Yucca Mountain can effectively protect public health and safety.

DOE's comprehensive evaluation of the proposed action provides a sound basis in scientific fact and state-of-the-art analysis for concluding that the short- and long-term environmental impacts of the proposed repository are small. A broad communications effort to convey this point to the public should be undertaken by the Energy Department. Accordingly, DOE should enhance its presentation of this conclusion by providing greater clarity and synthesis of its results. We offer the following recommendations for accomplishing this:

- The final EIS should better explain the key steps leading up to its preparation in order to place the document in its proper context.

- The final EIS should summarize the analytical and scientific processes that led to its results.

- The final EIS should better synthesize results to place both radiological and non-radiological risks in perspective by giving readers a basis for comparison.

DOE has rigorously followed the requirements of the National Environmental Policy Act (NEPA) and Nuclear Waste Policy Act (NWPA) in preparing this DEIS. The agency's decision not to consider alternatives to Yucca Mountain in this EIS is completely consistent with the roadmap for completion of the NEPA process provided by Congress in the NWPA. DOE also has adequately addressed the issues and concerns raised during the EIS scoping period, comprehensively discussed the environmental impacts of the proposed action, and provided broad opportunity for public comment.

DOE has presented two "no action alternative" (NAA) scenarios in this DEIS that comprehensively bound the range of no action possibilities. There is no need, as suggested by some, for DOE to attempt to define and evaluate specific "more likely" scenarios within these bounds. Such additional analysis would not provide readers with any better means to make a comparison than that already given. The human health impacts of the proposed action are shown to be lower than the lowest possible health impacts of "no action" (Scenario 1) and the cost impacts of the proposed action are shown to be lower than the least costly "no action" possibility (Scenario 2). Instead of additional NAA analysis, the industry recommends that DOE augment the basis for comparison provided by this DEIS by discussing the impacts of the proposed action in the perspective

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of known and existing risks so that the proposed repository might be more effectively judged on its own merits.

Our enclosed comments explain each of the above topics in greater detail and also provide, for DOE's consideration, the following input:

- A statement concerning environmental benefits of the proposed action not addressed by this DEIS.
- Concerns regarding the extent to which DOE has overestimated several of the impacts described in this DEIS.
- Our basis for concluding that this DEIS adequately bounds the impacts of pending design changes.
- Our basis for concluding that the evaluation of transportation impacts in this DEIS is sufficiently thorough and bounding.
- Specific technical comments.

NEI looks forward to maintaining an active ongoing dialogue with DOE on items of mutual interest with respect to the proposed Yucca Mountain repository as the project moves closer to a suitability decision. We would be pleased to address any questions the agency may have on our comments.

Sincerely,

Steven P. Kraft

Enclosure

c: The Honorable Ivan Itkin, PhD., Director, DOE OCRWM
Mr. Lake H. Barret, Deputy Director, DOE OCRWM
J Russell Dyer, PhD., Manager, DOE Yucca Mountain Project

The Honorable George Frampton, Chairman, Council on Environmental Quality
Mr. William F. Kane, Director, NRC NMSS
Mr. Richard E. Sanderson, EPA Director of Federal Activities

ENCLOSURE

NUCLEAR ENERGY INSTITUTE (NEI)
COMMENTS ON
The US Department of Energy's
DRAFT ENVIRONMENTAL IMPACT STATEMENT
"Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada"

1... I. **The Draft Environmental Impact Statement contains significant and compelling scientific evidence that supports moving forward with a repository at Yucca Mountain. However, this evidence can be presented in a manner that better facilitates public understanding.**

DOE's Draft Environmental Impact Statement (DEIS) provides a comprehensive evaluation of the short- and long-term environmental and human health impacts of the proposed major federal action – the construction, operation, and closure of a deep geological repository for spent nuclear fuel and high level radioactive waste at Yucca Mountain, Nevada. The document's basis in scientific fact and state-of-the-art analysis is truly impressive. DOE found that both the short and long-term impacts of building and operating a repository at Yucca Mountain would be extremely small. This conclusion results from nearly two decades of intensive research by the world's top scientists. The products of this research have been effectively combined with cautious conservatism and broadly accepted expert analytical tools (such as Total Systems Performance Assessment) to produce a statement that should give decision-makers confidence in the ability of the proposed repository to safely store nuclear fuel and protect public health and safety.

The short-term environmental impacts, assessed for approximately a 100-year period, thoroughly consider repository construction, operation, monitoring and closure and were shown to be small. For example, DOE found that: air quality will be fully protected, below regulatory limits; groundwater and surface water impacts would be small; and both radiological and non-radiological occupational and pubic health and safety impacts would be well below regulatory limits.

The long-term impacts of the proposed action were evaluated for a period of 9,900 years beginning after repository closure (assumed to be 100 years after beginning of waste emplacement). The DEIS shows the long-term impacts to be small with the long-term performance of the proposed repository over 10,000 years resulting in a peak dose of 1.3 millirem per year to residents who may be located 5 kilometers from the repository. This peak dose is far below regulatory limits proposed by the

...1 Environmental Protection Agency (EPA) and Nuclear Regulatory Commission (NRC) and represents less than a 1 percent increase in the annual radiation exposure to residents living in the vicinity of Yucca Mountain.

2 This DEIS is important to all Americans, who are concerned about responsible management of nuclear waste. However, the scope and credibility of DOE's effort and the strength of its results are apparent only through an exhaustive review of this 833-page document, its 12 appendices, and numerous references. Those who are experienced in nuclear and geologic science, and endeavor to undertake such a review, will benefit from the exhaustive scientific research to demonstrate that a safe repository can be built at Yucca Mountain. However, the public may find themselves confused by the overwhelming amount of information presented in this document.

To reduce the potential for confusion and to provide decision-makers with a clear and concise analysis of the environmental impacts of the proposed action, we make the following recommendations.

1. The final EIS should explain the key steps leading up to its preparation in order to place the document in its proper context.

2. The final EIS should summarize the analytical and scientific processes that led to its results.

3. The final EIS should synthesize results to place both radiological and non-radiological risks in perspective by giving readers a basis for comparison.

The rationale behind each of these recommendations is explained in detail below.

Explaining key steps leading up to this EIS

3... This DEIS is not an isolated event in the Yucca Mountain decision-making process. It is, rather, a key link in an ongoing chain of events leading up to a presidential decision in 2001 on whether to approve the development of a repository at Yucca Mountain. The events that have preceded this DEIS form the foundation from which it was developed. Accordingly, a soundly based interpretation of this document can best be made in the context of these prior events.

Yet, as presented, the DEIS does not well establish its historical context for the public. Figure S-2 does present an accurate timeline that shows the major historical milestones, however, little discussion is provided. This leaves the public without an appreciation for the unique, single op-

...3 tion, nature of this DEIS for a federally mandated project. It is, therefore, not surprising that the public may question the fact that alternatives to Yucca Mountain, indeed to geologic disposal itself, are not considered in this document.

The answer to these questions is that DOE was mandated by Congress to consider no alternatives to Yucca Mountain in the required NEPA process. Congress was fully cognizant of the considerable previous study of alternatives when, in 1987, it directed DOE to study only Yucca Mountain and, in 1992, reaffirmed this direction. In directing DOE to study only Yucca Mountain, Congress specifically stipulated that DOE's EIS for the project need not consider alternatives to Yucca Mountain (see comment II). This decision had a sound basis. The 1980 EIS on "Management of Commercially Generated Radioactive Waste," the 1981 Record of Decision choosing mined geologic disposal, and the 1986 Environmental Assessments of five candidate geologic disposal sites (including Yucca Mountain) form the substantive technical and environmental policy basis available to Congress when it acted. The decade of scientific work that went into these previous NEPA actions was significant and conclusive. Although each of these actions are indicated in the timeline of Figure S-2, their meaning and importance is not communicated in the summary. This is unfortunate, since an understanding of decisions that have already been made would greatly assist the public in understanding the unique position this DEIS has as an information component in the Yucca Mountain decision-making process. DOE needs to assure that the decision-making framework already established is clearly communicated as an integral part of this DEIS.

Summarizing Analytical and Scientific Processes

4... People are naturally concerned about radiation and the handling of radioactive wastes. This concern has spawned a proactive safety culture in this nation's nuclear energy industry that is unmatched in any industry. The industry, decision-makers, and the public, set a high standard for demonstrating radiation safety. It is not enough to simply tell the nation that radiation exposures due to a proposed repository at Yucca Mountain will be low. DOE must explain how it reached this conclusion in a way that is credible, trustworthy and easy to understand. It is important that the sound technical and scientific processes that have led to the development of this DEIS be clearly communicated and understood by the public as well as decision-makers.

To better inform the public on the validity of the analyses presented, this document needs to describe how those numbers were calculated. It needs to discuss the following aspects of the work that went into preparing this document:

...4

- the qualifications of the scientists who collected and evaluated data,
- the precautions taken to assure that the work was accurate,
- the time and resources devoted to assuring that a sufficient amount of information was collected and considered,
- the conservative judgement exercised when uncertainties were encountered,
- the rigor with which internationally accepted research practices were adhered to, and
- the peer review to which the work was subjected.

Synthesizing Results and Putting Risk in Perspective

5

This DEIS effectively looks at a comprehensive range of impacts, both radiological and non-radiological, for the proposed action as well as the two "no action" alternatives. A summary of these impacts is presented in Table S-1. For the proposed action, impacts in 13 different categories are characterized either quantitatively or qualitatively. Quantitatively evaluated impacts are assigned numerical values in terms of latent cancer fatalities while qualitatively evaluated impacts are described as, "low," "small," "within regulatory limits," "slight," or "not disproportionately high." The public and decision-makers must sort through this array of varyingly described data points, assign meaning to each individual characterization, and integrate these into some overall conclusion regarding the overall impact of the building and operating a repository at Yucca Mountain.

While a better understanding of each of these impacts can be gained by reviewing the document's hundreds of pages and references, in the final analysis, no straightforward yardstick is offered for interpreting the impacts. No basis for comparison is offered other than the no action alternative and, while this is helpful in illuminating the societal benefit of the proposed action, it does not provide a sense of perspective for the risks associated with each of the 13 categories of impacts described. (See comment III regarding the no action alternative). Perspective on the impacts is important to assure understanding.

6...

In a traditional DEIS that compares a number of alternatives to a proposed action, as long as each category of impacts is characterized in common terminology, the reader is given a relative yardstick by which to evaluate alternatives against one another. However, this DEIS is not, and can not, be a comparison of multiple alternatives. This DEIS is unique in evaluating, as mandated by Congress, the environmental impacts of the building and operating a repository at Yucca Mountain and the impacts of not taking that action. Accordingly, DOE should provide some measure of comparison of the environmental impacts in order that

...6 the postulated impacts can be better understood as they relate to the decision-making process.

We recommend that DOE facilitate the synthesis of results by using common terminology to depict each of the 13 categories of impact (i.e. low – moderate - high; 0 to 10 with 10 being most severe; or some other method). This scale should be defined in commonly understood terms. Examples should be provided of things that regularly occur in our world and where they fit onto each segment of the scale. For radiological risks, DOE should provide comparisons to both other radiological and non-radiological risks. Care should be taken to include facilities and activities that have common characteristics with Yucca Mountain wherever possible (i.e., where there is a broad societal need for action to be taken). Secondly, having applied a common scale to all impacts, DOE should then summarize the results in a manner that places Yucca Mountain risks in perspective.

7 Our confidence in the results of this DEIS is not diminished by our concern with how these results are presented. Our expert review of the impressive collection of scientific evidence encompassed by this DEIS finds that it supports what the world's pre-eminent scientists have long-agreed upon: that deep geologic disposal is a safe way to manage used nuclear fuel. Yucca Mountain's remote location, limited rainfall, geologic features, and elevation about 1,000 feet above groundwater, make it an excellent site for a permanent geologic repository. It is imperative that DOE improve its presentation of this evidence, so that it can also be better understood and evaluated outside the scientific community. Understanding of the environmental impacts of the proposed action is essential for establishing the groundwork for a decision by our nation's elected and appointed leaders.

II. The Draft Environmental Impact Statement effectively satisfies the requirements of the National Environmental Policy Act and Nuclear Waste Policy Act.

8

The NWPA is very specific regarding how the requirements of the National Environmental Policy Act (NEPA) should be applied to the proposed Yucca Mountain repository. Specifically:

- Section 114(f) states that a final environmental impact statement (FEIS) shall accompany any recommendation to the President to approve a site for a repository and as such shall be considered a major federal action for the purposes of NEPA.

- Compliance with the procedures and requirements of the NWPA shall be deemed adequate consideration of the need for a repository, the time of initial availability of a repository and all alternatives to the isolation of high-level radioactive waste and used nuclear fuel in a repository. [Section 114 (f)(2)]

- For purposes of complying with the requirements of NEPA and Section 114 of the NWPA, the Secretary need not consider alternate sites to the Yucca Mountain site.

DOE's decision not to consider alternatives to Yucca Mountain in this DEIS is completely consistent with the provisions of the NWPA cited above. This is fully in compliance with DOE's responsibilities under NEPA, because when Congress enacted the NWPA, the NEPA requirements concerning the evaluation of alternatives had already been adequately addressed by the following:

- The 1980 EIS on "Management of Commercially Generated Radioactive Waste,"

- The 1981 Record of Decision opting for mined geologic disposal, and

- The 1986 Environmental Assessments of five candidate geologic disposal sites (including Yucca Mountain).

DOE has followed the requirements of NEPA by taking the following actions:

- EIS scoping hearings in Nevada and at various sites throughout the United States from August 29, 1995, to October 24, 1995. DOE solicited written and oral comments regarding the scope of the EIS from

9...

...9 the public during this period. The DEIS addresses the issues and concerns raised during the scoping period.

- An EIS must include a discussion of the environmental consequences of a proposed action. The Yucca Mountain DEIS includes a comprehensive analysis of the environmental impacts of the proposed action including short-term and long-term impacts.

- DOE has distributed the DEIS for comment to the general public, stakeholders, and to federal, state, tribal and local governments. DOE has actively solicited comments in verbal and written form (via mail, facsimile, or email). DOE has provided an ample opportunity, including numerous public hearings in Nevada and across the nation, for those interested in participating in the process to provide comments and express their views.

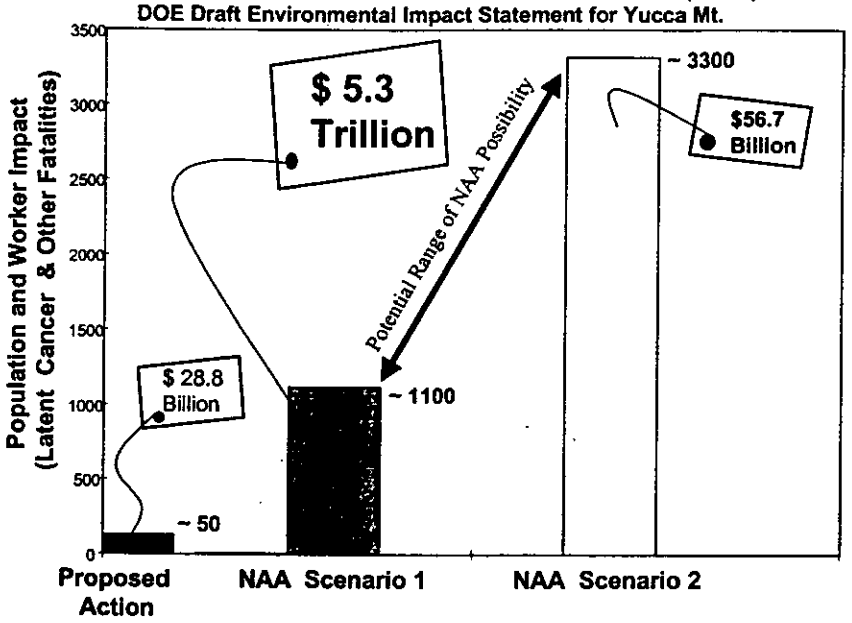
III. The Draft Environmental Impact Statement's evaluation of two No Action Alternative (NAA) scenarios adequately bounds the complete spectrum of no action possibilities.

10...

DOE included the two No Action Alternative (NAA) *"to provide a baseline for comparison with the Proposed Action."* The comparison provided demonstrates the tremendous societal benefit associated with the proposed action as opposed to doing nothing. These two scenarios adequately describe both ends of the full spectrum of "no action" possibilities. The NAA scenarios are comprehensive in describing the cost and environmental and human health impacts of the no action possibilities. NAA 1 sets the lower bound on environmental and human health impacts and the upper bound on the potential costs for the NAA. NAA 2 sets the upper bound on the environmental and human health impacts and the lower bound on the potential costs for the NAA. The human health impacts of the proposed action are shown to be lower than the lowest possible health impacts of "no action" (NAA 1) and the cost impacts of the proposed action are shown to be lower than the least costly "no action" possibility (NAA 2).

As part of the public hearing process, we understand that DOE has received some criticism for not constructing more realistic NAA scenarios. At the heart of much of this criticism is the realization that, in reality, society is unlikely to actually chose to take no action and simply leave spent fuel where it is over the long term. If the repository at Yucca Mountain does not go forward, society will "take some action" to manage spent nuclear fuel. DOE has recognized this in stating, regarding NAA Scenario 1 and 2, that *"neither scenario would be likely if there were a decision not to develop a repository at Yucca Mountain; however they are part of the EIS to provide a baseline for comparison to the Proposed Action."* In providing a basis for comparison through a bounding analysis, it is not necessary for DOE to address the likelihood of any specific "no action" possibilities or to attempt to identify the most likely outcomes. Any effort to be more specific within these bounds would only yield results that contain some combination of the costs and human health effects postulated for the two bounding scenarios, the net result of which will inevitably be higher impacts than for the proposed repository (as shown in Figure 1).

Figure 1
Comparative Costs and Impacts of
Proposed Action and No Action Alternatives (NAA)
DOE Draft Environmental Impact Statement for Yucca Mt.



A true "no action" alternative means that no actions are taken beyond what is currently being done at reactor and DOE sites to store spent nuclear fuel. To assume, for DOE's purposes herein, that some action would be taken on the part of utilities or DOE, would not be consistent with the "no action" alternative concept. In short, in the case of used nuclear fuel management, there is an irreconcilable conflict between undertaking "no action" and being realistic. Therefore, DOE's bounding approach is a sound, complete and effective way to address the "no action" concept.

...10

Rather than conducting additional "no action" analyses, a more valuable perspective would be provided for the public and decision-makers if DOE were to relate the risks and impacts of Yucca Mountain to other real risks and impacts that society already accepts (as we have recommended in Comment I).

11... **IV. The Draft Environmental Impact Statement does not address the tremendous environmental benefits of the proposed action**

In Comments I and II, we have discussed the fact that this is a unique DEIS in that it is an important step on the way to a national policy decision to be made at the highest levels. As such, it is important that DOE describe the impacts of building and operating a repository in the proper context. One aspect of context that is missing in the DEIS is a recognition that there are broader environmental issues associated with building a repository that relate to the importance of this decision to the future of nuclear energy and its societal benefits. At the present time, 103 operating nuclear plants supply approximately 20 percent of our electricity and also provide the following environmental benefits.

- The generation of electricity by nuclear power avoids the creation of 164 million metric tons of carbon equivalent per year. In absence of the nuclear contribution, the carbon emission reduction that would otherwise have to be attained to meet America's Climate Change Treaty obligation would double.

- Without nuclear power plants, required reductions in greenhouse gas emissions under the Kyoto Protocol from other sources must increase by more than 50 percent.

- Nuclear power plants avoid 2.4 million tons of nitrogen oxide and 5.1 million tons of sulfur dioxide annually and are important to meeting emissions reductions required by the Clean Air Act.

- Increased production and improved efficiency at nuclear power plants since 1993 represents one-third of voluntary carbon reductions from U.S. electric companies. Improved efficiency at nuclear power plants accounted for nearly half of voluntary carbon reductions by industry in 1998.

- In the EPA's acid rain program, 21 states had a 16.4 percent increase in nuclear generation from 1990 to 1995, helping to avoid 480,000 tons of sulfur dioxide or 37 percent of the required emissions reduction. Actual reductions achieved were 4.7 million tons or about 10 percent of the total. No clean air "credits" were allocated to these nuclear plants for this clean air benefit. Based on the average value of publicly traded sulfur dioxide credits, this emissions reduction by nuclear power plants would have been worth about $50 million.

- According to the Department of Energy's and the Energy Information Administration's report "Voluntary Reporting of Greenhouse Gases

...11 1997" (published June 1, 1999), the single most effective emission control strategy for utilities was to increase electricity production at nuclear power plants.

The industry recognizes that it is not possible to predict what effect a repository at Yucca Mountain would have on the prospects for future nuclear electric power generation. However, it can be said with certainty that those prospects – and the environmental benefits that come with them – would be stronger if the repository is built at Yucca Mountain. Clearly, the loss of even a small fraction of the environmental benefits of nuclear power would far outweigh the environmental impacts of the building a repository at Yucca Mountain.

We further recognizes that it is well beyond the scope of this EIS to attempt to evaluate the affects that taking, or not taking, the proposed action might have on future nuclear power generation. We are not requesting that DOE do this. Yet, the existence of broader environmental benefits should, at a minimum, be recognized in the Final EIS.

12 **V. Even though the Draft Environmental Impact Statement finds the impacts of the proposed action to be small, it has significantly overestimated these impacts in several respects.**

In conducting the performance assessment and other analyses that led to the determination of impacts presented in this DEIS, DOE has built in a number of conservative assumptions intended to establish a certain margin of confidence in the results. We fully agree with the need to do this, because knowing that such margin exists is vital to establishing confidence in the results in the face of uncertainty that results from a first-of-a-kind project that must consider possible impacts for thousands of years. However, DOE needs to better explain the existence and purpose of such margin, while also assuring that an excessive amount of margin is not applied. It is important that it be understood that the margin applied in the DEIS includes some overly conservative assumptions. Absent such conservatism, the impacts would have been much smaller, if not zero. Changes are needed to assure that the results of this EIS are presented with the proper perspective. DOE should review its analysis to assure that margin is both appropriate and clearly described throughout the Final EIS; there are three specific areas in which NEI believes changes are needed.

Transportation Impacts

13... DOE NEPA guidance to consider 1 in 10 million events is inconsistent with public policy elsewhere. Considering that used fuel will be transported for a relatively short period of time, the chances that such a "worst-case accident" might occur is essentially zero. The chances of such a fatal accident are far less than those of loss of life due to meteor impact, which has a probability of occurrence of 1 in 100,000 years*. To find such an improbable accident to analyze, DOE had to go farther into the realm of the incredible than they will be required to do by the responsible regulatory authorities**. The extreme conservatism of going beyond what is reasonable, in postulating worst case accidents, forces DOE to consider severe transportation accident scenarios that are not credible thereby increasing the calculated environmental impacts and effects to non credible levels.

* United States Atomic Energy Commission, Reactor Safety Study, WASH-1400, August 1974

** For example, NRC has proposed, in updating its Reactor Safety Goal Policy Statement, requiring licensees to evaluate large early release events having a probability of 1 in 10,000 or greater.

...13 DOE's analysis of these highly improbable severe transportation accidents also assumes no mitigation, which is misleading. In reality, a swift and comprehensive emergency response would follow any severe transportation accident. While DOE must consider the full impacts of a postulated severe transportation accident, DOE should also include the results of mitigation measures related to emergency response.

If DOE believes it is required to leave analyses in the FEIS that consider 1 in 10 million events, the FEIS should, at a minimum, also describe the effects at higher, more realistic probabilities.

14 Repository Accident

In its analysis of radiological consequences for repository operations accident scenarios, DOE again considers accidents with probabilities of 1 in 10 million, thereby increasing the calculated worker and public health effects associated with such an accident above and beyond what is credible.

If DOE believes it is required to leave analyses in the FEIS that consider 1 in 10 million events, the FEIS should, at a minimum, also describe the effects at higher, more realistic probabilities.

15... Use of collective dose to calculate radiological impacts

Appendix K of the DEIS states that the impacts of the radiological population doses estimated in the DEIS "should be viewed as conservatively high; in fact, the uncertainties are such that the **actual level of impact could be zero.**" [emphasis added] This fact should be included in the Summary and Volume I of the DEIS. Further, this conservatism in the estimates of the radiological impact should be more clearly identified and explained in plain language.

The following statement from Appendix K is one example of such a clarification, that needs to be brought forward and integrated into the conclusion of the DEIS to establish appropriate context, is :

> "The dose-to-risk conversion factors typically used to estimate adverse human health impacts resulting from radiation exposure contain considerable uncertainty. The risk conversion factor of 0.0005 latent cancer fatality per person-rem of collective dose for the general public is based ... on health effects observed in the high dose and high dose rate region. Health effects were extrapolated to the low-dose region (less than 10 rem per year) using the linear no-threshold model. This model is generally recommended by the In-

ternational Commission on Radiological Protection and the National Council on Radiation Protection and Measurements, and most radiation protection professionals believe this model produces a conservative estimate (that is, an overestimate) of health effects in the low dose region..."

In clarifying this statement, DOE should recognize that the use of the linear no-threshold dose response model is conservative and, thus, DOE used that assumption in assessing human health effects associated with the proposed action. The view that the dose response model assumed results in a conservative estimate of the human health impacts is an important factor in explaining the radiological consequences of the proposed action to members of the public. This conservatism in the calculated effects should be clearly stated in the Summary and in Volume 1 of the EIS and not only in an appendix.

16 **IV. Repository Design Enhancements currently planned by DOE will further reduce the impacts of the proposed action from what has been indicated in the Draft Environmental Impact Statement.**

From the numerous hearings that DOE has held on this EIS, the Department has received a number of comments that this DEIS is based on a preliminary design. It is entirely appropriate that DOE issue this EIS at this point in the Yucca Mountain decision-making process. However, DOE should clarify the distinction between NEPA documentation – which is input to a forthcoming national policy decision – and design documentation, which is engineering work related to the design development process that would occur after a decision is made (depending on the decision). This engineering work will be extensively and publicly evaluated in the NRC licensing process that will follow if Yucca Mountain is selected. The NEPA process should not be confused as a substitute for the NRC licensing process.

To this end, DOE should add a concise description of the NEPA process and the role it plays in this decision-making to the EIS summary. In doing so, DOE should point out that it is to the advantage of all interested parties, including those currently questioning the use of preliminary design information, to have the opportunity to provide input to the process early on – before the design has been finalized.

DOE should also explain the role of the EIS in future design evolutions including the following points:

17... • The purpose of the NEPA analysis is to assess the potential environmental effects of the proposed action.

18 • It is expected that the repository design will continue to evolve even after completion of the FEIS, which will be reviewed in the repository site recommendation and, if approved, repository licensing.

19 • It is expected that these design evolutions will be undertaken with full knowledge of the potential environmental impacts.

• DOE's analysis of three possible thermal loading scenarios and their short and long-term effects was included to bound the Viability Assessment (VA) design as well as other design alternatives under consideration by DOE.

...17 • DOE must ensure that the effects for any future evolution of the repository design are bounded by the effects shown in the EIS, or perform a supplemental EIS. It is not necessary that the final repository design be complete before the DOE and the President make a decision on the proposed action.

20 **VII. The Draft Environmental Impact Statement evaluations of National and Nevada-specific transportation are thorough, enveloping and provide a sound basis for proceeding to determine and evaluate actual routes.**

We understand the public concern regarding what has become one of the most often discussed aspects of the federal used fuel management program – used nuclear fuel transportation to Yucca Mountain. It is important that DOE be responsive to this concern. In conducting a thorough and comprehensive evaluation of used nuclear fuel transportation in this DEIS, DOE has taken an important first step in this direction. Opportunities to take additional steps will occur following the FEIS if Yucca Mountain is approved. Accordingly, there are three reasons that the Department should not yield to requests for a more specific evaluation of transportation routes in this EIS:

1. To do so would be to go beyond the scope of NEPA (to provide input to a decision) and to venture into route planning (to proceed with repository design, construction and operation). The purpose of a NEPA analysis is to assess the potential environmental and human health effects of a proposed action.
2. Bounding analysis, such as that DOE has conducted is appropriate for the purposes of NEPA.
3. The details of used nuclear fuel transportation can and should be more appropriately addressed in other venues subsequent to the NEPA process (specific route planning interactions with state and local governments, NRC licensing, etc.)

21 Because the EIS has adequately addressed the possible transportation impacts through bounding analysis, no supplement to this EIS should be made to address specific transportation routes.

Because the transportation of spent nuclear fuel is a subject of considerable public concern, DOE should put the transportation risk into perspective (as suggested in Comment I) with other non-voluntary risks that might be better understood by the general public. It should be evident, and clearly identified, that the risk associated with the transport of spent fuel as part of the proposed action is small. It may also be useful to put into perspective the less than 1 in 10 million probability of the severe transportation accident evaluated in the analysis (such as comparing it to the chance of a meteor striking a person as mentioned in Comment V above).

22 Our confidence that this EIS has thoroughly and appropriately addressed transportation impacts is based on the following observations.

- The DEIS included a comprehensive evaluation of the national and Nevada-specific transportation impacts. The transportation analyses included an assessment of impacts of incident free transportation, accident analysis, etc., and is consistent with the transportation analysis in other DOE EISs. For example, DOE's approach to providing route analysis for national transportation is consistent with the transportation route analysis performed in the DOE Final EIS for another program, "*DOE Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs FEIS*,DOE/EIS-0203-F, April 1995.

23 - The DEIS adequately addresses the potential consequences and effects associated with spent fuel transportation by assessing two diverse transportation alternatives, Mostly Rail and Mostly Truck scenarios. It is not necessary for the DEIS to identify specific transportation routes. As long as the DEIS evaluates the range of potential transportation impacts, DOE has done an appropriate NEPA analysis. The actual selection of transportation routes will take place at a future date. If, during the route planning process, a routing scenario is identified that has significant impacts not addressed or bounded by the evaluation in this EIS, then a supplemental analysis will be done at that time.

24 - Spent nuclear fuel has been transported safety in the U.S. and internationally for more than 35 years.

25 - The U.S. and international experience in shipping spent nuclear fuel is directly applicable to the future shipments associated with the proposed action. While the cask designs used in the proposed action may be different from those casks used in the past, and the distances shipped may be longer or shorter, the regulatory framework to which all spent nuclear fuel transportation casks are designed remains the same. This experience provides confidence that transportation casks can survive in the event of a severe transportation accident.

26... - Although DOE has been criticized for not clearly identifying the national highway and rail shipping routes in the DEIS, it is evident that DOE has indeed performed point-of-origin to point-of-destination analyses for transporting spent nuclear fuel from reactor and DOE sites to the proposed Yucca Mountain site. DOE has provided a summary of the total distances for both highway and railway ship-

...26 ments from each site to the proposed Yucca Mountain repository. Where appropriate, DOE has also considered the possibility of shipment via barge to rail inter-modal transfer. As discussed above, this bounding analysis is appropriate for a NEPA document.

27 • DOE provided extensive route-specific analysis for the Nevada transportation.

28 Confidence in the robustness of this evaluation would be further bolstered if the following improvements were made in the FEIS.

- DOE should include a discussion in the FEIS regarding the inherent safety of spent fuel transportation, given the comprehensive regulations that govern spent fuel transportation and the robust packages that will be used to transport SNF and HLW. The safety record associated with historical spent nuclear fuel shipments will provide an additional level of assurance to members of the public who are concerned about spent fuel transportation safety. This discussion should also include a description of the emergency planning and emergency response training that will accompany spent nuclear fuel shipments associated with operation of the proposed repository.

29 • DOE should address the fact that the mostly rail scenario is more likely than the mostly truck scenario. This is because most reactor sites, even those that do not now have the ability to handle rail casks, will likely modify cask handling capability to be able to handle 100 to 125 ton transportable storage systems. These upgrades will facilitate the use of rail casks for transportation. NEI would be pleased to provide examples of some sites that have upgraded or are in the process of upgrading sites and or plans.

VIII. There are a number of specific opportunities for the Department to further strengthen this Environmental Impact Statement

In addition to the overall recommendations made above, we offer the following specific comments for DOE's consideration.

30 DOE appropriately considered total inventories of high level radioactive waste and used nuclear fuel in this DEIS

While the proposed action is limited to the emplacement of the equivalent of 70,000 MTU of spent nuclear fuel and high-level radioactive waste, the DEIS also addresses the cumulative impacts associated with the disposal of the total projected waste inventory from all other sources. While the emplacement in Yucca Mountain of these additional materials above the 70,000 MTU allowed by the NWPA would require operation of a second repository (NWPA Section 114(d)) or legislative action by Congress, the inclusion of these materials in the DEIS is appropriate as it provides information for future actions and decisionmaking regarding the disposal of these materials.

31 DOE should increase the size of the early receipt facility in case lag storage needs increase due to delays or to accommodate future evolutions in repository and waste package design.

The DEIS considers the possibility of early receipt of spent fuel at the proposed Yucca Mountain repository. The early receipt facility would be capable of storing as much as 10,000 MTU of spent nuclear fuel and high-level radioactive waste in concrete storage modules. Possible changes under consideration for the repository and waste package design may result in the need for lower heat-load waste packages being emplaced in the repository. DOE should consider including an analysis of the impacts associated with a larger capacity early receipt facility in order to provide adding cooling of spent fuel to meet the needs of possible repository design evolutions.

32... We endorse DOE's treatment of sabotage and security risks in this EIS.

A system of safeguards and regulations exist to ensure the safety of the public, handling personnel, and the environment before transport, during transport, and upon arrival of the transport package at its end destination. NRC will be the lead agency in assessing spent nuclear fuel shipment safety, safeguards, and security.

Some of the measures that will ensure safeguarding of spent fuel shipments include:

...32

- Periodic updating of route conditions to facilitate use of alternative itineraries en route as conditions warrant.

- Route approval and security arrangements for each shipment that must be approved by NRC

- Use of armed escorts in urban areas.

- Requirements that State and local authorities be notified of shipments.

- Vehicle design features that would prevent the unauthorized movement of trucks carrying spent nuclear fuel (locking devices on trucks used to transport SNF).

33

NRC's ongoing update of the Modal Study does not affect this EIS.

The NRC is in the process of updating the report, "Shipping Container Response to Severe Highway and Railway Accident Conditions", NUREG/CR-4829, February 1987 (Modal Study). DOE used the Modal Study for its analysis of severe transportation accident impacts. The results of this update are not expected to be available to include in the FEIS. It would not be appropriate for DOE to delay the FEIS to await the NRC's updated Modal Study. The results of the existing study are a valid reference for assessing severe transportation accidents. While the updated study will address new cask designs and new information, the overall results are not expected to change significantly. If, after the Modal Study update has been released, DOE determines that its transportation analysis is affected by the results of the new information, DOE should then perform a supplemental EIS.

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