



## **Comments on the Draft EIS on the Yucca Mountain Repository (DOE/EIS-0250D)**

These comments of the Institute for Energy and Environmental Research (IEER) on the Draft Environmental Impact Statement on the Yucca Mountain Repository (EIS) are organized into two parts. Dr. Yuri Dublyansky, a geologist, has prepared comments for IEER on the EIS. [His comments are attached.](#) They are an integral part of the first portion of the following comments. Citations provided in that attachment will not be repeated here.

The Draft EIS of the Department of Energy (DOE) on the Yucca Mountain Repository is premature, scientifically unsound, fundamentally deficient, and improperly dismisses a crucial environmental justice issue. These conclusions are illustrated by the following points, which are discussed in more detail after the list:

1. The Draft EIS is premature because the basic scientific work needed to assess the environmental impact of the repository has not been completed. Some of it is still the subject of intense scientific controversy, research and debate. Essential questions must be resolved before the impact of the repository can reasonably be assessed.
2. The Draft EIS is scientifically unsound because it has ignored or improperly dismissed published peer-reviewed data, ignored lines of inquiry, not established a valid basis for uncertainty analysis, and failed to consider any redundancy in systems, which may result both in lower uncertainties and better containment.
3. The Draft EIS is fundamentally deficient because it has not considered some of the most significant environmental impacts, ignored relevant alternatives, and ignored many problems associated with human intrusion.
4. The Draft EIS has improperly dismissed a crucial environmental justice issue without due consideration of President Clinton's executive order on environmental justice.

### **1. and 2. The EIS is premature and scientifically unsound**

The presumption in the Draft EIS is that the repository will be unsaturated – that is it will not at any relevant time have a significant probability of flooding with water. As the [attached comments by Dr. Yuri Dublyansky](#) show, the DOE's assumption is unsound. The DOE's reasoning in summarily dismissing the evidence for repository flooding in the geologic past is based on misleading and selective use of information. There is a good deal of evidence indicating flooding of the repository. There is also some evidence of relatively recent flooding (in geologic terms). The entire Yucca Mountain repository program is based on the assumption of an unsaturated repository. Given the centrality of this issue, the DOE should re-issue a draft EIS with its analysis of the environmental consequences of such flooding, so that



the public can evaluate it on its merits.

Moreover, as is noted in Dr. Dublyansky's comments, the DOE has ignored the ongoing work that it has commissioned and is being performed by Dr. Jean Cline at the University of Nevada, Las Vegas. This DOE-funded program of research followed the publication of a report on the subject by Dr. Dublyansky that was commissioned by IEER. The results of that work were published by IEER in December 1998. The DOE project aims to confirm or negate earlier findings of hydrothermal incursions of groundwater into the repository horizon as well as to determine the date(s) in the geologic past when such incursion(s) might have occurred. The preliminary data from this work confirm the earlier work of Dr. Dublyansky. The project has not yet determined any dates for the hydrothermal events. The UNLV research will not be complete until well into 2001. Yet the DOE plans to publish its final EIS in the year 2000.

With the major exception of geologists involved with the Yucca Mountain Project, there is now widespread agreement that at some time in the geological past there were likely to have been hydrothermal incursions into the Yucca Mountain repository region. One or more such incursions in the future would utterly alter the analysis of repository impacts. This is therefore a crucial factor in projecting the performance of the proposed repository.

Were the issue being considered a marginal one, this sequence might, in some circumstances be considered acceptable. However, the questions of saturation and time of saturation are the central ones in determining repository performance. The Draft EIS is therefore premature. It should be re-issued in late 2001, at the earliest, after the UNLV findings have been published, peer-reviewed and their significance for the proposed repository has been carefully assessed.

If a Final EIS is completed without the data and analysis on hydrothermal incursions being fully taken into account in the assessment of impacts, the FEIS will be so basically deficient as to be invalid.

Besides the issue of hydrothermal incursions, the DOE needs to take fully into account the potential for the metal canisters to corrode in relatively short time periods (say, a few hundred years or less) if the repository is unsaturated but far more humid than has been assumed. Further, under such circumstances, the DOE also needs to factor in the potential for the rapid disintegration of the borosilicate glass waste form due to hydration aging. <sup>[1]</sup> Finally, the DOE needs to factor in the potential for far more rapid migration of plutonium and other actinides than has been assumed.

### **3. The EIS is fundamentally deficient**

Both of DOE's "no action" scenarios are straw men designed to orient the decision to "yes" for Yucca. Scenarios need to be plausible at least.

Inadvertent human intrusion is more likely to occur into or near the repository location because of the scarcity of groundwater resources in Nevada and possibly because of mineral deposits in the general area. The impact of human inadvertent human intrusion needs to be more carefully considered. It is unlikely that barriers and markers would endure for thousands of years. While there are instances of monuments enduring for thousands of years, there are many more instances of monuments disappearing altogether. The EIS needs to have a more realistic assessment of inadvertent human intrusion problems and a fuller description of the potential impacts not only on the hypothetical intruders, but also on other members of the public, after the intrusion has occurred.



The “no action” Scenario 1 of institutional control for 10,000 years on site is absurd and without historical foundation. The second “no action” alternative assumes on site storage for 100 years and loss of control after that. It assumes that society will take no action to protect the plutonium or the waste. This is equally absurd, given that huge quantities of weapons-usable plutonium are present in the waste and that the radiation barrier to the recovery of the plutonium will be sharply reduced after a few hundred years due to the decay of cesium-137 (half-life: about 30 years).

DOE recognized in its EIS that these scenarios are unlikely and that society would consider other ways of handling this problem. It dismissed these as “speculative” (p. S29). This is a deeply flawed argument. First the DOE’s “no action” scenarios are not truly “no action”. Both scenarios would require the US government to take control of the waste and put in place institutional and other control measures. It will likely have to build new storage facilities. The true “no action” alternative would be to leave the fuel in the control of the utilities, where it is today. There are a number of downsides to this, as there are to every alternative. A scenario having downsides is not a bar to its consideration under NEPA. On the contrary, a part of the objective is to illustrate both the advantages and disadvantages, so an environmentally sensible decision can be made.

IEER believes that the EIS should consider the no action alternative of leaving control on-site with utilities, which may then be expected to minimize their liabilities in various ways, instead of the two spurious and entirely implausible scenarios that it has set up. Moreover, the calculation of the impacts of these scenarios is highly speculative. In IEER’s view it is so speculative as to be without significant scientific merit. It cannot provide a rational basis for decision-making in a NEPA document.

Further, the EIS needs to consider the possibility that Yucca Mountain is found unsuitable in a more realistic framework other than a “no action” alternative. It is not speculative to say that alternative means of management and disposal would be considered if Yucca Mountain were found unsuitable. Some of these means are well-known and documented in the literature. For instance the 1983 National Research Council report on geologic isolation <sup>[2]</sup> examined a number of different geologic types and locations. As another example, IEER has published an entire plan of research and development so that alternatives may be considered within the framework of sound science and long-term management goals. The IEER plan is an integral part of these comments and is [attached](#).

DOE should create a set of realistic alternatives in case Yucca Mountain is not found suitable. IEER recognizes that DOE cannot examine another specific repository due to legal restrictions placed upon it. However, as IEER’s alternative waste management plan has shown, much can be done to define alternative paths to long-term management without considering other specific repository locations.

IEER applauds and appreciates the fact the DOE evaluated peak doses for up to 1 million years and did not restrict itself to the arbitrary time limit of 10,000 years in the draft EPA Yucca Mountain standard. The 10,000 year limit has been rejected more than once by the National Research Council and by many others, including IEER. This feature of the EIS should be maintained.

The DOE has not chosen the location of the maximally exposed individual conservatively. That individual should be located at the site boundary and not 5 kilometers away. [IEER’s comments on the EPA draft Yucca Mountain rule](#) are attached and are an integral part of these comments on the Yucca Mountain Draft EIS.



The DOE's analysis that the primary radiological impacts would occur from the water pathway is not correct for collective population doses. The EPA Science Advisory Board report on carbon-14 emissions from Yucca Mountain showed that, while the individual doses from carbon-14 emissions would be tiny, the collective global doses would be immense. Based on the linear no-threshold hypothesis, which is the basis for current radiation protection standards, and which is also the modeling approach recommended in the BEIR V committee report,<sup>[3]</sup> carbon-14 collective doses would be estimated to cause thousands of cancer fatalities.<sup>[4]</sup> These estimates cannot be ignored in the Draft EIS.

Moreover, the Draft EIS not only dismisses the potential for the repository to be saturated in the future; it does not discuss at all the possibility that upwelling contaminated water may outcrop at the surface (see [attached analysis by Dublansky](#)). Such an outcrop could contaminate large land areas, depending on the amount of upwelling water and the location of the outcrop. The DOE should consider land and surface water contamination impacts on the human population of such outcroppings as well as underground water contamination due to repository flooding, in its evaluation of which pathway would be the one to deliver the maximum individual dose. The DOE should also consider the larger ecological impacts of outcropping of contaminated water. These could be diverse and vast.

#### 4. Environmental Justice

We do not believe that referring to a Supreme Court decision regarding Western Shoshone land is sufficient consideration of the environmental justice issue. The Supreme Court has historically made decisions that have reflected prevailing social opinions that have been highly discriminatory and unjust – as in its support of slavery, segregation, and internment of Japanese Americans. That these decisions have been unjust has been acknowledged by the Supreme Court in its reversals of such decisions after decades.

The fact the Western Shoshone themselves have not accepted any money in compensation for their land should provide enough basis for a deeper consideration of their claims. The basis for this consideration in an EIS rests both in the presidential order on environmental justice and in the historical record of Supreme Court decisions and reversals on issues relating to oppressed minorities in the United States. The consideration of this issue in depth does not mean that DOE is not “abiding by” a decision of the Supreme Court. It will simply put the Supreme Court decision in historical context. IEER believes that full consideration of the issue in a historical context is required in the EIS in view of the presidential directive on environmental justice.

#### Also on this website:

- [Comments on the Yucca Mountain Draft EIS by Dr. Yury Dublansky](#), United Institute of Geology, Geophysics and Mineralogy, Russian Academy of Sciences, Siberian Branch
- [IEER's comments on the EPA draft Yucca Mountain rule](#)
- [Letter to the BEIR VII Committee](#) (Biological Effects of Ionizing Radiation) of the National Academy of Sciences

#### Notes:

1. Arjun Makhijani, *Glass in the Rocks : Some Issues Concerning the Disposal of Radioactive Borosilicate Glass in a Yucca Mountain Repository*, prepared for the Nevada Nuclear Waste Task



- Force and the Nevada Agency for Nuclear Projects, Nuclear Waste Project Office, State of Nevada. Takoma Park, Maryland: Institute for Energy and Environmental Research, January 29, 1991. [? Return](#)
2. National Research Council, Commission on Physical Sciences, Mathematics, and Resources, Board on Radioactive Waste Management, Waste Isolation Systems Panel, *A Study of the Isolation System for Geologic Disposal of Radioactive Wastes*. Washington, D.C. : National Academy Press, 1983. [? Return](#)
  3. National Research Council, Commission on Life Sciences, Board on Radiation Effects Research, Committee on the Biological Effects of Ionizing Radiations, *Health Effects of Exposure to Low Levels of Ionizing Radiation : BEIR V*. Washington, D.C. : National Academy Press, 1990. [? Return](#)
  4. United States Environmental Protection Agency, Science Advisory Board, *An SAB Report : Review of Gaseous Release of Carbon-14 : Review, by the Radiation Advisory Committee, of the Release of Carbon-14 in Gaseous Form from High-Level Waste Disposal*, EPA-SAB-RAC-93-010. Washington, DC, April 1993. [? Return](#)