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Final

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

Volume III
Comment-Response Document
Part 2 - Chapters 1 through 6

U.S. Department of Energy
Office of Civilian Radioactive Waste Management

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ACRONYMS AND ABBREVIATIONS

To ensure a more reader-friendly document, the U.S. Department of Energy (DOE) limited the use of acronyms and abbreviations in this environmental impact statement. In addition, acronyms and abbreviations are defined the first time they are used. The most common acronyms and abbreviations used in the text of this document are listed below.

CFR	Code of Federal Regulations
DOE	U.S. Department of Energy (also called *the Department*)
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FR	*Federal Register*
LCF	latent cancer fatality
MTHM	metric tons of heavy metal
NEPA	National Environmental Policy Act, as amended
NRC	U.S. Nuclear Regulatory Commission
NWPA	Nuclear Waste Policy Act, as amended
PM_{10}	particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 micrometers or less
REMI	Regional Economic Models, Inc.
RMEI	reasonably maximally exposed individual
Stat.	United States Statutes
TSPA	Total System Performance Assessment
U.S.C.	United States Code

UNDERSTANDING SCIENTIFIC NOTATION

DOE has used scientific notation in this EIS to express numbers that are so large or so small that they can be difficult to read or write. Scientific notation is based on the use of positive and negative powers of 10. The number written in scientific notation is expressed as the product of a number between 1 and 10 and a positive or negative power of 10. Examples include the following:

Positive Powers of 10	**Negative Powers of 10**
$10^1 = 10 \times 1 = 10$	$10^{-1} = 1/10 = 0.1$
$10^2 = 10 \times 10 = 100$	$10^{-2} = 1/100 = 0.01$
and so on, therefore,	and so on, therefore,
$10^6 = 1{,}000{,}000$ (or 1 million)	$10^{-6} = 0.000001$ (or 1 in 1 million)

Probability is expressed as a number between 0 and 1 (0 to 100 percent likelihood of the occurrence of an event). The notation 3×10^{-6} can be read 0.000003, which means that there are three chances in 1,000,000 that the associated result (for example, a fatal cancer) will occur in the period covered by the analysis.

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Proposed Action

1. PROPOSED ACTION

1.1 Purpose and Need for Agency Action

1.1 (34)
Comment - 11 comments summarized
Commenters stated that the EIS does not adequately justify the need for a geologic repository.

Response
As described in Chapter 1 of the EIS, Congress determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to permanently dispose of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act states that the Federal Government must take precautions to ensure that these materials do not adversely affect this and future generations.

The passage by Congress of the original Nuclear Waste Policy Act of 1982 established the need for a geologic repository. But this policy was developed only after years of careful consideration of other disposal methods. DOE examined these alternatives, including disposal in salt domes, on islands, in oceanic trenches, in ice sheets, by transmutation, by injection into deep holes, and by launching the waste into outer space, in a 1980 EIS (DIRS 104832-DOE 1980). A 1981 Record of Decision to that EIS determined that DOE would pursue mined geologic disposal (46 *FR* 26677, May 14, 1981) (see Section 1.3.1 of the EIS). Virtually every expert group that has examined the disposal of high-level radioactive waste (including spent nuclear fuel) has agreed that a geologic repository is the best approach. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). The panel's report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001), reaffirms this position. The National Research Council maintains that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

The Nuclear Waste Policy Act, as amended (NWPA), addresses how certain National Environmental Policy Act requirements apply to the proposed Yucca Mountain Repository. In particular, the Act specifies that DOE need not consider in the EIS the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain.

1.1 (40)
Comment - 2 comments summarized
Commenters suggested that Section 1.3 of the EIS discuss repository siting activities at Lyons, Kansas, including why the site was not developed and lessons that can be applied to the Yucca Mountain project.

It was also noted that the determination that a mined deep geologic repository is the best treatment alternative offers information from analyses that are at least 20 years old. If newer studies or reviews have been completed, or if other findings support or dispute these conclusions, the EIS should reference them. In light of the technological advancement, should other alternatives be considered?

Response
The research studies conducted in a Lyons, Kansas, salt mine led to a better understanding on the potential for use of bedded salt deposits for the disposal of high-level radioactive waste. Lessons learned from that research were incorporated in the technical basis for disposal of radioactive waste and into the siting guidelines for a repository, which have evolved since then.

Virtually every expert group that has examined the disposal of high-level radioactive waste (including spent nuclear fuel) has agreed that a geologic repository is the best approach. For more than 40 years, the National Academy of Sciences (NAS), through the National Research Council, has conducted studies on high-level radioactive waste and spent nuclear fuel. Over the course of this period, the Academy has repeatedly mentioned geologic disposal as the

preferred method for managing this waste. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). Their May 2001 report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001), reaffirms this position. The Academy maintains that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

1.1 (85)

Comment - 3 comments summarized

Page 2-69, Section 2.3.1 of the EIS contains a reference to a 1990 National Research Council report. Commenters requested clarification regarding the composition of the National Academy of Sciences panel that made the statement, "there is a worldwide scientific consensus that geologic disposal, the approach being followed by the United States, is the best option for disposing of high-level radioactive waste." A commenter also requested that DOE revisit the alternatives that were dismissed in 1981.

Response

The National Academy of Sciences is a private, nonprofit society of distinguished scholars engaged in scientific and engineering research. The Academy is dedicated to the advancement of science and technology, and to the use of science and technology to promote the general safety and wellbeing. On the authority of the charter granted to it by Congress in 1863, the Academy has a mandate that requires it to advise the Federal Government on scientific and technical matters. The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purpose of furthering knowledge and advising the Federal Government. The 1990 report by the National Research Council was prepared the Board on Radioactive Waste Management, a permanent committee of the National Research Council. In July 1988, the Board convened a week-long study session in Santa Barbara, California, where experts from the United States and abroad joined the Board on Radioactive Waste Management in intensive discussions on U.S. policies and programs on high-level radioactive waste management. The report issued by the National Research Council in 1990 was based on those discussions. The conclusions about geologic disposal were reaffirmed in 2001 by the National Research Council. Their May 2001 report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001), concluded that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

In the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste*, DOE evaluated high-level radioactive waste disposal alternatives including very deep borehole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, space disposal, and no action (DIRS 104832-DOE 1980). In its 1981 Record of Decision (46 *FR* 26677; May 14, 1981), DOE decided that the mined geologic disposal alternative was the best alternative for the disposition of spent nuclear fuel and high-level radioactive waste.

The Nuclear Waste Policy Act of 1982 began a process for selecting sites for technical study as potential geologic repository locations. In the Nuclear Waste Policy Amendments Act of 1987, Congress made the decision to focus on only the Yucca Mountain site as a geologic repository. Sections 114(f)(2) and (3) of the Act provide that DOE need not consider in the EIS the need for a geologic repository, and alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository [42 U.S.C. 10134(f)(2) and (3)]. In addition, the EIS does not have to consider any site other than Yucca Mountain for development as a repository. In light of the Congressional focus on a geologic repository and the consensus referred to by the National Research Council, DOE does not agree that the alternatives rejected in 1981 should be reconsidered.

1.1 (101)

Comment - 102 comments summarized

Commenters stated that DOE is studying Yucca Mountain as the only potential site for a geologic repository because Nevada is politically weak and is considered to be a wasteland. Many stated that this is especially unfair because

Nevada has no nuclear powerplants and has already suffered an undue burden from nuclear weapons testing at the Nevada Test Site.

Response
Congress made the decision to focus on the Yucca Mountain site as a geologic repository when it amended the Nuclear Waste Policy Act through the passage of the Nuclear Waste Policy Amendments Act of 1987. The Nuclear Waste Policy Act of 1982 provided a process for selecting sites for technical study as potential geologic repository locations. In accordance with this process, DOE identified nine candidate sites, the Secretary of Energy nominated five of the nine sites for further consideration, and DOE issued environmental assessments for the five sites. DOE recommended three of the five sites, of which Yucca Mountain was one, for study as repository site candidates. In 1987, Congress amended the Nuclear Waste Policy Act by directing the Secretary of Energy to perform site characterization activities at the Yucca Mountain site, and, if the site is found suitable, make a recommendation to the President on whether to approve the site for development of a repository.

DOE acknowledges that Nevada has played a major role in the development and testing of nuclear weapons. While Nevada has no nuclear powerplants, the State's residents benefit from nuclear power in the form of consumer goods manufactured in cities that use electricity generated at nuclear powerplants. In addition, Nevada residents use electricity generated by nuclear powerplants during times of peak electrical demand. DOE recognizes, nonetheless, that many people in Nevada believe that the Federal program to develop a geologic repository has unfairly focused on a candidate site in Nevada.

1.1 (122)
Comment - 23 comments summarized
Commenters stated that geologic burial is an unsafe method for disposing of nuclear waste, and they would like DOE and Congress to reevaluate the Nation's nuclear waste policy.

Response
Section 1.3 of the EIS provides a brief history of the management of spent nuclear fuel and high-level radioactive waste. Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission recommended burying radioactive waste in geologic formations in *The Disposal of Radioactive Waste on Land* (DIRS 100011-NAS 1957). In 1975, the Energy Research and Development Administration, a predecessor to DOE, selected a deep, geologic site near Carlsbad, New Mexico, for the Waste Isolation Pilot Plant for the disposal of transuranic waste. In the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980), DOE evaluated high-level radioactive waste disposal alternatives including very deep borehole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well-injection disposal, transmutation, space disposal, and no action. In a 1981 Record of Decision (46 *FR* 26677; May 14, 1981), DOE decided that the mined geologic disposal alternative was the best alternative for the disposition of spent nuclear fuel and high-level radioactive waste.

The Nuclear Waste Policy Act of 1982 established a process for selecting sites for technical study as potential geologic repository locations. In accordance with this process, DOE identified nine candidate sites, the Secretary of Energy nominated five of the nine sites for further consideration and DOE issued environmental assessments for the five sites. DOE recommended three of the five sites, of which Yucca Mountain was one, for study as repository site candidates. Congress amended the Nuclear Waste Policy Act through the passage of the Nuclear Waste Policy Amendments Act of 1987, directing the Secretary of Energy to perform site characterization activities at only the Yucca Mountain site.

The basic concept of geologic disposal is to place carefully prepared and packaged waste in excavated tunnels in rock. The advantage of a geologic repository is that it would not require perpetual human care and would not rely on the stability of society for tens of thousands of years into the future. It would rely instead on a series of natural and engineered barriers to contain the waste for thousands of years and to minimize the amount of radioactive material that would eventually reach the human environment. All countries pursuing geologic disposal are taking the multibarrier approach, though they differ in the barriers they emphasize. The German disposal concept, for example, relies heavily on the geologic barrier, a rock salt formation, at the prospective disposal site. The Swedish method, on the other hand, relies heavily on thick copper waste packages to contain waste. The U.S. approach is to

design a repository in which the natural rock barriers and engineered barriers work as a system. This is called defense-in-depth.

Virtually every expert group that has examined the problem of high-level radioactive waste disposal has agreed that a geologic repository is the best approach. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). Their May 2001 report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001), reaffirms this position. The National Research Council maintains that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

1.1 (123)
Comment - 4 comments summarized
Commenters questioned why only the Yucca Mountain site is being studied as a potential location for a geologic repository for spent nuclear fuel and high-level radioactive waste, expressing the concern that Yucca Mountain is not the best location. Commenters suggested other potential sites such as the Nevada Test Site, the Waste Isolation Pilot Plant in New Mexico, and sites in the eastern United States.

Response
Section 1.3.2 of the EIS contains a figure and discussion of the events leading to the selection of Yucca Mountain for study for geologic disposal of spent nuclear fuel and high-level radioactive waste. The Nuclear Waste Policy Act of 1982 established a process for selecting sites for technical study as potential geologic repository locations. In accordance with this process, DOE identified nine candidate sites, the Secretary of Energy nominated five of the nine sites for further consideration and DOE issued environmental assessments for the five sites. DOE recommended three of the five sites, of which Yucca Mountain was one, for study as repository site candidates.

Alternative sites mentioned by commenters are not suitable for study as repository locations for various reasons. Sites on the Nevada Test Site in contaminated areas once used for testing nuclear weapons are not suitable because DOE could use them for future testing if that became necessary for reasons of national security. The Waste Isolation Pilot Plant in New Mexico is authorized only for the disposal of defense transuranic waste, and not commercial nuclear waste. Potential sites in the eastern United States have been investigated over the years, such as those containing thick deposits of Devonian shale or thick salt domes, but in 1987 Congress amended the Nuclear Waste Policy Act of 1982 directing the Secretary of Energy to perform site characterization activities only at the Yucca Mountain site. The Act requires the Nuclear Regulatory Commission authorization of the repository to include a prohibition against the emplacement of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste until a second repository is in operation. Therefore, a site for a second repository could be considered in the future.

1.1 (124)
Comment - 29 comments summarized
Commenters stated that the Proposed Action would cause higher than acceptable levels of risk after the 10,000-year timeframe. They contend that DOE has focused on delaying releases from the repository so that future generations must shoulder the burden of, and receive the effects of, the resulting contamination.

Response
As described in Chapter 1 of the EIS, Congress determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose of spent nuclear fuel and high-level radioactive waste permanently to protect the public health and safety and the environment. The Act further states that the Federal Government must take precautions to ensure that these materials do not adversely affect this and future generations.

Congress amended the Nuclear Waste Policy Act though the passage of the Nuclear Waste Policy Amendments Act of 1987, directing the Secretary of Energy to perform site characterization activities only at the Yucca Mountain site.

Given the current state of technology, it is impossible to design and construct a geologic repository that would provide a reasonable expectation that there would never be any releases of radioactive materials. DOE would design, construct, operate and monitor, and eventually close a repository that would meet public health and safety radiation protection standards and criteria established by the Environmental Protection Agency and the Nuclear Regulatory Commission. Congress, in the Energy Policy Act of 1992, directed the Agency to develop public health and safety standards for the protection of the public from releases from radioactive materials stored or disposed of in a repository at the Yucca Mountain site. Congress also directed the Commission to publish criteria for licensing the repository that would be consistent with the radiation protection standards established by the Agency. These standards (40 CFR Part 197) and criteria (10 CFR Part 63) prescribe radiation exposure limits that the repository, based on a performance assessment, cannot exceed during a 10,000-year period after closure.

In the EIS, DOE has assessed the ability of the natural and engineered barrier system to isolate radioactive materials from the environment for thousands of years, and DOE would expect repository releases to the accessible environment to be orders of magnitude less than the prescribed radiation exposure limits during the 10,000-year period after closure. Based on the repository design and performance assessment, DOE believes that releases of radioactive materials for the first 10,000 years after repository closure would be limited, the result of incorporating a small number of waste package failures due to manufacturing defects into the Total System Performance Assessment.

DOE estimates that the peak annual individual dose (95th percentile) to a hypothetical individual would not occur until about 410,000 years after closure and would be about 620 millirem. The mean peak annual individual dose within 1 million years was calculated to be 150 millirem at 480,000 years. On this basis, DOE has concluded that the repository would provide a high degree of long-term isolation of spent nuclear fuel and high-level radioactive waste.

1.1 (287)
Comment - EIS000021 / 0003
Why not simply admit you made a mistake, and that it is sounder policy to retain the waste where it was/is generated and monitor it over time, praying always for the humility to succeed in that task. Yes, you'd take heat; it might even cause lawsuits. Isn't it better to admit a problem up front than to go on blindly compounding the mess that was caused by the original error in judgement? That would be the humane, noble thing to do.

Who cares about the impact of plutonium storage at Yucca Mountain? My children and the children of all of us unto the thousandth generation. Grow up, admit your policy flaws, and stop this insanity.

Response
As described in Chapter 1 of the EIS, Congress, through passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

In 1987, amendments to the Nuclear Waste Policy Act directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE has conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a repository. The results of the program have provided information for this EIS and other documents. The investigations and evaluations have consisted of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS). The Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada, and affected units of local government have reviewed the results of the site characterization program.

The Secretary of Energy will consider this information, as well as the results of the environmental analyses in this EIS and public input, in determining whether to recommend development of the Yucca Mountain site as a repository to the President.

1.1 (293)
Comment - EIS000027 / 0001
[DOE] decided long ago that Nevada was a worthless, barren wasteland fit only for all those superfluous atomic tests (did we not learn the awesome power of the atom at Hiroshima, Nagasaki, and Bikini Atoll). And now Nevada is to be used as the dump for radioactive garbage from almost every state and even some foreign countries!!!

Response
As described in the Final EIS on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuels (DIRS 101812-DOE 1996), the United States is accepting spent nuclear fuel containing uranium produced or enriched in the United States that has been used in foreign research reactors. This program involves approximately 19.2 metric tons of heavy metal (MTHM) in spent nuclear fuel and 0.6 MTHM in target material from 41 countries over a 13-year period. The purpose of the program is to support the broad U.S. nuclear weapons nonproliferation policy calling for reduction and eventual elimination of highly enriched uranium used in civil commerce worldwide.

While the United States has decided to accept foreign spent nuclear fuel under certain circumstances, foreign countries do not have an unfettered option to send their spent nuclear fuel to the United States. This EIS does not anticipate or analyze the disposal of foreign spent nuclear fuel other than that analyzed. If, in the future, this country should consider acceptance and disposal of additional foreign spent nuclear fuel, DOE would analyze any such proposals in separate environmental documentation consistent with the National Environmental Policy Act (10 CFR Part 1021).

1.1 (765)
Comment - 010028 / 0008
This nation should not allow the site safety issues to be deferred until after the President and Congress in their wisdom say Yucca Mountain is suitable. There is a very great difference between an Environmental Impact Statement review of key site safety issues and the Nuclear Regulatory Commissions staffs' review of safety. I propose that the process be modified and that all the site safety issues not involved with the subsurface repository design be addressed now using the Nuclear Power Plant Early Site Review Process. This process was legislated in the late 1970s to allow the determination of a proposed nuclear plant site prior to submitting a complete construction permit application. The early site review process leads to a letter from the Atomic Committee on Reactor Safety (ACRS). This process was successfully used for the proposed San Joaquin Nuclear Generating Station (four 1,200 MWe units) that was located in northwestern Kern County, California. However, after an informational vote of the citizens of Kern County against this San Joaquin Nuclear Generating Station, which was a joint project of all the major California utilities, the project was cancelled in favor of large coal-fired generating units in Utah.

Response
Section 1.3.2.3 of the EIS describes the repository decision process as established by Congress in the NWPA. There is no statutory basis for DOE to use any other process, such as the "Nuclear Power Plant Early Site Review Process," cited by the commenter. The Secretary of Energy will make a determination whether to recommend the site to the President on the basis of several types of information, including site recommendation documents and technical information in this EIS. Any recommendation would be accompanied not only by the Final EIS, but also by those other materials designated in Section 114 of the NWPA, including the views and comments of the Governor and legislature of any state or the governing body of any affected Indian tribe.

If the site designation becomes effective, the Secretary would submit a license application to the Nuclear Regulatory Commission (NRC) for authorization to construct a repository and would provide a copy of the application to the Governor and Legislature of Nevada. The NWPA requires the NRC to issue a final decision approving or disapproving the construction authorization, which would be based, in part, on compliance with 10 CFR Part 63. For example, this regulation would require DOE to conduct an integrated safety analysis to demonstrate that NRC performance requirements and radiation protection standards could be met in the Geologic Repository Operation Area prior to repository closure. For postclosure repository performance, DOE would be required to demonstrate the presence of multiple barriers and to show, by conducting a performance assessment, that the repository would satisfy postclosure radiation standards for a 10,000-year compliance period.

If the Secretary receives a construction authorization from the NRC, DOE could proceed with constructing the repository in accordance with NRC requirements. The Secretary could later submit to the NRC an amendment to the license application requesting a license to receive and possess waste.

1.1 (1095)
Comment - EIS000162 / 0001
It is imperative that the DOE take the necessary actions to fulfill its mandate in the Nuclear Waste Policy Act (NWPA) to develop a permanent repository for spent nuclear fuel and high-level radioactive waste at Yucca Mountain, Nevada. Doing nothing or taking no action to remove nuclear waste from the plant sites is not an option. There is nothing in the Draft Environmental Impact Statement (DEIS) that precludes moving forward with the development of Yucca Mountain as a permanent repository.

Response
The EIS is one of many documents that the Secretary of Energy will use in determining whether to recommend Yucca Mountain to the President for development as a repository. To date, the Secretary has not made a decision about such a recommendation.

1.1 (1314)
Comment - EIS000419 / 0001
I am concerned primarily with the flawed EIS process as exhibited in the DEIS presented to the public in July of 1999. Firstly, the need for the repository is not included and secondly no comparison to reasonable alternatives is given. All other EISs must provide this information. Congress's move in 1987 to exempt this particular EIS from the requirement to provide this information makes it an irresponsible anti-democratic activity that denies the intent of NEPA [the National Environmental Policy Act]. The public is not allowed the chance to make informed decisions since neither the design of the repository nor its impacts is included in the current EIS. The only rational way to rectify this appalling disregard of the democratic process is for Congress to recognize their huge manipulative mistake and scrap the 1987 decision.

Response
In amending the Nuclear Waste Policy Act of 1982, Congress concluded that a geologic repository was the safest alternative for waste disposal (see Section 1.3 of the EIS for additional information). The Act specifically exempts DOE from considering in the EIS (1) the need for a repository, (2) alternative sites to Yucca Mountain, (3) alternative methods to geologic disposal, and (4) the time at which a repository could become available.

Chapter 2 of the EIS and the Supplement to the Draft EIS describe the overall design of the repository and the transportation facilities that would be required in Nevada, including a variety of implementing alternatives and design scenarios. Chapters 4, 5, 6, 8, and 10 describe the environmental impacts associated with the Proposed Action.

1.1 (1472)
Comment - EIS000485 / 0001
When Congress amended the Nuclear Waste Policy Act in 1987, they designated Yucca Mountain, Nevada, as the only site to be considered as a high-level nuclear waste repository, removing all other sites, which until then were also under consideration. The reasons were political rather than scientific or technical. Yucca Mountain lies within the most earthquake-prone region of the country, which alone should have disqualified it from consideration long ago. However, because Nevada has only two representatives and two senators in Congress, we were an easy target for members of Congress representing more powerful states also under consideration for a repository.

Even more troubling than the politically-based nature of the decision to target Nevada alone for high-level waste, is the fact that to help insure approval of the site, Congress undermined key provisions of the National Environmental Policy Act with respect to the Yucca Mountain project. NWPA limited the scope and extent of the evaluation of potential environmental impacts normally required in an environmental impact statement under NEPA.

In other words, Congress has significantly diminished the inherent value of conducting an environmental impact statement, in an apparent attempt to rubber-stamp NEPA approval on the project.

Response
As described in Chapter 1 of the EIS, Congress, through passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

In amending the Nuclear Waste Policy Act of 1982, Congress concluded that a geologic repository was the safest alternative for waste disposal (see Section 1.3 of the EIS for additional information). The Act specifically exempts DOE from considering in the EIS (1) the need for a repository, (2) alternative sites to Yucca Mountain, (3) alternative methods to geologic disposal, and (4) the time at which a repository could become available.

Congress selected Yucca Mountain in 1987 as the only site to be studied as a potential location for a monitored geologic repository.

DOE has a site characterization program to evaluate and assess the suitability of the Yucca Mountain site as a potential geologic repository and to provide information for this EIS. The program consists of scientific, engineering, and technical studies and activities. The Department used the information from this program to support the preparation of the EIS, which is one of many documents that the Secretary of Energy will use in determining whether to recommend Yucca Mountain to the President for development of a repository. To date, the Secretary has not made a decision on such a recommendation.

The purpose of the National Environmental Policy Act is to promote an understanding of the environmental consequences of Federal actions before an agency takes action. DOE believes that this EIS appropriately describes the type and magnitude of environmental impacts that could occur if it constructed, operated and monitored, and eventually closed a repository at Yucca Mountain.

The repository would operate only if DOE can demonstrate that the repository would meet public health and safety standards promulgated by the Environmental Protection Agency and the Nuclear Regulatory Commission. These standards limit the amount and timing of releases to ensure that the repository would protect public health and safety. The repository would be designed and operated to meet such standards. In the vicinity of the repository – the area within 80 kilometers (50 miles) of Yucca Mountain – DOE estimates that no individual would receive more than a few millirem (a thousandth of a rem) per year during the preclosure period (see Sections 4.1.2 and 4.1.7 of the EIS) or during the 10,000-year period after repository closure (see Section 5.4). Based on the results of these analyses, DOE has concluded that the repository would provide a high degree of long-term isolation of spent nuclear fuel and high-level radioactive waste (consistent with the radiation protection standards at 40 CFR Part 197).

1.1 (1663)
Comment - EIS000441 / 0004
Nye County recognizes that the permanent isolation of the wastes that are currently in storage at scores of sites across the United States is an essential element of our national energy policy. Nye County also recognizes that the disposal of these wastes at Yucca Mountain will reduce the threats to the national resources and public dependent upon the resources at these sites. However, the United States must recognize that the risk reduction in communities across the country will result in the focusing of those risks on a single jurisdiction, my jurisdiction [Nye County], which I live very close to.

The disposal of these wastes with a total radioactivity on ... the order of 11 billion which we claim to be up to 14 billion and some say up to 26 billion curies will most certainly render Nye County vulnerable in contamination well into the future and will pose a threat [to] the citizens in the shadow [of the] repository for all practical purposes. For the laymen's terms, it might as well be forever.

Response
As described in Chapter 1 of the EIS, Congress, through passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the

Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations. DOE is implementing this Act.

The Energy Policy Act of 1992 requires the Environmental Protection Agency to promulgate standards at 40 CFR 197. These regulations establish limits on the annual committed effective dose that a member of the public can receive during the first 10,000 years following disposal, and require that releases of radionuclides from an undisturbed repository not cause the level of radioactivity in groundwater to exceed specified limits. The Environmental Protection Agency believes that these standards are reasonable, and that before the proposed repository could be licensed, DOE would have to demonstrate, to a reasonable degree of certainty, that the standards would be met.

1.1 (1676)
Comment - EIS000345 / 0002
As a taxpayer I am very mad that you have wasted my tax money into this site, when you knew that it was not doable. Many scientists during the surveys have said it would not work. So my question to you is, why do you continue to keep putting my tax dollars into this project?

Response
In 1987, amendments to the Nuclear Waste Policy Act directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE has conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a repository. The results of the program have provided information for this EIS and other documents. The investigations and evaluations have consisted of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS). The Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada, and affected units of local government have reviewed the results of the site characterization program.

The Secretary of Energy will consider this information, as well as the results of the environmental analyses in this EIS and public input, in determining whether to recommend development of the Yucca Mountain site as a repository to the President.

1.1 (1743)
Comment - EIS000533 / 0001
The Yucca [Mountain] DEIS is a sham and a farce due both to constraints placed by 1987 Waste Act and to DOE NTS officially consistent lousy estimate[s] of public danger and single-minded determination to implement grand plans that later turn out to be cataclysmic failures.

Response
As described in Chapter 1 of the EIS, Congress has determined, through the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act, as amended in 1987, directs the Secretary of Energy to determine whether to recommend that the President approve Yucca Mountain for development of a geologic repository and to prepare a Final EIS to accompany any site recommendation to the President. The Act addresses how certain National Environmental Policy Act requirements apply. In particular, the Act specifies that it is not necessary to consider in the EIS the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain.

The repository would operate only if DOE can demonstrate that the repository would meet public health and safety standards promulgated by the Environmental Protection Agency and the Nuclear Regulatory Commission. These standards limit the amount and timing of releases to ensure that the repository would protect public health and safety. The repository would be designed and operated to meet such standards. In the vicinity of the repository – the area within 80 kilometers (50 miles) of Yucca Mountain – DOE estimates that no individual would receive more than a few millirem (a thousandth of a rem) per year during the preclosure period (see Sections 4.1.2 and 4.1.7 of the EIS) or during the 10,000-year period after repository closure (see Section 5.4). Based on the results of these analyses, DOE has concluded that the repository would provide a high degree of long-term isolation of spent nuclear fuel and high-level radioactive waste (consistent with the radiation protection standards at 40 CFR Part 197).

1.1 (2053)
Comment - EIS000576 / 0001
We should look to whether or not the Yucca Mountain proposal is a good plan of action, by first looking at whether or not a need has been demonstrated. Now I find it kind of disheartening that Congress in its infinite wisdom in passing the Nuclear Waste Policy Act has told the Department of Energy that the EIS need not consider the need for a repository.

Now Congress didn't say that the EIS doesn't have to consider the need of Yucca Mountain being a repository. The EIS doesn't even have to consider if we need a repository at all. That seems kind of weird.

This alone is a reason to go with the no action alternative, because we can't even demonstrate that we actually need to have an action in the first place.

The second thing is though no need has actually been established, we still throw around this term that we need it as if we really do. So let's ask ourselves a question: What is this nebulous assumed need that everyone is talking about?

The need is actually space for storage. So the question then becomes, if we implement the Yucca Mountain plan, does it solve this need of space? And temporarily you could say that the answer is yes.

But what happens when the Yucca Mountain facility gets full? You are always going to need more space because the source of the nuclear waste is left untouched. So you are always going to have nuclear waste, and you are always going to be looking for space for it.

So in the long term, nothing is achieved by passing this Yucca Mountain proposal. Nuclear waste continues to be created, and space to store the nuclear waste will always be sought after. Which is another reason why maybe we ought to go back to the drawing board and consider whether or not its even a good idea that we have nuclear power.

I want to show to you what this big picture is, in seeing that the Yucca Mountain proposal has not demonstrated that we really need it, the Yucca Mountain proposal fails to solve the assumed need of space of where we're going to put the nuclear waste, and that the proposal is not even beneficial, and it has not been shown to be the best, it's obviously not sound policy making when you look to what Congress has decided to do with the Nuclear Waste Policy Act.

This means that Nevadans -- and I'm glad to see the people out here tonight. I'm glad that you guys are telling the Department of Energy that you have demands that you want our civic leaders to meet, and they need to.

But this is another thing, too, that I want the Department of Energy to take in tonight. It's important that the experts who are here in this room, and right now I only see one, but nevertheless, the experts who are here in this room, I mean you as I think an individual, I'm very sure that you know where I'm coming from here when I'm saying that, okay, logically speaking, we haven't even demonstrated that we need to have a repository. We don't even have to look at whether or not we need a repository.

Doesn't that seem weird to you? As a thinking individual, why would you implement a plan you can't even demonstrate you actually need to do?

So you yourself have grounds alone to reject this proposal, to reject this policy, and not kow-tow to Congress, because the Department of Energy and also the Environmental Protection Agency, those are the experts who should be telling Congress what to do, not the other way around. So what I would like to ask the Department of Energy to do is go ahead and exercise your power to say to Congress, you know what, you made a couple of bad moves here by passing the Nuclear Waste Policy Act, and we don't agree with what you are trying to tell us to do because we have consciences. We also agree with a lot of the things Nevadans have said because they have asked a lot of good questions which you as Congress for some reason or another don't want to look at.

I think that the Department of Energy in its right mind should turn this plan around and say no, Congress, go back to the drawing board. We as experts are going to tell you what is the best idea because right now the approach is bad, and the policy as it stands is also very flawed.

Response
Chapter 1 of the EIS states that Congress, through the passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act recognized a need to ensure that spent nuclear fuel and high-level radioactive waste now accumulating at commercial and DOE sites do not adversely affect the public health and safety and the environment [Section 111 (a)(7)].

As discussed in Section 1.5 of the EIS, the Nuclear Waste Policy Act, as amended, includes four provisions relevant to the EIS. Under the Act, the Secretary is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for the repository development.

1.1 (2229)
Comment - EIS000622 / 0013
There's also the problem that the amount of materials that you are talking about moving will actually have reached its peak. We will have this 70,000 tons of material by the time you're actually trying to open the doors down there. So we'll again be in the same problem with reactors all over the United States producing these kind of materials, stacking them up everywhere, and at the same time, we will have exposed 50 million people along the rail routes and the highways. We will have exposed 43 states. We will have exposed many so far clean areas, such as this one, and we'll have the same problem. And yet we'll have all this material shoved in the ground where there is nothing we can do to monitor it or take care of problems as they occur.

Response
The NWPA prohibits the Nuclear Regulatory Commission from authorizing the emplacement of more than 70,000 metric tons of heavy metal (MTHM) of spent nuclear fuel and high-level radioactive waste in the proposed repository until a second repository is in operation. Therefore, a site for a second repository could be considered in the future regardless of where the first repository would be located. However, in response to comments received during the EIS scoping period (see Section 1.5.1.1 of the EIS), DOE evaluated the disposal of more than 70,000 MTHM as a reasonably foreseeable future action as part of the Cumulative Impacts discussion (see Chapter 8). The introduction to Chapter 8 acknowledges that the emplacement of more than 70,000 MTHM would require legislative action by Congress unless a second licensed repository was in operation.

During the period starting with emplacement of materials and extending until closure (which could be as long as more than 300 years), DOE would monitor the repository continuously through a system of sensors and administrative inspections (see Section 2.1.2 of the EIS). This would give future decisionmakers the option to take corrective actions, if required, and make societal choices on closing the repository or retrieving material.

Section 122 of the NWPA requires DOE to maintain the ability to retrieve the materials in the repository if there was a decision to retrieve them to protect public health and safety or the environment or to recover constituent parts of spent nuclear fuel. This requirement is reflected in the Nuclear Regulatory Commission's disposal regulations [10 CFR 63.111(e)]. Although DOE does not anticipate that retrieval would be necessary, it would use the repository design to maintain the ability for future generations to retrieve materials for at least 50 years and possibly for as long as 300 years after emplacement operations have begun (see EIS Section 4.2). The Federal Government, therefore, would maintain stewardship of the repository site for generations to come. These stewardship activities would entail site protection, confirmatory scientific work, and a postclosure monitoring program required by Nuclear Regulatory Commission rules governing the disposal of high-level wastes in a geologic repository (10 CFR 63.51). The decision to close the repository (and thus give up active control) and the details of the postclosure monitoring program would be defined during the processing and approval of a license amendment for permanent closure, supported by what more advanced analyses based on future data and modeling tools. Section 2.1.2 discusses the types of monitoring that DOE would consider.

1.1 (2275)
Comment - EIS000545 / 0001
I would have to submit that the entire process is flawed by virtue of the kind of legislation under which the DOE has to operate. They are in a trap and we are in a trap because of the very bad legislation which brought us to this point.

And it seems almost impossible to come through the environmental impact process given the very bad option, the impossible option of no action and the unacceptable dangerous option of Yucca Mountain.

The most responsible thing perhaps would be for the DOE to take this evidence which is being presented back to Congress and say neither one of those will work.

Now there is a nuclear power industry which drives many of the decisions in Congress on this matter. That will have to be addressed at that point. But this is so badly flawed that that would seem to be the best option for all of us.

Response
As described in Chapter 1 of the EIS, Congress has determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act, as amended in 1987, directs the Secretary of Energy to determine whether to recommend that the President approve Yucca Mountain for development of a geologic repository. To date, the Secretary has not made a determination about such a recommendation.

The repository would operate only if DOE can demonstrate that the repository would meet public health and safety standards promulgated by the Environmental Protection Agency and the Nuclear Regulatory Commission. These standards limit the amount and timing of releases to ensure that the repository would protect public health and safety. The repository would be designed and operated to meet such standards.

If DOE determined that Yucca Mountain was an unsuitable site, it would recommend to Congress further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislation.

1.1 (2377)
Comment - EIS000664 / 0002
I believe that Congress will take the hole in the mountain at Yucca and use it. They've spent billions and billions and billions and that's Congress' history, not to start over and spend billions and billions and billions of more [money].

Response
In 1987, Congress directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. DOE has a site characterization program to evaluate and assess the suitability of the Yucca Mountain site as a potential geologic repository and to provide information for the EIS. The program consists of scientific, engineering, and technical studies and activities. The Department used the information from this program to support the preparation of the EIS, which is one of many documents the Secretary of Energy will use in determining whether to recommend Yucca Mountain to the President for development of a repository. To date, the Secretary has not made a decision about such a recommendation.

1.1 (2941)
Comment - EIS000988 / 0009
Analysis shows severe problems with any underground repository method and particularly shows absurdity of Congressional bills that exempt Yucca Mountain from environmental standards so that it remains the designated nuclear waste repository area. I can only agree with comments made by Senator Bryan during March 1995 debates stating:

"I am shocked and outraged that the [Department] of Energy and the nuclear power industry continues to force acceptance of a dump in Nevada when it appears that its own scientists cannot reach consensus on the most fundamental safety questions related to nuclear waste. The scientific community is still questioning the very

premise of geologic storage. Yet the DOE long standing official position is that nuclear waste storage at Yucca Mountain is a political problem not a technical one."

I can only add that I am appalled but not really surprised that so many in Congress have remained so crassly insensitive to the safety of their supposed constituents, with the possible exception of just before elections, and to the daunting technical problems they repeatedly force on federal agencies like DOE and the liability and costs to us taxpayers by mandating a national nuclear waste repository.

Response
As described in Chapter 1 of the EIS, through the passage of the Nuclear Waste Policy Act of 1982, Congress determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository.

DOE has a site characterization program to evaluate and assess the suitability of the Yucca Mountain site as a potential geologic repository and to provide information for this EIS. The program consists of scientific, engineering, and technical studies and activities. The Department used the information from this program to prepare the EIS, which is one of many documents the Secretary of Energy will use in determining whether to recommend Yucca Mountain to the President for the development of a repository. To date, the Secretary has not made that decision.

Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1976, the Energy Research and Development Administration (another predecessor agency) began investigating geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and launching waste into the sun.

Based on the results of these investigations and the analyses of the *Final Environmental Impact Statement Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980), DOE determined in a Record of Decision (46 *FR* 26677, May 14, 1981) that it would pursue mined geologic disposal. As stated in Section 2.3.1 of the EIS, virtually every expert group that has examined the issue of high-level radioactive waste disposal has agreed that a geologic repository is the best approach. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). This position was reaffirmed in 2001 by the National Research Council in its May 2001 report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001). The National Research Council maintains that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

1.1 (3405)
Comment - EIS001393 / 0006
In *Centesimus Annus* (On the Hundredth Anniversary of Rerum Novarum, Pope Leo XIII landmark document), Pope John Paul II calls on the state to provide "for the defense and preservation of common good such as the natural and human environments." (Section 40) Here, the government is clearly failing to heed the call to take of the common good of both human beings and the Earth that they depend on. In *Sollicitudo Rei Socialis* (On Social Concern), John Paul refers to quality of life, saying "We all know that the direct or indirect result of industrialization is, ever more frequently, the pollution of the environment, with serious consequences for the health of the population."

The pope continues, discussing God's command to Adam in Genesis: "The dominion granted to man by the Creator is not an absolute power, nor can one speak of a freedom to 'use and misuse', *or to dispose of things as one pleases.*" [Italics added.] This last phrase is a clear call for careful consideration of both long and short term results of any human endeavor. The dominion passage of [Genesis] 2:16-17 is frequently misconstrued to mean that people have a God-given right to do whatever they want with natural resources. However, John Paul states unequivocally that "The limitation imposed from the beginning by the Creator himself and expressed symbolically by the prohibition not to 'eat of the fruit of the tree' shows clearly enough that, when it comes to the natural world, we are subject not only to biological laws but also to moral ones, which cannot be violated with impunity."

Response
As described in Chapter 1 of the EIS, Congress, through the passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a potential geologic repository. The investigations and evaluations consisted of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS). The results of the program have provided information for the EIS and other Departmental documents. In addition, various independent entities including the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada, and affected units of local government reviewed the results of the site characterization program.

1.1 (4165)
Comment - EIS000978 / 0003
I expect my air and water to be clean and I expect that the government will immediately allot money to find a solution for safe disposal of this waste and will dispose of the ridiculous idea of transporting it. I want the DOE, any government agencies, Congress, and the President to start now to clean up the entire mess and stop listening to corp. and energy interests.

Response
As described in Chapter 1 of the EIS, Congress, through passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act, as amended in 1987, directs DOE to determine whether geologic disposal at Yucca Mountain is safe and to prepare an EIS to accompany any site recommendation to the President.

The EIS analyzes the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain, the potential impacts of transporting spent nuclear fuel and high-level radioactive waste from 77 sites across the United States to Yucca Mountain, and the potential impacts of leaving the waste at those 77 sites.

1.1 (4492)
Comment - EIS001464 / 0004
I guess I would conclude by saying that the United States currently has a failed policy for storage and isolation of spent fuel, has a failed policy in dealing with the Class B and C wastes associated with the nuclear power industry, with the compact system failing right and left as we speak; that it is time for elected leadership, particularly locally, to take an aggressive position to force a reassessment of both the high-level and the low-level radiation disposal systems, programs in this country; and until that is done at a policy level, at the level of the president and executive branch, legislative branch, that this program should not be proceeding to this stage of environmental review.

We believe the environmental review has been simply a means of justifying the political decision and that the scientific basis of that review, while extensive, is also ahead of -- or rather it's behind the environmental process, and that's inappropriate. The review process should be taking place further in the future when some of the scientific controversies and questions attendant to the facility itself are resolved satisfactorily.

That aside, this is still a policy question that needs to be determined at the highest levels of our government nationally, and it requires that the citizens of this region and this state be actively involved in forcing that process.

Response
As described in Chapter 1 of the EIS, Congress has determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

In 1987, Congress passed the Nuclear Waste Policy Amendments Act, which directs the Secretary of Energy to determine whether to recommend that the President approve Yucca Mountain for development of a geologic repository. In response, DOE conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a potential geologic repository. The investigations and evaluations consist of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS).

Congress created the U.S. Nuclear Waste Technical Review Board as an independent organization to evaluate the technical and scientific validity of site characterization activities for the proposed repository (NWPA, Section 503). The Board must report findings, conclusions, and recommendations based on its evaluations to Congress and to the Secretary of Energy at least twice each year (NWPA, Section 508). Other independent organizations, such as the Nuclear Regulatory Commission, the State of Nevada, and affected units of local government have reviewed the results of the site characterization program. The results of the program have provided information for the EIS and other Departmental documents.

The Secretary of Energy will consider this information, as well as the results of the environmental analyses of this EIS and public input, in determining whether to recommend development of the Yucca Mountain site as a geologic repository to the President.

The repository would operate only if DOE can demonstrate that it would meet public health and safety standards promulgated by the Environmental Protection Agency and the Nuclear Regulatory Commission. These standards limit the amount and timing of releases from the repository to ensure protection of public health and safety. The repository would be designed and operated to meet such standards.

1.1 (4667)
Comment - EIS001372 / 0010
I am very skeptical about this "need" to create a geologic repository for the nation's high-level radioactive waste. Yes, inevitably, we may need to create a repository somewhere...but in order to understand the "problem," we must open our vision wide enough to embrace the entire picture. There are 109 operating nuclear reactors in the U.S., which produce only 7.7% of the nation's power. And yet, these reactors produce the vast majority of the 6 metric tons generated each day in this country alone. Every 1000-megawatt reactor produces 25.4 metric tons of spent nuclear fuel waste every year, totaling nearly 3,000 tons nationwide annually. By 2010, it is anticipated that there will be 70,000 tons of spent nuclear fuel, which is over 1 million times more radioactive than unused fuel, but as of now, 2/3 of this fuel has not been used yet!! Imagine how much energy, money, and headaches we could save if we did not use this unused fuel! In addition, the projected capacity of Yucca Mountain is 70,000 tons. So, if Yucca Mountain opens in 2010, it will be filled as soon as it opens, and we will be right where we are now, asking the same question: What do we do with all this nuclear waste! It doesn't take a rocket scientist to state the clear and apparent answer: Stop producing it!

Response
As described in Chapter 1 of the EIS, Congress, through the passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a potential geologic repository. The investigations and evaluations consisted of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS). The results of the program have provided information for the EIS and other Departmental documents. In addition, various independent entities including the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada, and affected units of local government reviewed the results of the site characterization program.

The NWPA requires the Nuclear Regulatory Commission to include in its authorization of the repository a prohibition against the emplacement of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste in the repository until a second repository is in operation. Therefore, a site for a second repository could be considered in the future.

1.1 (4859)
Comment - EIS001665 / 0004
My objections to burying long-lived, high-level nuclear include: Yucca [Mountain] was chosen more for political expediency than geological suitability.

Response
In 1987, Congress amended the Nuclear Waste Policy Act of 1982 by selecting Yucca Mountain as a potential location for a monitored geologic repository. The Act directs DOE to determine whether Yucca Mountain is suitable for a geologic repository, and it eliminated Deaf Smith County, Texas, and the Hanford Site in Washington, which DOE was studying at the time. Yucca Mountain was selected for study because of its promising characteristics.

1.1 (5319)
Comment - EIS001887 / 0052
Page 1-9; Section 1.3.2 - Nuclear Waste Policy Act

The discussion of the Nuclear Waste Policy Act contained in this section presents a distorted and revisionist picture of the process that led to the 1987 amendments. The discussion fails to address the serious problems with DOE's implementation of the original Act, congressional investigations that found DOE deficient in its handling of the program, the level of controversy surrounding the program, the highly charged political environment that led to the 1987 amendments, and the purely political criteria that were used to single out Yucca Mountain as the only site to be studied. This information provides essential context for evaluating and understanding impacts associated with the program as it exists today.

Response
As discussed in the EIS, the purpose of Section 1.3 and its subsections is to provide background information on the management of spent nuclear fuel and high-level radioactive waste, and to describe the Nuclear Waste Policy Act of 1982 and its key amendments. In this context, this information assists in explaining the organization of the EIS, as discussed in Section 1.5. Given that organization, as influenced by the Nuclear Waste Policy Act information such as that suggested by this comment does not have a bearing on the environmental impacts that could occur from implementation of a Proposed Action to construct, operate and monitor, and eventually close a repository. Furthermore, discussions of the implementation of the original Nuclear Waste Policy Act, Congressional investigations, and the passage of the 1987 amendments are outside the scope of this EIS, which was established by Congress.

1.1 (6229)
Comment - EIS001560 / 0001
Some of the individuals and groups who may support the transportation plan and the Yucca Mountain plan may sound like they're coming from a position of not in my own back yard. I don't want it stored here so let's find another place, you know, out in the middle of nowhere. But my guess is that they're coming from a no win situation created by, what some previous speakers have been calling, you know, this long time use of an unsafe fuel source that we don't know what to do with the waste. So out of the fear that we have of coming from the effects of the

mistakes that have already been made, we have to find something to do with this. So even if we are expressing some support for a plan that's going to find a place to store this, it's out of no other alternative yet.

Response
Chapter 1 of the EIS explains that the Nuclear Waste Policy Act established the Federal Government's responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste and set forth a process and schedule for disposal of these materials in a geologic repository. The Act recognized a need to ensure that spent nuclear fuel and high-level radioactive waste now accumulating at commercial and DOE sites does not adversely affect the public health and safety and the environment [Section 111 (a)(7)].

In 1987, Congress amended the Nuclear Waste Policy Act by directing DOE to determine whether Yucca Mountain is suitable for a geologic repository.

1.1 (6370)
Comment - EIS000421 / 0003
Moreover, I don't think there should be a single site.

Response
The NWPA requires the Nuclear Regulatory Commission authorization of the repository to include a prohibition against the emplacement of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste until a second repository is in operation. Therefore, a site for a second repository could be considered in the future.

1.1 (6517)
Comment - EIS001241 / 0017
If the nuclear waste destined for Yucca Mountain is as safe as DEIS 0250D claims, why does it need to be moved from current storage locations?

As requested/suggested by a DOE representative at the Dec. 9, 1999 public hearing in Crescent Valley, I submit the attached map to indicate the proximity of my land and have to the proximity and alternate rail alignments of the Carlin Route.

Response
As described in Chapter 1 of the EIS, Congress, through the passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a potential geologic repository. The investigations and evaluations consisted of scientific, engineering and technical studies (see Section 1.4.3.1 of the EIS). The results of the program have provided information for the EIS and other Departmental documents. In addition, various independent entities including the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada, and affected units of local government reviewed the results of the site characterization program.

DOE acknowledges receipt of the map showing the location of the commenter's land.

1.1 (6753)
Comment - EIS001377 / 0012
The revised Draft EIS must provide a National Exit Strategy from the mining, production, research, testing and use of nuclear materials.

Response
Section 1.3.2 of the EIS explains that the NWPA directs the Secretary of Energy to study the Yucca Mountain site and recommend whether the President should approve the site for development as a repository. The EIS was prepared as part of the evaluation of the Yucca Mountain Site as a potential location for a repository. Providing a National Exit Strategy on the mining, production, research, testing, and use of nuclear materials is outside the scope of this EIS as established by Congress.

1.1 (6888)
Comment - EIS001611 / 0002
I heard two bits of information that was put on the record earlier today which I believe is erroneous, and I would ask that in future hearings or in future public situations, that the DOE take the lead and correct these misinterpretations. The first that I constantly hear is that this project is going to consolidate 77 sites into one site and isn't that environmentally better. Well, it is, but that's not going to happen for a long period of time. In fact, it's illegal to reduce the number of sites, the spent fuel pools and simultaneously run nuclear power plants. So the correct figure is really that the Yucca Mountain project is adding the 78th facility until such time as the reactors begin to shut down.

You cannot operate a nuclear reactor in this country unless you have an operating spent fuel pool. So Yucca Mountain, the DOE needs to go on record publicly saying this is actually the 78th high level radioactive waste facility until such time as the nuclear power plants shut down.

Response
Spent nuclear fuel will continue to accumulate at commercial nuclear reactor sites while the reactors are operating. In the short term, development of a repository would reduce the need to expand waste storage capacity at the reactor sites.

1.1 (6955)
Comment - EIS001807 / 0003
In drafting a plan to deal with highly radioactive waste, I encourage the Department of Energy to form a special methodology for dealing with such waste. Safety must be its chief concern.

Response
As described in Chapter 1 of the EIS, Congress has determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. Section 1.3.1 of the EIS discusses the background of the national effort to manage spent nuclear fuel and high-level radioactive waste that ultimately resulted in the 1981 Record of Decision announcing the DOE decision to pursue mined geologic disposal (46 *FR* 26677, May 14, 1981). The Nuclear Waste Policy Act of 1982 recognized a need to ensure that spent nuclear fuel and high-level radioactive waste accumulating at commercial and DOE sites do not adversely affect public health and safety and the environment [Section 111(a)(7)].

The repository would operate only if DOE demonstrated that it would meet public health and safety standards promulgated by the Environmental Protection Agency and the Nuclear Regulatory Commission. These standards limit the amount and timing of releases from the repository so that public health and safety would be protected. DOE would design and operate the repository to meet such standards. In the vicinity of the repository – the area within 80 kilometers (50 miles) of Yucca Mountain – DOE estimates that no individual would receive more than a few millirem (a thousandth of a rem) per year during the operations/preclosure period (see Sections 4.1.2 and 4.1.7 of the EIS) or during the 10,000-year period after the repository was closed (see Section 5.4). Based on the results of these analyses, DOE has concluded that the repository would provide a high degree of long-term isolation of spent nuclear fuel and high-level radioactive waste (consistent with the radiation protection standards in 40 CFR Part 197).

1.1 (7168)
Comment - EIS001337 / 0059
Page 1-1 The purpose and need of the environmental impact statement described here should make explicit reference to the potential use of the document in informing the Secretary of Energy, the President and the Congress regarding the need for new legislation.

Response
Under the NWPA, if DOE decided not to proceed with the development of a repository at Yucca Mountain, it would prepare a report to Congress with its recommendations for further action to ensure the safe permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority.

1.1 (7292)
Comment - EIS001832 / 0030
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 [metric tons of uranium] 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 [Nuclear Waste Policy Act] 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.

Response
The NWPA requires the Nuclear Regulatory Commission authorization of the repository to include a prohibition against the emplacement of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste until a second repository is in operation. Therefore, a site for a second repository could be considered in the future.

1.1 (7777)
Comment - EIS000817 / 0032
P. S-59 mention of "exceeding" the proposed action inventory of 70,000 MTHM [metric tons of heavy metal] is probably just what will happen and I think people in Nevada realize that. Once you finally get any repository site accepted, that will probably be where everything will go whether kept above ground or below. You will have too much trouble ever siting a second or third repository and you will need the space. It's inevitable. And you already have impacts from nuclear testing and possible storage of waste at Nellis Air Force Range. How unfair to hit people in Nevada with all this just by a vote of Congress. Wisconsin put up a real fight when DOE was considering a repository in granite in our state, and would again if you tried to site a second repository here -- nonetheless I feel it unfair to dump this all on Nevada.

Response
The NWPA requires the Nuclear Regulatory Commission authorization of the repository to include a prohibition against the emplacement of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste until a second repository is in operation. Therefore, a site for a second repository could be considered in the future, if the Act was not changed to accommodate the additional inventory analyzed in this EIS.

1.1 (8202)
Comment - EIS000817 / 0094
The comparison to the Manhattan Project worries me. I always think of General Groves saying we had to drop the bomb to prove it works and prove to Congress and the public that they got something for their money. Dr. Ernest Moniz says, "We've got to advance toward geological disposal." Why do we have to? To prove to Congress and the public that we'll get our money's worth? I think not. Yucca Mountain has become a movement forward by its own inertia because scientists want to do it. But they will all be "long gone" by the time humans are affected by the disaster they created. It is too big a risk.

Response
As described in Chapter 1 of the EIS, Congress has determined through passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act also requires that the Federal Government take precautions to ensure that these materials do not adversely affect this and future generations.

Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1976, the Energy Research and Development Administration (another predecessor agency) began investigating geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and launching waste into the sun. In 1981, DOE determined (46 *FR* 26677, May 14, 1981) that it would pursue mined geologic disposal.

The apparent advantages of a geologic repository are that it would not require perpetual human care and it would not rely on the stability of society for thousands of years into the future. Rather, it would rely on a series of barriers, natural and engineered, to contain the waste for thousands of years and to minimize the amount of radioactive material that could eventually escape from a repository and reach the human environment.

1.1 (8257)
Comment - EIS001950 / 0001
I believe it is unethical to continue to study Yucca Mountain as the only site for HLRW when the nation's waste producers, both Military and civilian, are currently producing and have plans to produce more of the wastes. Eventually the proposed action (if approved) will be filled. What is protecting Nevada from being targeted for future waste?

Response
The NWPA requires the Nuclear Regulatory Commission authorization of the repository to include a prohibition against the emplacement of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste until a second repository is in operation. Therefore, a site for a second repository could be considered in the future.

1.1 (8509)
Comment - EIS001032 / 0004
You have a responsibility to the citizens in this country, not to the nuclear and electrical utility lobbies who buy the elections of our congress people, who are waiting to act upon your recommendation. You must tell them three simple things: 1) shipping the waste is wrong, 2) storing the waste on site is the only logical conclusion, and 3) you are changing your name to the DOAE (the Department of Alternative Energy).

Response
As described in Chapter 1 of the EIS, Congress, through passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a potential geologic repository. The investigations and evaluations consisted of scientific, engineering and technical studies (see Section 1.4.3.1 of the EIS). The results of the program have provided information for the EIS and other Departmental documents. In addition, various independent entities including the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada, and affected units of local government reviewed the results of the site characterization program.

Virtually every expert group that has examined the disposal of high-level radioactive waste has agreed that a geologic repository is the best approach. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). Their May 2001report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001), reaffirms this position. The National Research Council maintains that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

1.1 (9049)
Comment - EIS001866 / 0006
The notice of intent (NOI) for the preparation of an environmental impact statement (EIS) for a repository at Yucca Mountain states that the need for a repository is not required to be considered. However in an effort to provide an unchallengeable need, the NOI clearly states in the background section -- (page 9) that the action (the Yucca Mountain repository) is being taken in accordance with the Nuclear Waste Policy Act of 1982 which was passed "in response to the continued accumulation of spent nuclear fuel (SNF) and high-level radioactive waste (HLW)." A repository will not address or resolve the issue of continued accumulation of SNF at the nation's commercial nuclear reactors. Waste removed from reactor pools will create available space for new waste being removed from the core, so waste will continue to accumulate at each reactor until shutdown of the plant. If the need or intent of the action is to respond to or halt future accumulation of waste, then the best alternative is the "No Action" which initially calls for the evaluation of continued accumulation of waste. If adopted, this action would lead to cessation of reactor operations thereby halting production and accumulation of new waste at commercial plants.

Response
The NWPA requires DOE to prepare a Final EIS to accompany any site recommendation the Secretary makes to the President. The purpose of this EIS, as stated in Chapter 1, is to address the actions DOE proposes to take to develop a repository at Yucca Mountain. In addition, the EIS considers systems for the transportation of spent nuclear fuel and high-level radioactive waste from 77 sites to Yucca Mountain. It analyzes potential environmental impacts of constructing, operating and monitoring, and eventually closing a repository for the disposal of spent nuclear fuel and high-level radioactive waste. Addressing the future accumulation of waste or the elimination of nuclear power are issues that are outside the scope of this EIS.

1.1 (9858)
Comment - EIS001888 / 0424
[Clark County summary of comments it has received from the public.]

DOE needs to look at what is being done in France and other places with the nuclear waste. It isn't fair for the waste to come to Nevada. Trying to decide whether to move my family from Nevada if Yucca Mountain is licensed.

Response
Section 1.3 of the EIS provides background information on the management of spent nuclear fuel and high-level radioactive waste. Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1976, the Energy Research and Development Administration (another predecessor agency) began investigating geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and launching waste into the sun. Based on the results of these investigations and the analyses of the *Final Environmental Impact Statement Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980), DOE determined in a Record of Decision issued in 1981 (46 *FR* 26677, May 14, 1981) that it would pursue mined geologic disposal.

In 1982, Congress enacted the Nuclear Waste Policy Act, which acknowledged the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste. The Act began a process for selecting sites for technical study as potential geologic repository locations. In 1986, DOE recommended three sites (Deaf Smith County, Texas, the Hanford Site in Washington, and Yucca Mountain)

for study as repository site candidates. Congress amended the law through the Nuclear Waste Policy Amendments Act of 1987, directing DOE to determine whether Yucca Mountain is suitable for a geologic repository.

The advantage of a geologic repository is that it would not require perpetual human care and would not rely on the stability of society for many thousands of years into the future. Rather, it would rely on a series of barriers, natural and engineered, to contain the waste for thousands of years and to minimize the amount of radioactive material that could eventually escape and reach the human environment. All countries pursuing geologic disposal use the multibarrier approach, though the barriers differ (DIRS 101779-DOE 1998). The German disposal concept, for example, relies heavily on the geologic barrier, a rock salt formation, at the prospective disposal site. The Swedish method, on the other hand, relies heavily on thick copper waste packages to contain waste. The U.S. approach, as recommended in the 1979 Report to the President by the Interagency Review Group on Nuclear Waste Management (DIRS 100149-Interagency Review Group on Nuclear Waste Management 1979) is to design a repository in which the natural and engineered barriers work as a system, so no barriers would fail for the same reason or at the same time. This design strategy is called defense-in-depth.

France has not selected a candidate site for a high-level radioactive waste repository, although it has begun construction of an underground research laboratory at Bure (Meuse Haute-Marne) in eastern France. In 1990, public opposition led to a moratorium on repository site selection. The Waste Act of 1991 established a legislative framework for disposition of high-level and long-lived intermediate-level wastes and initiated a 15-year research program in three areas:

1. Separation and transmutation of long-lived isotopes in waste
2. Disposition in deep geologic formations (via underground research laboratory tests)
3. Immobilization processes and long-term surface storage

According to the 1991 Act, the French government will submit an overall assessment of the three research areas to Parliament by 2006. At the same time it will submit a draft law authorizing, if appropriate, the creation of a repository for high-level and long-lived wastes. Geologic disposal must provide advantages over other options, in particular, separation and transmutation, and surface storage. Considerations of retrievability or reversibility must be included in repository design. The feasibility of spent nuclear fuel disposal in deep geologic formations is also being studied.

France generates 75 percent of its electricity by nuclear power and reprocesses spent nuclear fuel extensively. This differs from the United States, where reprocessing of commercial spent nuclear fuel is prohibited due to proliferation concerns. However, even with reprocessing and the development or use of other technologies such as separation and transmutation, there would still remain a significant quantity of high-level radioactive waste material requiring ultimate disposal. In the United States, there is also a large quantity of defense high-level radioactive waste that requires disposal after immobilization.

1.1 (10101)
Comment - EIS001739 / 0003
I am dismayed because somehow -- I don't want my government to do my thinking for me. I don't want them to come into my personal life and make my decisions for me, but by-golly I expect my government and its agencies to protect me; to protect me, to protect my home and to protect my children's future.

Response
As described in Chapter 1 of the EIS, Congress, through the passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

1.1 (10216)
Comment - EIS001888 / 0578
[Clark County summary of comments it has received from the public.]

Several commenters indicated that the EIS should address the inequities and the "political" and related aspects of the process by which Yucca Mountain site was elected for study by Congress. Issues raised by the commenters included: (1) siting a repository at Yucca Mountain considering that the original NWPA [Nuclear Waste Policy Act] required selection of a first site west of the Mississippi River and a second site east of the Mississippi River, (2) the validity of the NWPA given that the state was viewed as politically weak and that comparative evaluations among sites are not possible.

Response
Section 1.3.2 of the EIS discusses the evolution of the Nuclear Waste Policy Act and how Congress chose Yucca Mountain as the only location for study as a potential repository site. The Act, passed by Congress in 1982, began a process for selecting sites for technical study as potential repository locations. DOE nominated nine sites for further consideration, and published environmental assessments for five of them in May 1986. In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. It eliminated Deaf Smith County, Texas, and the Hanford Site in Washington, which were under study at the time.

DOE has modified Section 1.4.1 of the EIS by adding additional discussion of why Congress selected Yucca Mountain as the only site for study as a potential repository site.

1.1 (10528)
Comment - EIS002159 / 0003
This is one of their own statements stating like -- I know that these people are intelligent somewhere, but it's just they don't act like it, and the next statement is like they're talking about natural disaster and they go on to say acts -- excuse me. Natural disasters are a dramatic example of people living in conflict with the environment, period.

And they go on to say sustainable development implies not only disaster resistance, but also resource efficiency. The prudent use of energy, water and materials to ensure supplies for future generations. Well, at first glance this facet of sustainable development may seem unrelated to a disaster prevention. In truth, they are intrinsically tied, and this is from your statements. You guys know this stuff and you're not practicing it. This is like disaster planning, curiously stuff you have in here, and that's what's going on with Yucca Mountain. We've got a conclusion that we're trying to back some logic in to back into a conclusion, and yet I think that they're planning a real disaster up there regardless.

Response
As described in Chapter 1 of the EIS, Congress has determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act recognizes a need to ensure that spent nuclear fuel and high-level radioactive waste accumulating at commercial and DOE sites do not adversely affect public health and safety and the environment [Section 111(a)(7)].

The repository would operate only if DOE can demonstrate that it would meet public health and safety radiation protection standards and criteria established by the Environmental Protection Agency and the Nuclear Regulatory Commission. In the vicinity of the repository—the area within 80 kilometers (50 miles) of Yucca Mountain—DOE estimates that no individual would receive more than a few millirem (a thousandth of a rem) per year during the preclosure period (see Sections 4.1.2 and 4.1.7) or during the 10,000-year period after the repository was closed (see Section 5.4).

1.1 (10647)
Comment - EIS001965 / 0010
Before addressing our particular concerns with respect to this "environmental impact analysis," we wish first to comment on the selection process in general. According to the DEIS, the Nuclear Waste Policy Act acknowledged the "Federal Government's responsibility" to provide for permanent disposal of our nation's spent nuclear fuel and

high-level radioactive waste. (DEIS at 1-9). This Act, set in motion a process whereby three "repository site candidates" were identified and approved. The DEIS goes on to note, that in 1987, Congress "significantly amended" the Act to single out only one of the sites for study. (Id.). Provisions in the Nuclear Waste Policy Act as amended in 1987 allow the DOE to prepare an environmental impact statement which doesn't consider the need for a repository, alternative locations or alternatives to geological disposal. This amendment was attached at the last minute at the urging of the nuclear industry, it was not subject to wide debate or public discussion, hardly the actions of a DOE concerned about the future generations. By not including a needs statement or any alternatives the EIS process is completely subverted. The evaluation of alternatives is the heart of the NEPA process. The DOE was asked to include alternatives during the scoping process in 1995, yet has ignored the public's requests. The DEIS fails to provide an adequate description of the process by which Yucca Mountain was singled out for exclusive study.

The process, as outlined in the DEIS, fails to provide the reader with any insight whatsoever into the decision-making process that resulted in the need for and purpose of the document. From what one is presented with in the DEIS, it appears simply that Nevada lacks the political strength to defend itself. Without any discussion of the reasoning behind the singling out [of] Yucca Mountain, the Act appears undemocratic at best and fraudulent at worst. With ever increasing skepticism directed towards our Congress and political system, the need for truly open and honest democratic discourse cannot be debated. The DEIS needs to assure the reader that the purpose and need for the project are well reasoned and accurately reflect the reality of the situation.

Response
Chapter 1 of the EIS explains that the Nuclear Waste Policy Act of 1982 established the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste and set forth a process and schedule for disposal of these materials in a geologic repository. The Act recognized a need to ensure that the materials now accumulating at commercial and DOE sites do not adversely affect the public health and safety and the environment [Section 111 (a)(7)]. In addition, it requires the Secretary of Energy to submit a Final EIS if recommending whether the President approve a site for the development of a repository [Section 114(a)(D)]. DOE believes that Chapter 1 adequately describes the purpose and need for the repository.

1.1 (10794)
Comment - EIS002170 / 0006
The EIS needs to include the following:

Considering the magnitude of this problem, and the longevity of the dangerous materials created, decommissioning of all toxic long half-life nuclear waste creating industries should be part of this study. The government, etc., is ignoring the fact that the source of this problem is not being discontinued, but is indeed being encouraged to create even more waste by giving them more storage space!

Response
Congress' enactment of the Nuclear Waste Policy Act in 1982 established the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste and set forth a process and schedule for the disposal of these materials in a geologic repository. In 1987, Congress amended this Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository.

The NWPA requires DOE to prepare a Final EIS to accompany any recommendation submitted to the President to approve Yucca Mountain for development as a repository. Consistent with the NWPA, DOE developed this EIS, which analyzes potential environmental impacts of constructing, operating and monitoring, and eventually closing a repository for the disposal of spent nuclear fuel and high-level radioactive waste. The issues of whether nuclear power should be eliminated as a source of electricity for this country, and the decommissioning of nuclear powerplants, are outside the scope of this EIS.

1.1 (10892)
Comment - EIS000431 / 0004
The government has some of the smartest people in the world working for them. I can't believe that Yucca Mountain was the best they came up with. I think it is the politicians that agree to do the project to make them look good to the dumb public. The politicians say to the people that they are getting rid of nuclear waste without giving

any explanations. I don't have a solution, just that you get those smart people [and] lock them up for however long it takes. I am sure that they will come up with some good ideas and then investigate those ideas. Out [of] all the ideas I bet there is one out there that will solve the problem at hand.

Response
Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a report from the National Academy of Sciences to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-National Academy of Sciences 1957). In 1976, the Energy Research and Development Administration (another DOE predecessor agency) began investigating geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and rocketing waste into the sun. Based on the results of these investigations and the analyses of the *Final Environmental Impact Statement Management of Commercially Generated Radioactive Waste* (DIRS 104832- DOE 1980), DOE determined in a Record of Decision issued in 1981 (46 *FR* 26677, May 14, 1981) that it would pursue mined geologic disposal.

Virtually every expert group that has examined the disposal of high-level radioactive waste (including spent nuclear fuel) has agreed that a geologic repository is the best approach. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). Their May 2001 report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001), reaffirms this position. The National Research Council maintains that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

The NWPA directs DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE has conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a repository. The results of the program have provided information for this EIS and other documents. The investigations and evaluations have consisted of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS). The Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada, and affected units of local government have reviewed the results of the site characterization program.

The Secretary of Energy will consider this information, as well as the results of the environmental analyses in this EIS and public input, in determining whether to recommend development of the Yucca Mountain site as a repository to the President.

1.1 (10915)
Comment - EIS000289 / 0010
Now it's on the table also that there is every intention to create a second national repository. When does the expansion end?

Response
The NWPA requires the Nuclear Regulatory Commission authorization of the repository to include a prohibition against the emplacement of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste until a second repository is in operation. Therefore, a site for a second repository could be considered in the future.

1.1 (11025)
Comment - EIS000514 / 0003
My brother, his wife, and his mother-in-law and her two children live in Las Vegas. Every time I go down he says, "What do you know about Yucca Mountain?" I go out amongst Las Vegas. I don't hear the sorts of things I hear when I work on the Rocky Mountain Arsenal. I don't hear the kinds of things that, "This is wrong." I hear people that are genuinely afraid of this site. People are afraid of Yucca Mountain.

The State of Nevada – here, I got a little brochure from them. "Why does the state oppose Yucca Mountain?" I think you've heard lots of good reasons. You got people from the State of Nevada that go to all of these things. They tell you why they don't like Yucca Mountain.

What have we got wrong here? We've got the people whose land this belongs to say they don't want it there. We've got the state in which this falls saying they don't want it there. Not only do some 70 percent of the people I understand from the latest poll don't want it there, the government doesn't want it there, the representatives don't want it there. The only people that want it there are the industry people that have something to make a buck off of it.

Response
As described in Chapter 1 of the EIS, Congress, through passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

The NWPA directs DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE has conducted a series of investigations and evaluations (the site characterization program) to assess the suitability of the Yucca Mountain site as a repository. The results of the program have provided information for this EIS and other documents. The investigations and evaluations have consisted of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS). The Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada, and affected units of local government have reviewed the results of the site characterization program.

The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in this EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to recommend to the President the development of a repository at Yucca Mountain. The President would then decide whether to recommend the site to Congress. If so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if that does not happen, the site is approved). Assuming that a notice of disapproval was received, the site would be disapproved unless, during the first 90 days of continuous session of Congress after the notice of disapproval, Congress passed a joint resolution of repository siting approval that the President then signed into law.

1.1 (11110)
Comment - EIS001207 / 0001
As the agency implements National Environmental Policy Act (NEPA) in the Yucca Mountain Project, the agency is determining the suitability of an unprecedented project; i.e., the nation's first "permanent" repository for high-level radioactive waste after the site has been selected, i.e., named in Nuclear Waste Policy Act. No "other candidate site," as of the date of this correspondence to my knowledge, has ever been considered as an alternative to the Yucca Mountain site. Although, it would seem reasonable to predict that another candidate will be required or that the Yucca Mountain 70,000 metric-ton capacity will require future adjustments to accommodate: 1) the spent nuclear fuel already awaiting disposal, 2) the commercial spent nuclear fuel projected to produced requiring disposal (in civilian nuclear reactor using LEU [low-enriched uranium] fuel), 3) the "uncertainty" of the final disposition of 33 metric tons of surplus-to-national-defense-program needs of nuclear weapons grade plutonium to be recycled "used" in commercial nuclear reactors, and 4) the 17 metric tons of surplus plutonium to be immobilized in ceramic form, sealed in cans, and placed in canisters filled with [borosilicate] glass at the Defense Waste Processing Facility, SRS, Ref: U.S. DEPARTMENT OF ENERGY, RECORD OF DECISION FOR THE SURPLUS PLUTONIUM DISPOSITION FINAL ENVIRONMENTAL IMPACT STATEMENT. Issued January 4, 2000.

"CONCLUSION:
"The Department of Energy has decided to disposition up to 50 metric tons of plutonium at SRS using a hybrid approach and the MOX [mixed-oxide] approach. Approximately 17 metric tons of surplus plutonium will be immobilized in a ceramic form, placed in cans, and embedded in large canisters containing high-level vitrified waste for ULTIMATE DISPOSAL IN A GEOLOGIC REPOSITORY PURSUANT TO THE NUCLEAR WASTE

POLICY ACT (Emphasis added). Approximately 33 metric tons of surplus plutonium will be used to fabricate HGX fuel, which will be irradiated in existing domestic, commercial reactors. The reactors are the Catawba Nuclear Station near York, South Carolina; the McQuire Nuclear Station near Huntersville, North Carolina; and the North Anna Power Station near Mineral, Virginia. THE RESULTING SPENT FUEL WILL BE PLACED IN A GEOLOGIC REPOSITORY PURSUANT TO THE NUCLEAR WASTE POLICY ACT" (emphasis added). Ibid. page 29.

It is apparent (and transparent) that the Department of Energy has either already determined that the Yucca Mountain Site is to be receptor of 33 metric tons of excess plutonium after recycling in commercial nuclear reactors (named in January 4, 2000 DOE ROD [Record of Decision]) and to "ultimately" receive 17 metric tons of surplus plutonium after processing and "placement" at DOE SRS [Savannah River Site], or alternative site to Yucca Mountain has yet to be "named" pursuant to revisiting of the language of Nuclear Waste Policy Act, after-the-fact and late in the process. Reinventing the Nuclear Waste Policy Act by belated reinterpretation would involve [considerable] deception, as would siting Yucca Mountain as designed to capacity of 70,000 metric tons with "annex" already in planning stages.

DOE Yucca Mountain Site Characterization Office has obligation to coordinate with other DOE agency actions to determine whether Yucca Mountain's design capacity (70,000 metric tons) will accommodate/hold the 17 metric tons of surplus plutonium to be processed at SRS, and the metric tons of spent nuclear fuel to be generated from recycling 33 metric tons of surplus plutonium as MOX fuel. How much high-level radioactive waste will be generated from 33 metric tons of plutonium irradiated in commercial reactors as MOX fuel?

It would certainly appear that DOE and others, through various actions, are re-designing/retro-fitting either the Yucca Mountain Site and/or the Nuclear Waste Policy Act or both. NEPA [National Environmental Policy Act] process, as well as democratic process would seem to suffer considerable harm, i.e., discredit by any such "re-designing" of the process by any agencies.

In spite of considerable pressures from political forces, DOE cannot reasonably proceed with agency actions that essentially throttle and strangle democratic process in order to, in the larger perspective, save democracy! Although, the agency has made some attempt at articulating "purpose and need" in ROD Surplus Plutonium Disposition Final Impact Statement of 1/4/2000 in support of a cooperative agreements between the United States and Russia to reduce the threat of nuclear weapons proliferation world-wide by "disposing of surplus plutonium in a safe, secure, environmentally acceptable and timely manner." (Ref: 1/4/00, ROD, pg. 3) Some obvious DOE 1/4/00 ROD contradictions require mention for consideration by DOE Yucca Mountain Site Characterization Office.

1) DOE determination in ROD 1/4/00 is to meet THE SPENT FUEL STANDARD (that surplus plutonium be made roughly as inaccessible and unattractive for weapons production as the much larger and growing stock of plutonium in civilian spent nuclear fuel) by "recycling"/generating MOX fuel from 33 metric tons of surplus weapons grade plutonium. Given the fact that plutonium produced in commercial nuclear reactors can be used in nuclear weapons (although the United States has not done so), the "unattractive" and "inaccessible" Spent Fuel Standard appears by terminology only much more significant in advancing nonproliferation of nuclear weapons by foreign countries than is actually accomplished. DOE has met THE SPENT FUEL STANDARD by ROD 1/4/00 by decision to produce SPENT FUEL-- which the U.S. has never historically used in the production of nuclear weapons! Logic would require conclusion that meeting the Spent Fuel Standard accomplishes nonproliferation of the U.S. surplus Pu [plutonium] by making it "unattractive" to the U.S. only!

2) Potential "benefit" of disposition of excess Pu in forms meeting the Spent Fuel Standard include:

   Lay(ing) the essential foundation for parallel disposition of exceed Russian plutonium, reducing risks that Russia might threaten U.S. Security by rebuilding its Cold War nuclear weapons arsenal, or that this material might be stolen for use by potential proliferators.

   Russia is presently reported to be in process of rebuilding its weapons arsenal, conventional, and high-tech. Russia's "weakness" in conventional forces has recently motivated a New Doctrine which would allow its leaders to use all existing forces--including nuclear weapons to oppose any attack, conventional, or nuclear.

Nuclear weapons formerly were to be used to defend sovereignty. It would appear that Russia intends to significantly increase spending on its military forces--which makes surplus plutonium a potentially valuable and saleable commodity. "[Putin] Calls for Increase in Weapons Spending," 1/28/2000, THE LEDGER INDEPENDENT, pg. 7-A. It would certainly seem apparent that meeting the Spent Fuel Standard has little, if anything, to do with nuclear nonproliferation as priority item on Russia's current agenda. Has DOE program-wide considered the potential sources for funding available to Russia to rebuild its nuclear and conventional arms program?

3) Threat of theft and terrorist attack of surplus plutonium increases during transport. (Ref.: DOE ROD 1/4/00, Disposition of Surplus Plutonium.) Considerable transport prior (from DOE stockpile storage to processing facilities), during processing, to the six nuclear reactor[s] for use, and after--as disposal/repository waste pursuant to The Nuclear Waste Policy Act is required in DOE ROD of 1/4/00.

4) DOE decision to "recycle" surplus U.S. weapons grade plutonium, may in all probability, proliferate plutonium rather than keep it out of "the wrong hands." Should foreign nations follow the U.S. lead in the use of MOX in commercial reactors, plutonium (not of the purity of U.S. weapons grade) will, in fact, be produced. See "Iran's Nuclear Progress a Worry," THE CINCINNATI ENQUIRER, Jan. 18, 2000, pg. A-4.

   "Even through Iran ratified the Nuclear Nonproliferation Treaty in 1970 and since 1992 ... it has repeatedly tried to overcome the major weakness in its program--the lack of either enriched uranium or plutonium. Since the early 1990's, Iran has been purchasing equipment that could be used in peaceful or nuclear weapons program from Russia, China, and European countries.

   "Russia is helping complete construction of Iran's primary nuclear reactor at Bushehr, and Moscow is training Iranian nuclear scientists." (Ref.: IBID.)

Argument with some misgivings in DOE ROD of 1/4/00 indicates foreign nations may, in fact, "misread" the signals being sent by decision to use MOX fuel in U.S. commercial nuclear reactors. Furthermore, the U.S. sent a somewhat "mixed" signal by recent Congressional failure to ratify the Nuclear (Weapons) Non-proliferation Treaty. DOE decision to recycle 37 metric tons of Pu surplus to program needs would seem highly unlikely to send higher priority signal to foreign nations, including Russia. Bluntly stated, foreign nations certainly appear to be "sending the U.S. nuclear weapons signals" which DOE should consider in agency decision-making process!

Response

This EIS analyzes potential environmental impacts of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository for disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain. Decisions made in the Surplus Plutonium Disposition EIS Record of Decision (65 *FR* 1608, January 11, 2000) are outside the scope of this EIS. However, DOE considered public input during the preparation of that EIS (DIRS 118979-DOE 1999) and in the decisionmaking process leading to its Record of Decision. As explained in that EIS and its Record of Decision, nuclear nonproliferation is a major objective of the Surplus Plutonium Disposition Program. Consistent with findings of the National Academy of Science (DIRS 154884-Holdren et al. 1995), alternatives meeting the Spent Fuel Standard would offer major nonproliferation and arms reduction benefits in comparison to leaving the material in storage in weapons-usable form. DOE believes that the Preferred Alternative selected in that Record of Decision meets this objective.

The comment correctly points out that the Surplus Plutonium Disposition EIS (DIRS 118979-DOE 1999) indicates that spent mixed-oxide fuel and immobilized plutonium would be sent to a geologic repository pursuant to the Nuclear Waste Policy Act. However, that EIS does not specify Yucca Mountain as the site for the repository, only that the material would be sent to a repository. References in the Surplus Plutonium Disposition EIS to disposition in a geologic repository do not imply that there has been a decision to site the repository at Yucca Mountain. In fact, DOE has made no decision to dispose of spent nuclear fuel or high-level radioactive waste at the proposed repository at Yucca Mountain. After the completion of the Final EIS, the Secretary of Energy will determine whether to recommend approval of the site to the President for the development of a repository. If there is such a determination, the President will then decide whether to recommend the site to Congress.

1.1 (11344)
Comment - EIS002268 / 0005
In drafting a plan to deal with this, I encourage the DOE to form a new methodology and a new method for dealing with such waste. Safety must be its chief concern. The DOE, which is charged with promoting nuclear power, may need to excuse itself from the disposal process.

Response
As described in Chapter 1 of the EIS, Congress, through the passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act established a process that will lead to a determination by the Secretary of Energy on whether to recommend that the President approve Yucca Mountain for development of a geologic repository. To date, the Secretary has not made such a determination.

The repository would operate only if DOE could demonstrate that it would meet public health and safety standards established by the Environmental Protection Agency and the Nuclear Regulatory Commission. The repository would be designed and operated to meet such standards.

1.1 (11401)
Comment - EIS002257 / 0002
The other thing I have to say is that a lot of people that are here, you are playing Russian roulette with our lives. The problem is you are not -- pointing the gun toward yourselves; you are pointing it at millions of people out there. And the thing is, just because the gun hasn't gone off yet, doesn't mean the gun isn't going to go off.

Response
As described in Chapter 1 of the EIS, Congress has determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act established a process that will lead to a determination by the Secretary of Energy on whether to recommend that the President approve Yucca Mountain for development of a geologic repository. The Secretary will make the determination regarding such a recommendation based in part on the Final EIS.

The repository would operate only if DOE could demonstrate that it would meet public health and safety standards established by the Environmental Protection Agency and criteria developed by the Nuclear Regulatory Commission. DOE would design and operate the repository to meet such standards. In the vicinity of the repository – the area within 80 kilometers (50 miles) of Yucca Mountain – DOE estimates that no individual would receive more than a few millirem (a thousandth of a rem) per year during the operations/preclosure period (see Sections 4.1.2 and 4.1.7 of the EIS) or during the 10,000-year period following repository closure (see Section 5.4). Based on the results of these analyses, DOE has concluded that the repository would provide a high degree of long-term isolation of spent nuclear fuel and high-level radioactive waste (consistent with the radiation protection standards in 40 CFR Part 197).

1.1 (11476)
Comment - EIS002247 / 0004
I want to know why hasn't there been new amendments to the Nuclear Waste Policy Act, seeing that the last amendment in '87, the screw Nevada bill -- they tried to say that Yucca Mountain is the only site to be looked at.

As we already see, Yucca Mountain is not suitable, so when is this next amendment coming in? And how can we make sure that gets passed?

Response
In 1987, Congress amended the Nuclear Waste Policy Act of 1982 by selecting Yucca Mountain as a potential location for a monitored geologic repository. The Act directs DOE to determine whether Yucca Mountain is suitable for a geologic repository and it eliminates Deaf Smith County, Texas, and the Hanford Site in Washington from characterization. DOE is not aware of any planned amendments to the Nuclear Waste Policy Act.

1.1 (11768)
Comment - EIS000574 / 0003
It's very upsetting for me to come here and see 13-year-old children that are trying to make a statement to try to educate the leaders of our country, to making reasonable and sensible decisions that aren't motivated by money and greed.

The reason that we don't hear about what's happening in our country is because the media has been bought up and controlled. General Electric owns one major television station network, Westinghouse owns another. They are two companies that manufacture nuclear equipment and build nuclear sites.

I think that it's an abomination that we should have to endure the injustices and the absolute shameful representation by our representatives, and I am appalled that my money that I work hard for and that my family has to live on should go for such insane things.

Response
As described in Chapter 1 of the EIS, Congress has determined through passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act also requires that the Federal Government take precautions to ensure that these materials do not adversely affect this and future generations.
In 1987, Congress amended the Nuclear Waste Policy Act by selecting only Yucca Mountain as a potential location for a monitored geologic repository. The Act directed DOE to determine whether Yucca Mountain is suitable for a geologic repository and eliminated Deaf Smith County, Texas, and the Hanford Site in Washington, which DOE was studying at the time.

DOE has a site characterization program to evaluate and assess the suitability of the Yucca Mountain site as a potential geologic repository and to provide information for the EIS. The program consists of scientific, engineering, and technical studies and activities. DOE used information from this program to prepare the EIS. The EIS is one of many documents the Secretary of Energy will use in determining whether to recommend Yucca Mountain to the President for development of a repository. To date, the Secretary has not made a decision about such a recommendation.

1.1 (11770)
Comment - EIS000609 / 0001
The law establishing Yucca Mountain as the site for burial was introduced by a man from Massachusetts, I think his name might have been McKey. At any rate, it was a stipulation that burial should not be in granite. That startled me because granite is part of the rigid earth, crust of the earth. It's the stable part of the crust of the earth, and burial should certainly be in the stable part of the crust of the earth, not in the unstable part. And anything west of the Wasatch is unstable.

Now that was introduced, I'm sure, I have never been told this, but I happen to understand it because there's lots of granite in New England. Of course, they don't want the stuff up there. But we don't want it here either.

And we have some granite nearby in the Sierras. The Sierra Nevada batholith is a very large body, and the central part of that in Yosemite and so forth is very stable. Along the eastern edge of it, it is not stable. It is a major fault block that's tilting westward and has raised and is raised on the eastern side. Near that fault area, it's unstable, and on eastward into Nevada it's unstable.

But the stable part of the crust of the earth is the thing that ought to be most likely considered, and in Scandinavia, as demonstrated by the DOE, the burial is in granite or granitic rock, and that's because it is stable.

Response
In 1987, Congress amended the Nuclear Waste Policy Act of 1982 by selecting Yucca Mountain as a potential location for a monitored geologic repository. The Act directs DOE to determine whether Yucca Mountain is suitable for a geologic repository, and it eliminated Deaf Smith County, Texas, and the Hanford Site in Washington, which DOE was studying at the time.

In 1995, the National Academy of Sciences issued *The Technical Bases for Yucca Mountain Standards* (DIRS 100018-National Research Council 1995). That report, prepared at the request of Congress for the Environmental Protection Agency, indicates that Yucca Mountain is stable and has been stable, in terms of its basic structure and geological setting, for a million years. Earthquakes are likely, and their potential impacts are part of the performance evaluation reported in the EIS. Volcanic activity is unlikely, but DOE has evaluated it in the EIS in terms of the risk of a dose from such an unlikely event.

1.1 (11773)
Comment - EIS000530 / 0001
I cannot understand why Yucca Mountain was chosen as a site for nuclear waste. The Las Vegas area has traffic problems, accidents constantly, it is a major tourist area, and has an exploding population.

Transporting and storing such hazardous waste with these circumstances considered makes you realize this is a major catastrophe waiting to happen.

I was born in Las Vegas, left, and returned five years ago. My children have moved here from California, also. We had planned on retiring here. If this project goes through we are going to relocate, as well as the rest of our family. Our son who is fourteen loves it here and had planned on going to UNLV [University of Nevada, Las Vegas]. Even at this age he has decided if nuclear waste is brought here he will leave, too.

Response
Section 1.3.2 of the EIS discusses the evolution of the NWPA, and how Congress selected Yucca Mountain as the only location for study as a potential repository site. The Nuclear Waste Policy Act of 1982 began a process for selecting sites for technical study as potential locations for a geologic repository. DOE nominated nine sites for further consideration and issued environmental assessments for five of the sites in May 1986. In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. It eliminates Deaf Smith County, Texas, and the Hanford Site in Washington from characterization.

Chapters 4, 5, 6, 8, and 10 of the EIS describe potential short- and long-term impacts from the repository program, including waste transport in Nevada.

1.1 (12227)
Comment - EIS001832 / 0003
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 option, 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 [National Environmental Policy Act] 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 [is] 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 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.

Response
DOE agrees that it is important for stakeholders to understand the historic context of the Yucca Mountain Project. Section S.2.2 of the EIS Summary provides an overview of this context. In addition, Section 1.3.1 provides background information on the 1981 DOE decision to pursue mined geologic disposal for the Nation's spent nuclear fuel and high-level radioactive waste (see 46 *FR* 26677, May 14, 1981). Section 1.3.2 describes the evolution of the Nuclear Waste Policy Act, which began the process for selecting sites for study as potential sites for geologic repositories.

1.1 (12336)
Comment - 010317 / 0015
Though both the DEIS and the DEIS-S contained some sections on the historical search for a U.S. high-level nuclear waste repository, they failed to tell the full story which includes efforts begun in the 1950's and study sites in southeastern U.S. salt domes.

Response
Section 1.3 of the EIS describes briefly the history of efforts to manage spent nuclear fuel and high-level radioactive waste. Referenced reports in Section 1.3 provide detailed information about the history of waste disposal. The Department does not believe that these details are needed in the EIS.

1.2 Decisions on the Proposed Action

1.2 (77)
Comment - 75 comments summarized
Commenters stated that, based on the original siting guidelines, Yucca Mountain should be eliminated as a site for a nuclear waste repository and that "wishing will not turn Yucca Mountain into a suitable geologic repository." Commenters also stated that, rather than disqualifying the site based on existing criteria, Congress and DOE have changed and weakened the site suitability criteria, and the new criteria will not be sufficient to protect public health and safety. Commenters also requested that the criteria remain unchanged. With respect to the revised criteria, commenters questioned why there are no specific disqualifiers and what specific conditions at the Yucca Mountain site would cause DOE to recommend site disqualification.

Response
DOE has not proposed to amend its general guidelines (10 CFR Part 960) to avoid the elimination of the Yucca Mountain site from consideration. Rather, the purpose of the new Yucca Mountain-specific guidelines (10 CFR Part 963) is to implement the NWPA, given the regulations and criteria of the Environmental Protection Agency (40 CFR 197) and the Nuclear Regulatory Commission (10 CFR 63), and to provide a technical basis to assess the ability (or performance) of a geologic repository at Yucca Mountain to isolate spent nuclear fuel and high-level radioactive waste from the environment.

The Nuclear Waste Policy Act of 1982 [Section 112(a)] directed the Secretary of Energy (and by extension, DOE) to issue general guidelines for the recommendation of sites for characterization, in consultation with certain Federal agencies and interested Governors, and with the concurrence of the NRC. These guidelines (issued in 1984 at 10 CFR Part 960) were to include factors related to the comparative advantages among candidate sites located in various geologic media, and other considerations such as the proximity to storage locations of spent nuclear fuel and high-level radioactive waste, and population density and distribution.

In 1987, amendments to the Nuclear Waste Policy Act specified Yucca Mountain as the only site DOE was to characterize. For this reason, DOE proposed in 1996 to clarify and focus its 10 CFR Part 960 guidelines to apply

only to the Yucca Mountain site (to be codified at 10 CFR Part 963), but never issued these guidelines as final. In 1999, DOE proposed further revisions to the draft Part 963 guidelines for three primary reasons:

1. To address comments that criticized the omission of essential details of the criteria and methodology for evaluating the suitability of the Yucca Mountain site.

2. To update the criteria and methodology for assessing site suitability based on the most current technical and scientific understanding of the performance of a potential repository, as reflected in the DOE report, *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998).

3. To be consistent with the then-proposed site-specific licensing criteria for the Yucca Mountain site issued by the NRC (the Commission has since promulgated these criteria at 10 CFR Part 63), and the then-proposed site-specific radiation protection standards issued by the Environmental Protection Agency (EPA has since promulgated these standards at 40 CFR Part 197).

In 2001, DOE promulgated its final 10 CFR Part 963 guidelines to establish the methods and criteria for determining the suitability of the Yucca Mountain site for the location of a geologic repository. These final guidelines are principally the same as those proposed in 1999.

With respect to disqualifying conditions at Yucca Mountain, the 1984 DOE general guidelines (10 CFR Part 960) include explicit disqualifiers to guide the Department's assessment of multiple sites under consideration for repository development. At that time, failure to meet the qualifying condition of any guideline was a basis for removing a site from further consideration. The current standards do not contain explicit disqualifiers, but failure to meet the Environmental Radiation Protection Standards set by the Environmental Protection Agency (40 CFR Part 197) would disqualify the site, as would failure to meet the Nuclear Regulatory Commission requirements of 10 CFR Part 63.

1.2 (78)
Comment - 19 comments summarized
Commenters discussed whether DOE should maintain the present schedule for site characterization and decisionmaking. Some commenters advocated maintaining the present schedule because many years of study have occurred, because basic political decisions had been made by Congress, and because of the need to plan for the disposition of spent nuclear fuel and high-level radioactive waste. One commenter stated that "it is now time to review the science and other elements of feasibility for Yucca Mountain and get to the stage of packaging spent nuclear fuel and shipping it safely to the best location for disposal in the United States." Other commenters contended that the schedule should be extended to allow more consideration, either because of the potential for impacts to future generations or because DOE needed to be sure of its decision and needed to have all permits in hand before bringing wastes to Yucca Mountain in order to avoid having to later transport the waste again if problems developed at Yucca Mountain.

Response
DOE's schedule for determining whether to recommend that the President approve the Yucca Mountain site for a monitored geologic repository depends on the completion of its ongoing site characterization studies. DOE is responsible for the ultimate disposition of spent nuclear fuel from commercial utilities and recognizes the need to make its recommendation.

1.2 (79)
Comment - 51 comments summarized
Commenters stated that people who live in Nevada should have the final say in what happens to them. Some commenters asked why, if many Nevadans oppose a repository at Yucca Mountain, DOE continues to proceed with the project. Others stated that in a democracy, the government should not be able to force a community to accept dangerous material for permanent storage. One commenter stated that the construction of a repository at Yucca Mountain would be illegal because the people of Nevada, the Governor of Nevada, and the Western Shoshone nation oppose it.

Response
The disposal of spent nuclear fuel and high-level radioactive waste is a concern for the country as a whole as well as the State of Nevada. Chapter 1 of the EIS explains that 77 sites in 35 states store these radioactive materials and that developing a geologic repository for disposing of the materials and a system for transporting the materials to a repository has become the focus of a national effort.

The Nuclear Waste Policy Act of 1982 established a process for selecting sites for technical study as potential geologic repository locations. In accordance with this process, DOE identified nine candidate sites, the Secretary of Energy nominated five of the nine sites for further consideration and DOE issued environmental assessments for the five sites. DOE recommended three of the five sites, of which Yucca Mountain was one, for study as repository site candidates. In 1987, Congress amended the Nuclear Waste Policy Act of 1982 directing the Secretary of Energy to perform site characterization activities at the Yucca Mountain site, and, if the site is found suitable, make a recommendation to the President on whether to approve the site for development of a repository. Any approval recommendation is required to be accompanied by a final environmental impact statement.

If the Secretary of Energy makes an approval recommendation, the President must then decide whether to recommend the site to Congress. If the President recommended the site, the legislature or Governor of the State of Nevada would have 60 days in which to submit a notice of disapproval regarding the site designation. This notice of disapproval would become final unless both houses of Congress, within 90 calendar days of continuous session of Congress following receipt of the notice of disapproval from the State, passed a resolution of siting approval, and such resolution later became law. Nevada citizens, through their democratically elected representatives in Congress and in the State Legislature and Governor's office, have had and will continue to have opportunities to make their views known.

1.2 (81)
Comment - 10 comments summarized
Commenters question DOE's decisionmaking process with respect to the transportation of spent nuclear fuel and high-level radioactive waste. One commenter stated that it is not clear whether the Secretary of Energy's determination whether to recommend the Yucca Mountain site to the President will include consideration of transportation issues. Other commenters stated that the Draft EIS does not provide the information necessary to make transportation mode and routing decisions. Without the necessary information, environmental, socioeconomic, and public health and safety impacts could occur without mitigation. If the proposed repository is approved on the basis of the EIS, DOE will begin to make a substantial commitment of resources to the proposed repository even though the method of transportation to the site has not been determined. This could result in forcing a transportation-related decision that results in unacceptable adverse impacts. This is the scenario the National Environmental Policy Act process is designed to avoid.

Response
The Secretary of Energy will consider the potential impacts associated with the transportation of spent nuclear fuel and high-level radioactive waste, among other factors, when determining whether to recommend Yucca Mountain as the site of this Nation's first monitored geologic repository. DOE believes that the EIS adequately analyzes environmental impacts that could result from either the Proposed Action or the No-Action Alternative. This belief is based on the level of information and analysis, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions where information is incomplete or unavailable, or where uncertainties exist.

DOE also believes that the EIS provides the environmental impact information necessary to make certain broad transportation-related decisions, namely the choice of a national mode of transportation outside Nevada (mostly rail or mostly legal-weight truck), the choice among alternative transportation modes in Nevada (mostly rail, mostly legal-weight truck, or heavy-haul truck with use of an associated intermodal transfer station), and the choice among alternative rail corridors or heavy-haul truck routes with use of an associated intermodal transfer station in Nevada.

DOE has identified mostly rail as its preferred mode of transportation, both nationally and in the State of Nevada. At this time, however, the Department has not identified a preference among the five potential rail corridors in Nevada.

If the Yucca Mountain site was approved, DOE would issue at some future date a Record of Decision to select a mode of transportation. If, for example, mostly rail was selected (both nationally and in Nevada), DOE would then identify a preference for one of the rail corridors in consultation with affected stakeholders, particularly the State of Nevada. In this example, DOE would announce a preferred corridor in the *Federal Register* and other media. No sooner than 30 days after the announcement of a preference, DOE would publish its selection of a rail corridor in a Record of Decision. A similar process would occur in the event that DOE selected heavy-haul truck as its mode of transportation in the State of Nevada. Other transportation decisions, such as the selection of a specific rail alignment within a corridor, would require additional field surveys, State and local government and Native American tribal consultations, environmental and engineering analyses, and NEPA reviews.

1.2 (243)

Comment - 68 comments summarized

Commenters said that DOE has already decided to construct, operate and monitor, and eventually close a repository at Yucca Mountain, regardless of scientific evidence disqualifying the site, and without responding to public concerns. These commenters believe that the EIS and the hearing process are a "rubber stamp," and that DOE is trying to "ram [the repository] down our throats" rather than objectively studying the site. Other commenters stated that the purpose of documents prepared pursuant to the National Environmental Policy Act was to make decisions, not to justify decisions already made, and that the purpose of the National Environmental Policy Act process was to explore Yucca Mountain as a possible site, not to convince the public that Yucca Mountain should be selected. Some commenters said that DOE had concealed negative impacts and manipulated data and assumptions.

Commenters also indicated that DOE efforts show a disregard for human health and safety, and that DOE has disregarded the truth.

Response

After the Department has gathered sufficient information from the site characterization program at Yucca Mountain, elicited public comments on the proposed repository, conducted public hearings in the vicinity of Yucca Mountain on the possible recommendation of the site, and completed the Final EIS, the Secretary of Energy will decide whether to recommend the site to the President for development as a repository. Based on this Final EIS, which includes responses to comments on the Draft EIS and Supplement to the Draft EIS, the Secretary will consider short- and long-term environmental impacts and human health risks from the construction and operation of the repository and from the transportation of nuclear waste to the repository. DOE believes that the EIS accurately describes the type and significance of environmental impacts that could occur if it built and operated a repository at the Yucca Mountain site.

The Nuclear Waste Policy Act of 1982 began a process for selecting sites for technical study as potential geologic repository locations. In accordance with this process, DOE identified nine candidate sites, the Secretary of Energy nominated five of the nine sites for further consideration and DOE issued environmental assessments for the five sites. DOE recommended three of the five sites, of which Yucca Mountain was one, for study as repository site candidates. In 1987, Congress amended the Nuclear Waste Policy Act of 1982 directing the Secretary of Energy to perform site characterization activities at the Yucca Mountain site, and, if the site is found suitable, make a recommendation to the President on whether to approve the site for development of a repository. The NWPA requires that a final environmental impact statement accompany any approval recommendation.

As part of the site characterization process, the Act requires the Secretary to evaluate the geology, hydrology, and other natural barrier characteristics of Yucca Mountain to determine its suitability for a repository. DOE has used information from the site characterization program in preparing the EIS, and has relied on reports and studies sponsored by other Federal agencies, the National Academy of Sciences, the Nuclear Waste Technical Review Board, the State of Nevada, and affected units of local government. The Secretary will base the site recommendation decision in part on whether the repository can satisfy DOE suitability guidelines (10 CFR Part 963), and on whether it would be likely to meet the public radiation protection standards promulgated by the Environmental Protection Agency and the Nuclear Regulatory Commission for a repository at Yucca Mountain, as well as other considerations such as the environmental consequences reported in this EIS (see Section 2.6).

The NWPA (Section 114(f)(2) and (3)) provides that DOE need not consider in the EIS the need for a geologic repository, and alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository. In

addition, the EIS does not have to consider any site other than Yucca Mountain for development as a repository. This EIS does not analyze alternatives other than the Proposed Action and No-Action Alternative.

Because the NWPA states that DOE need not consider alternatives to Yucca Mountain or geologic disposal, the Department understands that some people reading the EIS might feel that DOE is biased toward the repository. However, in the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980), DOE evaluated high-level radioactive waste disposal alternatives including very deep borehole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, space disposal, and no action. In a 1981 Record of Decision (46 *FR* 26677, May 14, 1981), DOE decided that the mined geologic disposal alternative was the best alternative for the disposition of spent nuclear fuel and high-level radioactive waste.

DOE believes that it has performed site characterization activities, as well as the analyses conducted to support the preparation of this EIS, in an open and honest fashion, consistent with the NWPA and the National Environmental Policy Act. Under no circumstances has DOE manipulated data or assumptions to obtain desired results. The health and safety of potential repository workers and the public are of paramount importance to DOE. If the repository site was approved, DOE would comply fully with Environmental Protection Agency and Nuclear Regulatory Commission regulations (40 CFR Part 197 and 10 CFR Part 63, respectively) that were developed to protect workers and the public. If the site was recommended and approved, the Commission would not license a repository unless DOE could demonstrate with "reasonable expectation" that it could meet the regulatory standards.

1.2 (588)
Comment - EIS000127 / 0005
It was brought up before that the scientific peer review studied this EIS this year. They said that the report was highly unreliable, and in fact the review panel concluded predicting how radioactive waste would behave once it is stored in the mountain, "may be beyond the analytical capabilities of any scientific and engineering team."
So we're trying to do something that we do not have the scientific ability to even study, let alone do. They're trying to ram it down our throats. We can't let it happen.

And this is the honesty that we're having out of this group of people that are writing this document and trying to ram this down our throats.

Proof they're trying to ram it down our throats, a quote from Dr. Ernest Moniz, the Undersecretary of Energy who's overseeing the Yucca Mountain research, said, quote: "One way or another, we've got to advance towards geological disposal. We're pushing it hard."

This is at a point where they're supposed to be studying if it's possible, not ramming it down our throats.

Response
As enacted by Congress, the Nuclear Waste Policy Act of 1982 directed DOE to investigate and potentially develop a permanent geologic repository for spent nuclear fuel and high-level radioactive waste in a deep subsurface location that would provide a reasonable assurance of adequate protection for the public and the environment.

The concept of geologic disposal, for decades recognized by scientists world-wide as the best approach, was reaffirmed in a May 2001 report by the National Research Council (DIRS 156712-National Research Council 2001), which stated:

"After four decades of study, geological disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management. It also offers security benefits because it would place fissile materials out of reach of all but the most sophisticated weapons builders. As in all scientific work, progress in achieving geological disposal has been marked by surprises, new insights, and the recognition that for even the best-characterized sites, there always will be uncertainties about the long-term performance of the repository system. Providing convincing evidence that any repository assures long-term safety is a continuing technical challenge. Never the less, a well-designed repository represents, after closure, a passive system containing a succession of robust safety barriers. Our present civilization designs, builds, and lives with technological facilities of much greater complexity and higher hazard potential."

Congress, in the Energy Policy Act of 1992, directed the Environmental Protection Agency to develop public health and safety standards for the protection of the public from releases of radioactive materials stored or disposed of in a repository at the Yucca Mountain site. Congress also directed the Nuclear Regulatory Commission to publish criteria for licensing the repository that would be consistent with the radiation protection standards established by the EPA. In part, the EPA standards (40 CFR Part 197) and NRC criteria (10 CFR Part 63) prescribe radiation exposure limits that the repository, based on a performance assessment, must be designed not to exceed during a 10,000-year period after closure.

DOE acknowledges that it is not possible to predict with certainty what will occur thousands of years into the future. The National Academy of Sciences, the Environmental Protection Agency, and the Nuclear Regulatory Agency also recognize the difficulty of predicting the behavior of complex natural and engineered barrier systems over long periods. The NRC regulations (see 10 CFR Part 63) acknowledge that absolute proof is not to be had in the ordinary sense of the word, and the EPA has determined (see 40 CFR Part 197) that reasonable expectation, which requires less than absolute proof, is the appropriate test of compliance.

The statement by Dr. Moniz was likely not intended to indicate his desire to push geologic disposal, regardless of site characterization results. Rather it was an expression of the DOE desire to advance the program as rapidly as sound science would support to minimize the expenditure of taxpayer and nuclear ratepayer funds.

1.2 (849)
Comment - EIS000173 / 0014
Guideline: 960.5-2-6 Preclosure Disqualifying Condition for Socioeconomic Impacts:

A site shall be disqualified if repository construction, operation, or closure would significantly degrade the quality, or would significantly reduce the quantity, of water from major sources of offsite supplies presently suitable for human consumption or crop irrigation and such impacts cannot be compensated for, or mitigated by, reasonable measures.

This guideline as written does not expressly apply to the post-closure phases of repository performance, however isolation of nuclear waste from the environment, including groundwater is implicit in the goal of the repository program. Therefore we assert that this Guideline is relevant to the assessment of Yucca Mountain.

The expectation of the Guidelines was that the geologic barrier of the site would limit radionuclide releases from the repository through time, such that environmental contamination away from the repository would not be significant. Now, as discussed, the picture is quite different. The expected performance of a Yucca Mountain repository will result in significant amounts of radionuclides degrading the quality of off-site supplies of groundwater that are presently suitable for and used for human consumption and crop irrigation. Current land use in the Yucca Mountain area includes large-scale milk production. With 92% of milk comprised of water, our children may eventually be drinking radionuclides for breakfast, lunch, and dinner.

DOE intends for the contamination to occur during the long postclosure period, and affect much of the ground water in the Amargosa Valley before it is finally discharged to the ground surface where contaminants will be reconcentrated. Compensation for this degradation, as allowed for in the Guideline, is impossible. If mitigation were feasible, it would have to be included in the repository assessment; it is not.

The ability to avoid significant groundwater degradation after closure of the repository should be no less a siting requirement that it is before and during closure. These Guidelines were designed to prevent the emplacement of high-level nuclear waste at a site that is known to contaminate water supplies. Omission of this disqualifying factor from the Post-Closure Guidelines was in actuality an affirmation of the national commitment in the Nuclear Waste Policy Act to assuring the long-term isolation of radioactivity from the environment.

Response
Consistent with the Energy Policy Act of 1992, the Environmental Protection Agency has established Yucca Mountain-specific radiation protection standards (40 CFR Part 197, Environmental Radiation Protection Standards for Yucca Mountain, Nevada). Groundwater protection standards (40 CFR 197.135) are a key element of these regulations. Also consistent with the Energy Policy Act of 1992, the Nuclear Regulatory Commission has

established final requirements for Disposal of High-Level Radioactive Waste in a Proposed Repository at Yucca Mountain, Nevada (10 CFR Part 63) for the proposed repository that are consistent with the radiation protection standards established by the Environmental Protection Agency.

As indicated in Chapter 5 of the EIS, overall human health impacts to Amargosa Valley residents would be small. The hypothetical person studied to calculate human health impacts would live year-round in the Valley, eat locally produced foods, and drink water from potentially contaminated sources. This is consistent with the reasonably maximally exposed individual defined in the Environmental Protection Agency regulations at 40 CFR 197.21.

DOE published the Supplement to the Draft EIS to focus on recent design enhancements (resulting in a flexible design) that would allow the repository to be operated in a range of higher- and lower-temperature modes. This design offers key enhancements for repository long-term performance and was carried forward to the Final EIS. As indicated in Section 5.4.2 of the Final EIS, analysis of the design using new model formulations and updated and improved data showed that the mean peak annual dose 18 kilometers (11 miles) from the repository would be near zero for the first 10,000 years after closure. The peak annual individual dose (95th percentile) would occur approximately 410,000 years after closure and would be approximately 620 millirem. The mean peak annual individual dose within 1 million years was calculated to be 150 millirem at 480,000 years. The dose to the reasonably maximally exposed individual would depend strongly on distance from the repository. Farther from the repository, the dose rates would be much lower.

The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses of the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to recommend development of a repository at Yucca Mountain to the President.

1.2 (1150)
Comment - EIS000087 / 0007
The money that could be saved by designing to the lesser standard or the higher emissions is in the billions of dollars.

I suggest to them -- them, the government, all of you people and more, too, look at the potential economics of paying every man, woman, child here in the valley a million bucks apiece, providing them with fair market value or even extraordinary market value for their properties, project the business incomes of the businesses that are here, buy everyone out and you'd be millions -- billions of dollars ahead of where you're headed.

Response
DOE is designing the proposed geologic repository at the Yucca Mountain site to the standard required to protect public health and safety and the environment, both in the short term and the long term. DOE does not believe it is appropriate to design to any lesser standard, and then attempt to buy out potentially affected landowners. Affected landowners might not be willing to sell for a variety of personal reasons, and forcing them to sell would create an undue hardship. Foremost, however, this could create essentially a "sacrifice zone" around the repository site. DOE does not believe these are desirable, or responsible, outcomes.

1.2 (1988)
Comment - EIS000515 / 0005
What I find most troubling has been the response to a petition to the Secretary of Energy in November 1998, and signed by more than 200 environmental and public interest groups. The document expressed concern about the failure of the Yucca Mountain site to pass site suitability guidelines established by the DOE for the burial of radioactive waste.

Among the facts documented in the petition are that the site of the Yucca Mountain repository is as seismically active as the California bay area, having experienced more than 600 earthquakes within a 50-mile radius of the proposed burial site within the last 20 years.

The DOE response was not to address the concerns with more scientific technological research, but to change the site suitability guidelines. If we set a precedent for violating our own safety guidelines on Yucca Mountain, what compromises await us on other environmentally flawed projects that may lie ahead?

More importantly, what is the message we send to the private contractors who will carry the waste on the highways and railways when we blatantly violate our own safety standards? What if, in an effort to make a profit, the privatized carriers follow the DOE example of compromising safety standards? What will be the financial liability when an accident occurs? Are the private carriers protected from lawsuits by individuals harmed by toxic exposures? What will be the liabilities of the federal government in the case of contamination of an area, and the individuals who live within it? Will the burden fall once again upon the taxpayers?

If the past behavior of the nuclear industry and the federal government reflects the future behavior of both entities in responding to the pleas of workers for addressing nuclear safety issues and nuclear illness issues, I fear we are in grave danger.

Response

As discussed in EIS Section 1.3.2.4, Section 121 of the NWPA directs the Environmental Protection Agency (EPA) to establish generally applicable standards to protect the general environment from offsite releases of radioactive materials in repositories and directs the Nuclear Regulatory Commission to issue technical requirements and criteria that it will apply in approving or disapproving applications for such repositories. In 1992, Congress passed the Energy Policy Act of 1992. Section 801(a) of the Energy Policy Act directs the EPA to retain the National Academy of Sciences to conduct a study and issue findings and recommendations on setting reasonable standards for protecting public health and safety in relation to a repository at Yucca Mountain. Section 801(a) also directs the EPA to establish specific standards for Yucca Mountain based on and consistent with the Academy's findings and recommendations. The National Academy of Sciences issued its findings and recommendations in a 1995 report (DIRS 100018-National Research Council 1995). The EPA established the standards in 40 CFR Part 197, Environmental Radiation Protection Standards for Yucca Mountain, Nevada. The regulations specify limits on annual committed effective doses resulting from any radioactive releases from a repository at Yucca Mountain and groundwater protection standards.

Section 801(b) of the Energy Policy Act directs the Nuclear Regulatory Commission to revise its general technical requirements and criteria for geologic repositories to be consistent with the Environmental Protection Agency's site-specific Yucca Mountain standards (10 CFR Part 60). The NRC has issued site-specific technical requirements and criteria [10 CFR Part 63, Disposal of High-Level Radioactive Wastes in a Proposed Repository at Yucca Mountain, Nevada, which it would use to evaluate an application from DOE to construct a repository at Yucca Mountain, to receive and possess spent nuclear fuel and high-level radioactive waste at such a repository, and to close and decommission such a repository.

The NWPA requires the Secretary of Energy to issue general guidelines for use in recommending potential repository sites for detailed characterization [Section 112(a)]. DOE issued these guidelines in 1984 (10 CFR Part 960). The guidelines described DOE policies applicable to the three sequential stages of the siting process in the NWPA (preliminary site screening, site nomination, and site selection for recommendation to the President). In 1996, DOE published proposed amendments to the guidelines to reflect the prevailing scientific view on how to evaluate the suitability of the Yucca Mountain site for development of a nuclear waste repository (61 *FR* 66158; December 16, 1996). Because Congress had by that time required DOE to focus only on Yucca Mountain, the Department's proposed amendments dealt with provisions of the guidelines that were applicable to the site recommendation stage. In November 1999, DOE revised its 1996 proposal to focus on the criteria and methodology to be used for evaluating geologic and related aspects of the Yucca Mountain site (64 *FR* 67054; November 30, 1999). DOE has finalized its guidelines at 10 CFR Part 963.

DOE did not revise its guidelines because of any conditions found at the Yucca Mountain site. Pursuant to Congressional direction, DOE established the bases for the site suitability criteria it would use and the methodology for applying the criteria to a design for a proposed repository at the Yucca Mountain site. In any event, failure to meet the Environmental Protection Agency standards or the Nuclear Regulatory Commission criteria for licensing would result in a decision by the Nuclear Regulatory Commission not to license the Yucca Mountain site.

With respect to financial liability in the event of an accident, the Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that as much as $9.43 billion is available to compensate for damages suffered by the public in a nuclear accident or incident, regardless of who causes the damages. The liability of all responsible parties is limited to the amount of coverage provided by the Price-Anderson system. State and local governments cannot be required to provide additional compensation.

In addition to Price-Anderson indemnification, all motor vehicles carrying spent nuclear fuel or high level radioactive waste are required by the Motor Carrier Act of 1980 (42 U.S.C. 10927) and implementing regulations (49 CFR Part 387) to maintain financial responsibility of at least $5 million. Such financial responsibility would be available to cover public liability from a non-nuclear incident and for environmental restoration. Federal law does not require rail, barge, or air carriers of radioactive materials to maintain liability coverage, although those carriers often voluntarily carry such insurance. Regardless of whether the carriers had insurance, a radioactive material incident involving them would be subject to state law that is applicable for any type of accident.

1.2 (1990)
Comment - EIS000524 / 0001
Well, I'm really not too fond of the idea of a nuclear waste site in my town, but if the government has it's heart set on this, there is really not much I can do.

Response
Nevada residents, through their democratically elected representatives in Congress, the State Legislature, and the Governor's Office, have had and will continue to have opportunities to make their views known.

1.2 (2042)
Comment - EIS000570 / 0002
It's bad enough that the nuclear waste dump is going to be rammed down our throats, but lowering the standards in order to make Yucca Mountain qualify is adding insult to injury. Nevada is almost as far away as one can get from the generators of the waste, and the transportation of it is very, very scary.

In "The Republic" Plato coined a term called the tyranny of the majority, and the tyranny of the majority simply defined is when one majority group imposes conditions on a minority group which they themselves would not agree to. And we have many examples of this throughout history.

We have examples that led up to the civil rights movement. Examples of the white majority treating African Americans differently, treating the Western Shoshone in specific differently. Giving them conditions that they themselves would not wish on themselves.

Another term for this might be called domestic imperialism. I noticed that DOE is very quibbling to say there is no nuclear waste coming from foreign governments to our lands.

Well, what about domestic imperialism? What about the fact this waste is coming from places and states where they are benefiting from nuclear energy, they are creating nuclear waste, and yet 75 percent of Nevadans have said no to nuclear energy and nuclear waste? We're not generating it here, but we're supposed to take the conditions of its existence.

That's what I call domestic imperialism. And my hat's off, even though they have already left, to all the young people that were here. There is a group that I think understands the term domestic imperialism. A minority that has conditions imposed upon them the majority does not follow.

They cannot vote. They cannot drive yet. They got on a bus and got here to speak about their future. They didn't create this waste, but they are going to have to live with it.

The Western Shoshone are another group which understand the term domestic imperialism and take it very seriously. Anybody who has ever had their land stolen out from under them, anybody who has read the Ruby Valley Treaty will take that term domestic imperialism seriously. I think as a whole Nevadans have shown that they are taking it seriously.

I would just like the DOE and the federal government to take the term domestic imperialism seriously because history has shown you cannot keep a minority group down for long. They will come back up, they will bite you in your back, and that's exactly what will happen if you do not listen to the minority you're stepping on here today.

Response
The NWPA established a comprehensive process for determining the suitability of Yucca Mountain as a repository and whether DOE should build and operate a monitored geologic repository at the site. After publication of this Final EIS, the Secretary of Energy must determine whether to recommend the site to the President. If there was such a recommendation, the President would decide whether to recommend the site to Congress. If the President made such a recommendation, the State of Nevada would have 60 days to submit a notice of disapproval. At this point the site would be disapproved unless Congress passed an approval resolution within 90 calendar days of continuous session. Nevada residents, through their elected representatives in Congress and in the State Legislature and Governor's Office, have had and will continue to have opportunities to make their views known.

Section 121 of the Nuclear Waste Policy Act directs the Environmental Protection Agency to establish generally applicable standards to protect the environment from offsite releases of radioactive materials in a repository and directed the Nuclear Regulatory Commission to issue technical requirements and criteria for such repositories. In 1992, Congress passed the Energy Policy Act of 1992. Section 801(a) of that Act directs the Environmental Protection Agency to retain the National Academy of Sciences to conduct a study and issue findings and recommendations on setting reasonable standards for protecting public health and safety in relation to a repository at Yucca Mountain. Section 801(a) also directs the Environmental Protection Agency to establish specific standards for Yucca Mountain based on and consistent wit the Academy's findings and recommendations. The National Academy of Sciences issued its findings and recommendations in a 1995 report (DIRS 100018-National Research Council 1995). The Environmental Protection Agency established the standards in 40 CFR Part 197, Environmental Radiation Protection Standards for Yucca Mountain, Nevada. The regulations specify limits on annual committed effective doses resulting from any radioactive releases from a repository at Yucca Mountain, and groundwater protection standards.

Section 801(b) of the Energy Policy Act directs the Nuclear Regulatory Commission to revise its general technical requirements and criteria for geologic repositories to be consistent with the Environmental Protection Agency's site-specific Yucca Mountain standards (40 CFR Part 197). The Nuclear Regulatory Commission has issued site-specific technical requirements and criteria (10 CFR Part 63, Disposal of High-Level Radioactive Wastes in a Proposed Repository at Yucca Mountain, Nevada), which it would use to evaluate an application from DOE to construct a repository at Yucca Mountain, to receive and possess spent nuclear fuel and high-level radioactive waste at such a repository, and to close and decommission such a repository.

DOE understands that there are strong opinions and passionate beliefs about the Ruby Valley Treaty of 1863 and that the Yucca Mountain area is sacred to the Western Shoshone. At present, the land encompassing the Yucca Mountain site is Federally owned, as documented by a U.S. Supreme Court decision that says payment for the land has been made, that payment constitutes a final settlement, and that Western Shoshone tribal land claims to the land are invalid. DOE will not debate the Supreme Court decision on the Ruby Valley Treaty of 1863. The Department will abide by current and any potential future rulings on the Treaty. Section 3.1.1.4 of the EIS acknowledges the issue over the Treaty but does not present new analysis on the issue or speculate on future Western Shoshone positions.

1.2 (2351)
Comment - EIS000644 / 0002
I was going to go through the book and say a lot of things about different things I saw there. I was amazed at the amount of money spent, the amount of people working there, to try to prove that this would work, and they are the ones that are saying to me in the background that, no, it isn't going to work, but the government wants to pay me, I'll take the money.

Well, folks, I hope that is one thing that we can kill them on. This is the National Environmental Policy Act of 1969. If you read it really close there is a couple of good paragraphs in here that will put Yucca Mountain back to Yucca Mountain and not a Yucca Mountain repository.

Response
In determining whether to make a recommendation to the President to develop a repository at Yucca Mountain, the Secretary of Energy will consider the results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

The Department believes that the EIS is consistent with the National Environmental Policy Act.

1.2 (3715)
Comment - EIS001079 / 0002
Even more troubling is the fact to help ensure approval of the site, Congress undermined key provisions of the National Environmental Policy Act (NEPA) with respect to the Yucca Mountain project. NWPA [the Nuclear Waste Policy Act] as enacted limited the scope and extent of the evaluation of potential environmental impacts normally required in an environmental impact statement under NEPA. Specifically, NWPA exempts the Yucca Mountain environmental impact statement from consideration of: the need for a repository; the time of initial availability of the repository; alternative sites to Yucca Mountain; and alternatives to geologic disposal of high-level waste. Congress has, in other words, significantly diminished the inherent value of conducting an environmental impact statement, in an apparent attempt to rubber stamp NEPA approval on the project.

Response
The purpose of the National Environmental Policy Act is to promote an understanding of the environmental consequences of Federal actions before decisions are made. The Act does not prohibit activities that might harm the environment; rather, it requires Federal agencies to disclose the extent of such environmental harm, and any environmental benefits, to the public and agency decisionmakers. DOE believes that the EIS appropriately describes the type and magnitude of environmental impacts that could occur if it constructed, operated and monitored, and eventually closed a repository at the Yucca Mountain Site.

DOE believes that the EIS is consistent with the National Environmental Policy Act.

1.2 (4396)
Comment - EIS000813 / 0003
The mandate by Congress, that no alternative sites to Yucca Mountain need to be established, seems most unreasonable; we, as Nevadans, are being coerced into accepting a site, which has been rejected by other states. So here we are forced by power politics to accept what is being rammed into our landscape. This is no issue for power politics.

Response
The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President whether to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

1.2 (4969)
Comment - EIS001326 / 0003
I have learned from history that the worst things happen to people who don't have a way out. Before you start this project be sure to have a way out.

Response
From the start of emplacement until closure, there would be continuous monitoring of the repository through an elaborate system of sensors and administrative inspections. A post-permanent-closure monitoring program is required by Nuclear Regulatory Commission regulations (10 CFR Part 63). These regulations include requirements for monitoring activities that would occur around the repository after DOE closed and sealed it.

As discussed in Section 4.2 of the EIS, DOE has considered the impacts of retrieving material from the repository. Although the Department does not anticipate retrieval, and it is not part of the Proposed Action, DOE would maintain the ability to retrieve the waste for at least 100 years and possibly more than 300 years in case retrieval became necessary to protect public health and safety or the environment or to recover resources from spent nuclear fuel. Section 4.2 also discusses impacts from above-ground storage prior to waste emplacement.

1.2 (5244)
Comment - EIS001887 / 0008
The NEPA [National Environmental Policy Act] analysis in the document is segmented, which can only lead to fragmented decision making. In the State's view, DOE has corrupted the NEPA process by leaving some of the most significant issues and impacts un-assessed. DOE has either refused to assess or purposely postponed key decisions concerning national and local transportation modes and routing alternatives. These actions have conveniently avoided compliance with NEPA tiering requirements.

Response
DOE believes that the EIS adequately analyzes environmental impacts that could result from the Proposed Action or the No-Action Alternative. DOE has identified mostly rail as the preferred mode of transportation both nationally and in the State of Nevada. The Foreword of the EIS acknowledges that DOE would need to prepare project-specific National Environmental Policy Act documents before siting, constructing, and operating a branch rail line. In that regard, the EIS assesses the environmental impacts of the proposed repository program, to which DOE would tier (link) later National Environmental Policy Act documents.

1.2 (5315)
Comment - EIS001887 / 0049
Page 1-3; Section 1.1 - Potential Actions and Decisions Regarding the Proposed Repository

This section must also include a discussion about the need for and/or option to use NEPA [National Environmental Policy Act] supplemental environmental impacts statements to address forthcoming repository related decisions (as per 10 CFR 102.314). State officials contend that DOE will receive substantial public comment on the Draft EIS about the lack of NEPA analysis to support the selection of transportation modes and routes. DOE must advise readers that supplemental EIS documents will be prepared if DOE determines that the purpose of NEPA will be furthered by doing so (40 CFR 1502.9(c)(2). This section should also note that DOE is required to prepare a supplemental EIS if there are substantial changes in the Proposed Action that are relevant to environmental concerns, or if there are significant new circumstances or information about environmental concerns that would affect the Proposed Action or its impacts (40 CFR 1502.9(c)).

Response
To resolve some uncertainties and to provide information on the repository design that became available after the publication of the Draft EIS, DOE published a Supplement to the Draft EIS to provide updated information to the public. The Supplement focused on the most recent base design, including various heat management scenarios. This information was carried forward to the Final EIS.

DOE believes that the EIS adequately analyzes impacts that could result from the Proposed Action or the No-Action Alternative. If Yucca Mountain is approved and if rail is chosen as the preferred mode of transportation, DOE recognizes that additional National Environmental Policy Act studies and documentation for the specific alignment

of a rail route in an identified rail corridor would be necessary, and has stated this in the EIS (see the Foreword and Section 1.1, for example).

1.2 (6124)
Comment - EIS001654 / 0044
Figure 2-5 shows the array of choices in both repository design and transportation of waste that stakeholders have an opportunity to review and comment upon. We [are] confident that the Department of Energy and other federal agencies involved will consider each of these important factors in developing the best balanced approach to repository design and operations that places safety as the foremost consideration. We urge that the process continue to be open to coordination with State and local governments and other stakeholders and that a public education program continue.

We know that much effort has gone into the site characterization process and that scientific studies have been conducted to help develop preliminary repository designs and operational planning. Program schedules show that there will be several more years of effort and hundreds of millions of dollars expended to refine each of those details to be included in a construction license application to be presented to the independent Nuclear Regulatory Commission for a rigorous review before granting a license now scheduled no sooner than 2005.

Response
With regard to programs to coordinate with state and local governments and other stakeholders and to inform the public, DOE intends to continue its practice of meeting regularly with the State of Nevada, affected units of local government, and Native American tribal governments to provide information and identify concerns. In addition, DOE will continue to involve the public in its decisionmaking processes on the proposed Yucca Mountain Repository.

1.2 (6421)
Comment - EIS001828 / 0001
It is clear that while transportation of nuclear waste to Yucca Mountain remains an uncertainty, nuclear power industry executives are fixated on pushing the process forward with little or no concern for the residents of Southern Nevada. This point is displayed by Rod McCullum of the Nuclear Energy Institute when stating the process should move forward recognizing there is an "involuntary risk" in disposing of nuclear waste. The transportation of nuclear waste poses a clear and undeniable risk to the resident and economy of Southern Nevada. Furthermore, such comments undermine and trivialize the very real concerns we have about the impacts on our communities for years to come.

Response
The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President whether to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

Chapter 6 of the EIS addresses risks associated with the transportation of spent nuclear fuel and high-level radioactive waste. DOE recognizes that even an incident-free transportation campaign could adversely affect people who lived or worked near the routes. For truck transportation, such effects could include noise and air pollution due to increased truck traffic. For rail transportation, they could include land use and aesthetic impacts as a result of the need to construct a branch rail line to the Yucca Mountain site.

DOE analyzed impacts from transportation accidents. Although traffic accidents would be probable, given the estimated number of shipments, DOE does not believe that any such accident would result in the release of radioactive material, primarily because of the structural integrity of the casks in which it would ship the material.

1.2 (6704)
Comment - EIS001377 / 0001
In my comments, I will refer to the DOE Draft EIS as "your" Draft to clarify that I hold the authors of this document accountable to all of us living now, to the Ancestors, and to future generations, for the personal decisions they are making to work on this project and for the recommendations they are individually and collectively making to support the DOE "Proposed Action."

Response
Consistent with the regulations on the National Environmental Policy Act promulgated by the Council on Environmental Quality, DOE takes responsibility for the scope and content of this EIS [see 40 CFR 1506.5(c)]. The contributors to the EIS listed in Chapter 13 of the EIS used their respective expertise to describe and analyze the potential impacts of the Proposed Action as accurately as possible.

1.2 (6821)
Comment - EIS001905 / 0020
The DOE must amend its decision-making process to ensure real public participation always exists.

Response
Consistent with the National Environmental Policy Act and the Nuclear Waste Policy Act, DOE has followed a decisionmaking process that encourages public participation. As discussed in Section 1.5.1.1 of the EIS, DOE initiated public scoping in 1995, eventually holding 15 public meetings around the country. This process determined the scope of the EIS and identified issues to be analyzed. The Draft EIS is the result of this process. After issuing the Draft EIS, and again after issuing the Supplement to the Draft EIS, DOE held many public meetings across the country to seek comments on these documents. The Draft EIS hearings were held in 21 locations (two sessions at each location) and three public hearings were held on the Supplement to the Draft EIS. DOE has considered and addressed every comment it received on the Draft EIS and every comment on the Supplement received by August 31, 2001, and has made changes to the EIS as a result of comments received.

1.2 (7020)
Comment - 010123 / 0004
There should be siting guidelines. There should be a licensing rule. All of these things should have been finalized by using the public comments. I was at all of those hearings and there were a tremendous number of public comments, and we hear that they're just going along with what was proposed at that time and was highly opposed by the people of Nevada.

So what needs to happen is there needs to be rules in place, then somebody needs to come up with a site characterization plan that actually fits the project then we can go out for scoping on an Environmental Impact Statement.

Response
The Nuclear Waste Policy Act [Section 112(a)] directs the Secretary of Energy (and by extension, DOE) to issue general guidelines for the recommendation of sites for characterization, in consultation with certain Federal agencies and interested Governors, and with the concurrence of the Nuclear Regulatory Commission (NRC). These guidelines (issued in 1984 at 10 CFR Part 960) were to include factors related to the comparative advantages among candidate sites located in various geologic media, and other considerations such as the proximity to storage locations of spent nuclear fuel and high-level radioactive waste, and population density and distribution.

In 1987, amendments to the Nuclear Waste Policy Act specified Yucca Mountain as the only site DOE was to characterize. For this reason and given advancements in site characterization, DOE proposed in 1996 to clarify and focus its 10 CFR Part 960 guidelines to apply only to the Yucca Mountain site (to be codified at 10 CFR Part 963), but never issued these guidelines as final. In 1999, DOE proposed further revisions to the still draft Part 963 guidelines.

In 2001, DOE finalized its Part 963 guidelines to be consistent with the site-specific licensing criteria for the Yucca Mountain repository issued by the NRC (10 CFR Part 63) and the site-specific radiation protection standards issued by the Environmental Protection Agency (40 CFR Part 197). DOE's final guidelines incorporate comments

received during the public comment period held for the 1999 draft revision, including those given at public hearings. The NRC licensing process (10 CFR Part J) provides opportunities for public involvement in the licensing proceedings prior to any decision on Construction Authorization.

A decision concerning whether to recommend the site to the President will be made on the basis of a number of different types of information, including that contained in the Final EIS. Any recommendation would be accompanied not only by the Final EIS, but also by those other materials designated in Section 114 of the NWPA. These include, for example, a description of the proposed repository, preliminary engineering specifications for the facility, a description of the proposed waste form, an explanation of the relationship between the proposed waste form or packaging and the geologic medium of the site, a discussion of the site characterization data that relate to the safety of the site, preliminary comments of the NRC concerning the sufficiency of information for inclusion in any Departmental license application, and the views and comments of the Governor and legislature of any state or the governing body of any affected Native American tribe.

1.2 (7843)
Comment - EIS001653 / 0032
Pg 2-87 states that the Secretary of Energy is to undertake and complete site characterization activities at Yucca Mountain to provide information and data required to evaluate the site. How is this effort different from the information and analysis in the DEIS?

Response
The Nuclear Waste Policy Act established a process leading to a decision by the Secretary of Energy on whether to recommend the Yucca Mountain site to the President for development of a geologic repository. As part of this process, DOE must undertake site characterization activities at Yucca Mountain to provide information and data needed to evaluate the site and prepare an EIS. The Department has an ongoing site characterization program of investigations and evaluations to assess the suitability of the Yucca Mountain site as a potential geologic repository and to provide information for the EIS. The program consists of scientific, engineering, and technical studies and activities. DOE used information from the program in preparing the EIS.

1.2 (7978)
Comment - EIS000817 / 0044
The more I read on the less I have any confidence you are ready to make any decisions. You have many "options" for every choice and haven't come to the details of anything really. How much waste? In what form? In what package? In what transport? When closed? etc. You are leaving all such decisions to the future. That' how we got in this position in the first place -- leaving the real decisionmaking to the future.

Response
DOE believes that the EIS, including the Supplement to the Draft EIS, adequately analyzes the environmental impacts that could result from either the Proposed Action or the No-Action Alternative.

DOE identified mostly rail as its preferred mode of transportation both nationally and in the state of Nevada. At this time, DOE has not identified a preference for a specific rail corridor in Nevada. If the Yucca Mountain site was approved, and if DOE selected rail as the preferred mode of transportation, DOE would identify such a preference in consultation with affected stakeholders, particularly the State of Nevada.

1.2 (8345)
Comment - EIS001758 / 0002
I believe the proposal being presented today is unacceptable. With all the critical questions that remain regarding the present and future viability of the Yucca Mountain geology and hydrology and its ability to effectively shield the radioactive materials from our environment, I believe that the DOE must step back from this proposal and reevaluate its options.

While the Draft Environmental Impact Statement seeks to demonstrate that it's possible to transport high-level waste across state lines and that a safer permanent disposal facility has been found, I believe such reassurances are unwarranted and premature. So I urge the Department of Energy to go back to the drawing board and defer its

recommendation to Congress and the President until we have conclusive answers to the many troubling questions in this proposal.

Response
DOE believes that the EIS adequately analyzes environmental impacts that could result from the Proposed Action. This belief is based on (1) a sufficient level of detail and analysis of the performance of the repository, and of the transportation aspects of the Proposed Action, (2) the analytical methods and approaches used to develop conservative estimates of the reasonably foreseeable impacts that could occur, and (3) the use of conservative assumptions if information was incomplete or unavailable and if uncertainties existed. DOE has identified mostly rail as the preferred mode of transportation both nationally and in the State of Nevada.

1.2 (8535)
Comment - EIS001596 / 0001
Corporate power forcing upon the public a nuclear energy base which has not functioned on its own since day one. It is fundamentally a boondoggle industry dependent on massive public subsidies that allow it to perpetrate on the public serious harm without the requirement to bear the responsibilities that it creates.

We are in Chicago, the city of the done deal. So I think it is easy to recognize one when we see it. The selection of Yucca Mountain was not based, as some have stated, on the last word in science. There is a great deal of dissension amongst the scientific community about the substance of the geological structure which they have selected.

It is fundamentally an attempt to bail out the corporations and the industry that have hitched their wagon to the nuclear genie and now would like to transfer the liabilities which they have created into the public realm, and use that to justify trying to expand nuclear power at the expense of investment in alternative and renewable sources of energy.

Response
The reasonableness of past, present, or future use of nuclear power as an energy source does not diminish the need for the permanent isolation of existing spent nuclear fuel and high-level radioactive waste. The Secretary of Energy has made no decision on the suitability of Yucca Mountain as a geologic repository. As directed by Congress, DOE developed a site characterization program to investigate the suitability of the Yucca Mountain site as a potential geologic repository and to provide information for the EIS. The program consists of scientific, engineering, and technical studies and activities. The Department used the information from the program in preparing the EIS, and has relied on reports and studies sponsored by other Federal agencies, the State of Nevada, and affected units of local government. After publication of the Final EIS, the Secretary of Energy will determine whether to recommend Yucca Mountain to the President for development of a repository.

The NWPA requires DOE to prepare a Final EIS to accompany a Site Recommendation from the Secretary of Energy to the President. Consistent with this requirement, DOE developed this EIS, which analyzes potential environmental impacts of constructing, operating and monitoring, and eventually closing a repository for the disposal of spent nuclear fuel and high-level nuclear waste. The issues of eliminating nuclear power as a source of electricity for this country and decommissioning nuclear powerplants are outside the scope of this EIS.

1.2 (8641)
Comment - EIS002120 / 0001
For the record, I would like to state that Nye County has maintained a neutral position in this entire process. We neither support nor oppose the repository. Nye County recognizes that it has no role in the decision process and no voice in the outcome of this process. If a repository's identified for Yucca Mountain, Nye County will be forced to accept it. Thus Nye County's role in this entire process is to protect the health and safety of its residents and also under the Nuclear Waste Policy Act to provide technical and oversight of Department of Energy activities at Yucca Mountain.

Response
The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public

comments in determining whether to make a recommendation to the President whether to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

1.2 (9189)
Comment - EIS002123 / 0004
I would just like to state a couple of things here about Senator Murkowski and Senator Larry Craig. Senator Craig's from Idaho and Frank Murkowski is of course from Alaska, and "they want to send the nation's nuclear waste, eventually 77,000 tons to Nevada for permanent storage." Let me see here. I'll try to skip down here.

"Craig and Murkowski are gearing up for another debate on the bill to come after Congress resumes. The two will continue to clash with Bryan and Reid, Democrats who are well known for opposing waste storage in Nevada."

"The biggest problem is what to do with the waste in this country." Now get this: "It's a political problem," Craig said. "It's not a scientific problem. It's not an engineering problem. It's purely political."

Not in my backyard, and I tell him, "Mr. Murkowski, not know my front yard, either."
"This is something the country has to do," Craig said. "We cannot sit idly by and let nuclear waste pile up across the country," and you want to know that they've had a lot of nuclear waste stored in Idaho and they just recently shipped it all down to WIPP down in Carlsbad, New Mexico, and even at that, it's some that had been there for 50 years, and I thought to myself boy, that ought to be in great shape to reload and drag it halfway across the country and pass over a lot of states....

"It's safer, cheaper, and more efficient to store the waste in one place," Craig said. "Yucca seems the safest place to store it." He said, "scientists have been studying Yucca for years to determine if it's the best location for waste with no final conclusions." There should never be a conclusion to that one.

"Murkowski assumed the lead role in advocating Yucca because he is chairman of [the] Senate Energy and Natural Resources Committee." He said: "Alaska has no stored nuclear waste." Isn't that a surprise? "I have an obligation to address the oversight and we all have a responsibility to do something with it," Murkowski said.

Well, I can tell you, Mr. Murkowski. Take it up to Alaska. We've had our turn. You take it.

Response
The NWPA determined that DOE should study the Yucca Mountain site as a possible location for the Nation's first nuclear waste repository. After passage of the Nuclear Waste Policy Act of 1982, Yucca Mountain was one of nine sites DOE identified as potentially acceptable for a repository. Yucca Mountain remained on the list of potentially acceptable sites as that list was narrowed to five and then to three. In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to characterize only the Yucca Mountain site for its potential suitability for a repository [Section 113(a)]. The Act established a process leading to a determination by the Secretary of Energy on whether to recommend Yucca Mountain to the President for the development of a monitored geologic repository. The Act makes it DOE policy to determine whether geologic disposal at Yucca Mountain would be safe. It does not direct DOE to examine other methods or sites for storage or disposal because those issues had been thoroughly examined during the years before the passage of the Nuclear Waste Policy Act in 1982. For this reason, the EIS does not examine alternative methods or sites for nuclear waste disposal.

1.2 (9205)
Comment - EIS002140 / 0002
One of the reasons it's a great spot is because there's so much -- it's so dry. We've got this huge overburden over where the waste is going to be deposited and then they have about 1,000 feet before you get to the water table, and that's really why it was chosen. They looked all over the United States and they found one of the driest spots they could in the United States and that's how it was selected.

Response
After passage of the Nuclear Waste Policy Act in 1982, the Yucca Mountain Site was one of nine sites DOE identified as potentially acceptable as a nuclear waste repository, considering such factors as the locations of valuable natural resources, hydrology, geophysics, seismic activity, nuclear defense activities, proximity to water supplies, populations, and public lands such as national parks and national forests. The Yucca Mountain site remained on the DOE list of potentially acceptable sites as the list was narrowed to five and then to three. In 1987, Congress selected Yucca Mountain as the only site for DOE to study as a potential location for a monitored geologic repository.

1.2 (9483)
Comment - EIS001888 / 0149
[Summary of comments noted by Clark County Nuclear Waste Division staff at various citizens' meetings.]

HELPLESSNESS

There was a feeling of helplessness in some people.

Many wanted to do something but felt overwhelmed or that it was futile.

Others commented on feeling overwhelmed and that their effort would be futile.
Feeling that the larger cities, county and state would lead the fight to keep it out of Nevada and that there wasn't much they could do to make a difference.

Feelings of helplessness about stopping waste coming on I-15 through Mesquite – can't pick up and leave jobs and homes.

Interest and concern, but a sense of helplessness against an agency that they perceive as not trustworthy.

Response
Thank you for your comment.

1.2 (9956)
Comment - EIS001888 / 0481
[Clark County summary of comments it has received from the public.]

Commenters requested that the Implementation Plan provide a description of the contents of the Record of Decision. Commenters also requested that the Record of Decision include (1) how, and by whom, costs for emergency preparedness and response along transportation routes would be paid; (2) mitigation measures adopted to avoid or minimize impacts, rectify concerns or conflicts, and to compensate affected parties for unavoidable consequences; (3) mitigation measures that were not adopted and the reasons why; (4) the basis for the decision, and (5) an explanation of alternatives considered and the identification of the environmentally preferable alternative.

Response
In response to comments received during the EIS scoping process, DOE prepared the *Summary of Public Scoping Comments Related to the 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* (DIRS 104630-YMP 1997). As discussed in Section 1.5.1.1 of the EIS, DOE considered all comments received during the scoping process and instituted appropriate changes in the information bases and analytical approach to the EIS. The Department determined that comments calling for it to identify the contents of a Record of Decision were not germane to the scope of the EIS, and thus did not address them in the EIS.

Regarding the Record of Decision, Section 114(a)(1) of the Nuclear Waste Policy Act, as amended, authorizes the Secretary of Energy to decide whether to recommend approval of the Yucca Mountain site to the President for development as a repository for the disposal of spent nuclear fuel and high-level radioactive waste. A comprehensive statement of the basis for the recommendation, including a Final EIS, would accompany such a recommendation. However, the decision to approve the site rests not with the Secretary, but with the President.

Because the President would make this determination, DOE does not anticipate issuing a Record of Decision if the Secretary recommends the site to the President. In determining whether to make that recommendation, the Secretary would consider not only the potential environmental impacts identified in the EIS, but other factors (discussed in Section 2.6 of the EIS), including, for example:

- The ability to obtain necessary approvals, licenses, and permits;
- The ability to fulfill stakeholder concerns;
- Consistency with the DOE mission;
- Assurance of safety;
- Facility construction and operation flexibility;
- The cost of implementation; and
- The ability to mitigate adverse impacts.

Because DOE does not anticipate issuing a Record of Decision for the determination whether to recommend the Yucca Mountain site, it might not prepare a Mitigation Action Plan. However, the Yucca Mountain site, if approved in accordance with provisions of the Nuclear Waste Policy Act, as amended, would be subject to licensing by the Nuclear Regulatory Commission. DOE, in submitting its application to the Commission to construct and operate the repository, would identify relevant commitments, including those identified in the Final EIS, and could reasonably expect a comprehensive set of mitigation measures or conditions of approval to be part of the licensing process. Under Section 180(c) of the NWPA, DOE would provide technical assistance and funds to states and Native American tribes to support training of state, tribal, and local public safety officials to help ensure safe routine transportation and emergency response for shipments to Yucca Mountain. Appendix M of the EIS discusses the provisions of Section 180(c) and DOE's Draft Policy for its implementation.

DOE believes that the EIS adequately analyzes the environmental impacts that could result from the Proposed Action. DOE also believes that the EIS provides the environmental impact information necessary to make certain broad transportation-related decisions, namely the choice of a national mode of transportation outside Nevada (mostly rail or mostly legal-weight truck), the choice among alternative transportation modes in Nevada (mostly rail, mostly legal-weight truck, or heavy-haul truck with use of an associated intermodal transfer station), and the choice among alternative rail corridors or heavy-haul truck routes with use of an associated intermodal transfer station in Nevada.

DOE has identified mostly rail as its preferred mode of transportation, both nationally and in the State of Nevada. At this time, however, the Department has not identified a preference among the five potential rail corridors in Nevada.

If the Yucca Mountain site was approved, DOE would issue at some future date a Record of Decision to select a mode of transportation. Thereafter, for example, if mostly rail was selected (both nationally and in Nevada), DOE would then identify a preference for one of the rail corridors in consultation with affected stakeholders, particularly the State of Nevada. In this example, DOE would announce a preferred corridor in the *Federal Register* and other media. No sooner than 30 days after the announcement of a preference, DOE would publish its selection of a rail corridor in a Record of Decision. A similar process would occur in the event that DOE selected heavy-haul truck as its mode of transportation in the State of Nevada. Other transportation decisions, such as the selection of a specific rail alignment within a corridor, would require additional field surveys, State and local government and Native American tribal consultations, environmental and engineering analyses, and NEPA reviews.

1.2 (10010)
Comment - EIS001888 / 0507
[Clark County summary of comments it has received from the public.]

Commenters suggested that the EIS be deferred until funding issues are resolved, new legislation and standards are approved, and a revised program approach is developed. More specifically, the EIS should consider: (1) how the EIS process and assessment of impacts would be affected because of unfunded or underfunded state and county(ies) activities, (2) alternative funding mechanisms if the Nuclear Waste Trust Fund is depleted, and (3) how the EIS process will respond to legislation requiring siting an interim storage facility, and allowing DOE discretion in route

selection and shipping schedules. In addition, these commenters recommended that, until these issues are resolved, DOE should plan on additional scoping meetings or scoping should remain open indefinitely. Commenters also indicated that the resulting implementation plan would be inadequate until these program issues are resolved.

Response
As described in Section 1.5.1.1 of the EIS, DOE initiated public scoping in 1995, eventually holding 15 public meetings around the country. The Department used this process to determine the scope of the EIS and to help identify significant issues it would analyze in depth in the EIS. The Draft EIS was the result of this process. How the EIS process or assessment of impacts would be affected by unfunded or underfunded state and county activities, by depletion of the Nuclear Waste Fund, or by legislation on interim storage of nuclear waste are not relevant in an EIS prepared to assess the potential environmental impacts associated with the construction, operation and monitoring, and eventual closure of a geologic repository at Yucca Mountain. Moreover, none of these situations have affected the EIS process.

1.2 (10306)
Comment - EIS001873 / 0083
Lincoln County Independent Research:

The County, under its federally funded Nuclear Waste Oversight Program, has produced numerous studies containing information concerning local impacts of the Yucca Mountain Project. As the County has stated in comments on the DEIS, the DOE has evidently not made any use of the County effort, which has cost approximately five million dollars to date. Following are some of the findings of the County studies.

A Nevada Local Government Perspective on European Nuclear Waste Management 1990

Following a tour of several European facilities and meetings with various officials, a group of Lincoln County residents concluded that:

Generators not government should be responsible for managing radioactive waste.

Local government should have the power to withhold approval for nuclear waste disposal sites.

Response
As discussed in Section 2.5 of the EIS, DOE has received input from a number of organizations including universities, other Federal agencies, the State of Nevada, counties, municipalities, other local governments and Native American tribes. Their input includes documents that present research or information that in some cases disagrees with the views that DOE presented in the Draft EIS. DOE reviewed these documents and evaluated their findings for inclusion as part of the EIS analyses. If the information represented a substantive view, the Department made every effort to incorporate that view in the EIS and to identify its source.

DOE has modified the EIS, as appropriate, to incorporate references by using new information (for example, see new population information in Section 3.1.7.1, and the concept of a representative fuel assembly for repository and transportation accident analyses in Section A.2.1.5).

As described in Chapter 1 of the EIS, Congress determined, through the passage of the Nuclear Waste Policy Act, as amended, that the Federal Government has the responsibility to dispose of spent nuclear fuel and high-level radioactive waste permanently to protect the public health and safety and the environment. The Act goes on to say that the Federal Government needs to take precautions to ensure that these materials do not adversely affect this and future generations.

The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President whether to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the

President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

1.2 (10522)
Comment - EIS002211 / 0005
This society and government is unqualified to address this issue responsibly. That's what the crux issue is. We don't know what the hell we're doing in plain English. Pardon my French, but I like to emphasize just a little bit here and there. Okay.

We need to set up what I referred to as a nuclear waste priesthood. Don't laugh at that term. I mean a secular priesthood, of course, non-denominational.

The sole purpose would be that would be comprised of individuals and -- who are attained to an utmost higher idealized standard of human spiritual quality effectiveness in terms of reason, integrity, responsibility, morals, ethics and above all conscience to realize what we're dealing with here is capable of causing the extinction of consciousness itself. Think about that while you can still think.

Response
DOE is responsible for complying with laws passed by Congress. As described in Chapter 1 of the EIS, through the passage of the Nuclear Waste Policy Act of 1982, Congress determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

1.2 (10666)
Comment - EIS001966 / 0006
The assumption that the "No Action Alternative" may be based in part upon the Nuclear Waste Confidence Decision, which is circularly based upon Yucca Mountain "progress." It is time for an update of the Nuclear Waste Confidence Decision, particularly now that the January 31, 1998, deadline has passed without removal of the nuclear waste.

Response
The Nuclear Regulatory Commission, not DOE, issued the Waste Confidence Decision. DOE did not base the No-Action Alternative on that decision. Rather, the Department based the No-Action Alternative on guidance in the Council on Environmental Quality's "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (46 *FR* 18026; March 23, 1981). That guidance defines a no-action alternative as "...no change from current management direction or level of management authority...." DOE analyzed the No-Action Alternative to serve as a basis for comparing the magnitude of potential environmental impacts of the Proposed Action.

1.2 (10919)
Comment - EIS000159 / 0001
Nuclear waste is the deadliest substance known to humans. A few seconds exposure to an irradiated fuel rod causes cancer, a few minutes, death.

Common sense dictates that we treat this material with utmost caution to protect human health and the environment. Any decision regarding this radioactive waste must be based on sound science and protecting the public. Instead, nuclear waste policy in this country has been driven by the arrogance and greed of the nuclear industry and the reckless legislation promoted by industry allies. Political expediency has replaced responsible stewardship, as sound science and decision-making is thrown out the window at the request of the nuclear industry.

We are disappointed that the Department of Energy (DOE) has chosen to continue this trend as evidenced in its continued refusal to follow its own guidelines and disqualify Yucca Mountain while simultaneously seeking to

weaken the guidelines, and in this draft EIS. This draft EIS is an expensive rubber stamp for the Yucca Mountain waste dump. It is not the careful, conservative analysis of safety and environmental issues required of a public agency.

Response

The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President whether to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

Section 121 of the Nuclear Waste Policy Act of 1982 directed the Environmental Protection Agency to establish generally applicable standards to protect the general environment from offsite releases of radioactive materials in any repository and directed the Nuclear Regulatory Commission to issue technical requirements and criteria for such repositories. In 1992, Congress modified the rulemaking authorities of the EPA and the NRC with regard to a possible repository at Yucca Mountain, which Congress selected in 1987 as the only site for DOE to study for a possible repository. Section 801(a) of the Energy Policy Act of 1992 directed the EPA to retain the National Academy of Sciences to conduct a study and issue findings and recommendations on setting reasonable standards for protecting public health and safety in relation to a repository at Yucca Mountain. Section 801(a) also directed the EPA to establish specific standards for Yucca Mountain based on and consistent with the Academy's findings and recommendations. The standards (40 CFR Part 197) set health-based limits for any radioactive releases from a repository at Yucca Mountain.

Section 801(b) of the Energy Policy Act (Public Law 102-486) directs the Nuclear Regulatory Commission to revise its general technical requirements and criteria for geologic repositories to be consistent with the Environmental Protection Agency's site-specific Yucca Mountain standards (10 CFR Part 60). The NRC has issued site-specific technical requirements and criteria (10 CFR Part 63, Disposal of High-Level Radioactive Waste in a Proposed Geologic Repository at Yucca Mountain, Nevada), which it would use to evaluate any application from DOE to construct a repository at Yucca Mountain, to receive and possess spent nuclear fuel and high-level radioactive waste at such a repository, and to close and decommission such a repository.

The Nuclear Waste Policy Act of 1982 required the Secretary of Energy to issue general guidelines for use in recommending potential repository sites for detailed characterization [Section 112(a)]. DOE issued these guidelines in 1984 (10 CFR Part 960). The guidelines described DOE policies applicable to the three sequential stages of the siting process in the Nuclear Waste Policy Act (preliminary site screening, nomination of sites, and site selection for recommendation to the President). In 1996, DOE published proposed amendments to the guidelines to reflect the prevailing scientific view on how to evaluate the suitability of the Yucca Mountain site for the development of a nuclear waste repository (61 *FR* 66158; December 16, 1996). Because Congress had by that time required DOE to focus only on Yucca Mountain, the Department's proposed amendments dealt with provisions of the guidelines that were applicable to the site recommendation stage. In November 1999, DOE revised its 1996 proposal to focus on the criteria and methodology to be used for evaluating geologic and related aspects of the Yucca Mountain site (64 *FR* 67054; November 30, 1999). DOE has finalized its guidelines at 10 CFR Part 963, *Yucca Mountain Site Suitability Guidelines*.

The 1984 DOE general guidelines (10 CFR Part 960) included explicit disqualifiers to guide the Department's assessment of sites under consideration for repository development. At that time, failure to meet the qualifying condition of any guideline was a basis for disqualifying a site. Under the NWPA Congress directed DOE to focus only on Yucca Mountain and, as discussed above, has directed the Environmental Protection Agency and the Nuclear Regulatory Commission to promulgate standards to protect public health and safety. Failure to meet the EPA standards or the NRC criteria for licensing would disqualify the Yucca Mountain site.

1.2 (11044)
Comment - EIS000475 / 0007
DOE "streamlining" of the NEPA process could more accurately be termed "steamcoiling" over the public and democratic process. Yet, DOE has failed to comply with the agency's own requirements as outlined for contractors in the "streamlining/steamrollering" process.

If the NEPA [National Environmental Policy Act] process is not completed before the (contract) award the contract work must be made contingent on completion of the NEPA process, and contract work must be phased to allow the NEPA process to be completed in advance of a go/no-go decision.

It is my understanding that DOE is holding public hearings in Las Vegas, Nevada on January 11, 2000 to solicit, include, and respond to 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 (DOE/EIS-0250D, DOE 1999), yet DOE has already made "go" decision and published that decision in November of 1999 (in another final EIS).

Response
DOE has complied with all applicable statutes and regulations in performing site characterization activities at Yucca Mountain, and would continue to do so in the construction, operation and monitoring, and eventual closure of a geologic repository if the site was approved. Chapter 11 of the EIS discusses the statutory and other requirements that apply.

DOE has stated in EISs and Records of Decision for other proposed actions its intention to pursue the disposal of spent nuclear fuel and high-level radioactive waste in geologic repositories. If Yucca Mountain was not approved DOE would have to develop recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislation.

At the time of publication of the Draft EIS, the Secretary of Energy had not determined whether to recommend the Yucca Mountain site to the President. In determining whether to recommend the site to the President, the Secretary will consider the information and results of the site characterization program, as well as the environmental analyses of the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to recommend development of a repository at Yucca Mountain to the President.

1.2 (11053)
Comment - EIS000475 / 0010
DOE lessons learned from the splitting of the atom for nuclear weapons/national security must include these past abuses to avoid irreparable harm to democratic process. It-sounds-like-science, fund-the-research/control-the-findings, and outright bullying over the opposition (citizens) is unacceptable in a democracy. To my knowledge, Yucca Mountain has been targeted from 1982 congressional mention as a candidate site/sacrifice zone for the nuclear power industry. DOE has apparently now assigned a larger purpose, i.e., national security in weapons/reactor grade disposal which is a ruse promoted by the nuclear power industry/MOX [mixed-oxide] fuel promoters. One wonders if U.S. citizens are, in fact, in considerably more danger from special interests foreign and domestic, than from foreign military operations.

Response
Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1976, the Energy Research and Development Administration (another predecessor agency) began investigating geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and launching waste into the sun. Based on the results of these investigations, DOE determined in a Record of Decision (46 *FR* 26677, May 14, 1981) that it would pursue mined geologic disposal. In passing the Nuclear Waste Policy Act of 1982, as amended in 1987, Congress determined that decades of research had been sufficient to conclude that a geologic repository was the safest alternative for waste disposal (see Section 1.3 of the EIS for additional information).

The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President whether to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

1.2 (11238)
Comment - EIS000126 / 0001
Basically I don't think that the State of Nevada let alone this community [Pahrump] has the clout to stop what you're doing. You know, I'd like to see it stopped, but I have to deal with reality, and I don't see that happening, so my focus has to be well, how can I make it good for me, then?

Nye County's lost a lot of jobs. It's going nowhere, hasn't been going anywhere. This community's going nowhere. It's just a place for people to move and retire. They don't want anything happening here, but I got to look at the young people and their future, and like I said, if I had any choice, I'd like you to take in that stuff wherever it came from and leave it there, but I don't and I don't think it's going to happen, but like I said, I'm going to look at how I can make it sort of positive for me.

Response
The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President on whether to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site is approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

The NWPA provides for funding to the State of Nevada and affected units of local government to participate in the process of characterizing and selecting a site for a geologic repository. In addition, the Act requires DOE to provide financial and technical assistance to the State and affected units of local government to mitigate the impacts of the development of a repository and the characterization of the site. The Act authorizes the State and any affected unit of local government to collect an amount equal to the amount that the State or local government would receive if authorized to tax site characterization activities. If DOE built and operated the repository at Yucca Mountain, the State and local governments would be able to collect an amount equal to the taxes imposed on non-Federal real property and industrial activities. Financial assistance comes from the Nuclear Waste Fund, which is funded by contributions from nuclear utility ratepayers.

1.2 (11418)
Comment - EIS002288 / 0001
I think that there's one thing missing in the DEIS that has to be included. Every engineering document that I have ever worked on or read has always had the good and the bad.

I think it's important for DOE to say this is our project; this is what's good about it. But you are not God; there's got to be something bad. Let the Congress make the decision. Let them do it. Don't you guys take their job. Give them the plusses and the minuses, and let's see what happens.

Response
DOE believes that the EIS adequately analyzes environmental impacts that could result from the Proposed Action or the No-Action Alternative. The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of the State of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

1.2 (11475)
Comment - EIS002247 / 0003
What about 10 CFR 960.4-2-1? Which basically said that the site is -- the current feasibility guidelines, if the water moves faster in a thousand years from above the site down to the water table, it should be eliminated as a site for under speculation.

So I'd like to know why the site hasn't been eliminated so far and why are the siting guidelines being changed halfway through the project? This seems [like] a little bit of a mistake. Seems like a political move. I know we have spent 7.4 billion dollars so far of our taxpayer money on this project, and now they are changing the siting guidelines in the middle of whether or not the site is suitable. So I want to know about that and why this 963 thing is going on.

Response
The Nuclear Waste Policy Act of 1982 required the Secretary of Energy to issue general guidelines for use in recommending potential repository sites for detailed characterization [Section 112(a)]. DOE issued these guidelines in 1984 (10 CFR Part 960). The guidelines described DOE policies applicable to the three sequential stages of the siting process in the Nuclear Waste Policy Act of 1982 (preliminary site screening, nomination of sites, and site selection for recommendation to the President). DOE published proposed amendments to the guidelines in 1996 to reflect the prevailing scientific view on how to evaluate the suitability of the Yucca Mountain site for the development of a nuclear waste repository (61 *FR* 66158; December 16, 1996). Because Congress had by that time required DOE to focus only on Yucca Mountain, the Department's proposed amendments dealt with provisions of the guidelines that were applicable to the site recommendation stage. In November 1999, DOE revised its 1996 proposal to focus on the criteria and methodology to be used for evaluating geologic and related aspects of the Yucca Mountain site (64 *FR* 67054; November 30, 1999). DOE has finalized its guidelines at 10 CFR Part 963 to replace 10 CFR Part 960.

DOE included explicit disqualifiers in the 1984 general guidelines (10 CFR Part 960) to guide its assessment of a number of sites under consideration for repository development. At that time, failure to meet the qualifying condition of any guideline was a basis for disqualifying a site. Under the NWPA Congress directed DOE to focus only on Yucca Mountain and directed the Environmental Protection Agency and the Nuclear Regulatory Commission to promulgate standards to protect public health and safety. Failure to meet the Environmental Protection Agency standards or Nuclear Regulatory Commission licensing criteria would disqualify the Yucca Mountain site.

Even though 10 CFR Part 960 no longer applies to Yucca Mountain, information and analyses do not support a finding that the site would have been disqualified under the groundwater travel time disqualifying condition at 10 CFR 960.4-2-1(d). Under that condition, a site would be disqualified if the expected groundwater travel time from the disturbed zone (the area in which properties would change from construction or heat) to the accessible environment would be less than 1,000 years along any pathway of likely and significant radionuclide travel. The definition of groundwater travel time in 10 CFR 960.2 specifies that the calculation of travel time is to be based on the average groundwater flux (rate of groundwater flow) as a summation of travel times for groundwater flow in discrete segments of the system. As part of its site characterization activities, DOE has undertaken various studies to identify and consider characteristics of the unsaturated (above water table) and saturated (water table) zones, such

as the flow and transport of water and radionuclides, that are relevant to analyzing groundwater travel times. DOE has considered physical evidence such as the chemistries and ages of water samples from these zones. Based on numerical models, which incorporate the results of these studies and available physical evidence, DOE estimates that the median groundwater travel times would be about 8,000 years, and average groundwater travel times would be longer. Given this, DOE believes that the site would not have been disqualified under the groundwater travel condition at 10 CFR 960.4-2-1.

The Secretary of Energy will consider the information and results of the DOE site characterization program and the environmental analyses in the EIS, and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission, Department of the Interior, the Environmental Protection Agency, the Council on Environmental Quality, and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President to develop a repository at Yucca Mountain.

1.2 (11494)
Comment - EIS002254 / 0007
This is genocide, and anyone who sits at the table of genocide will be a part, and will be accountable to their next generation through our oral history. We will make sure that that stays alive.

Response
As described in Chapter 1 of the EIS, Congress, through the passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

DOE believes that the analyses in the EIS demonstrate that the Proposed Action would cause small, short-term public health impacts due primarily to the transportation of spent nuclear fuel and high-level radioactive waste to the repository from existing commercial nuclear reactor sites and DOE sites. These impacts would be caused chiefly by traffic fatalities and radiological doses to members of the public from the routine transportation of these materials. Under the No-Action Alternative the obligation to store these materials continuously in a safe configuration would become the responsibility of future generations.

1.2 (12039)
Comment - EIS000540 / 0013
Urge the Secretary of Energy to meet his or her duty* and declare the Yucca Mountain site unsuitable for development of a nuclear repository now or in the future, terminate all work at the site, and inform Congress of his or her actions.

* Nuclear Waste Policy Act, as Amended [42 U. S. C. 10101 *et seq.*] Sec. 113(c)(3).

Response
The NWPA establishes a process leading to a decision by the Secretary of Energy on whether to recommend that the President approve Yucca Mountain for development of a geologic repository. As part of this process, DOE must undertake site characterization activities at Yucca Mountain to gather information and data needed to evaluate the site and to prepare an EIS. The Department has an ongoing site characterization program of investigations and evaluations to assess the suitability of the Yucca Mountain site as a geologic repository and to provide information for this EIS. The program consists of scientific, engineering, and technical studies and activities. DOE used the information from the program in preparing the EIS, and has relied on reports and studies sponsored by other Federal agencies, the State of Nevada, and affected units of local government. The Secretary has made no decision on the suitability of Yucca Mountain as a geologic repository. In determining whether to recommend the Yucca Mountain site to the President, the Secretary would consider not only the potential environmental impacts identified in this EIS, but other information designated in Section 114 of the NWPA.

DOE is responsible for the ultimate disposal of spent nuclear fuel and high-level radioactive waste. If DOE determined that the Yucca Mountain site is unsuitable for a repository, then it would have to develop

recommendations for further action, including the need for new legislation to ensure the safe, permanent disposal of these materials.

1.2 (12228)
Comment - EIS001873 / 0017
P.1-3. EIS should be issued after rulemaking process is complete.

Response
As required under the Energy Policy Act of 1992, the Environmental Protection Agency has established standards for the protection of the public from releases of radioactive materials disposed of in a repository at the Yucca Mountain site (see 40 CFR Part 197), and the Nuclear Regulatory Commission has published criteria for licensing the repository (10 CFR Part 63) that are consistent with the radiation protection standards established by the Environmental Protection Agency. In addition, DOE promulgated its final 10 CFR Part 963 guidelines to establish the methods and criteria for determining the suitability of the Yucca Mountain site for the location of a geologic repository.

At the time of publication of the Draft EIS, only the proposed Nuclear Regulatory Commission criteria were available. Although DOE has considered the final regulations in this EIS, it does not believe it necessary to have the final form of these regulations to evaluate potential environmental impacts from the Proposed Action. The regulations are not applicable, per se, to the analysis of the Proposed Action, and provide limited information useful to judging the significance of related environmental impacts.

1.2 (12339)
Comment - EIS001482 / 0002
I heard Cynthia say earlier that Yucca Mountain will be the worst spot for this stuff. There couldn't have been a worse spot. Well, there was a worse spot between Six Year Peaks (phonetic) in Canyonlands National Park, but luckily Utah wasn't blessed with this waste.

But the fact of the matter is that because of my experience in the mid-80's with this process, I happen to know, or actually I feel that this hearing here right here tonight is a bunch of crap. This hearing is a bunch of crap, this process is a bunch of crap, and the decision to focus on Yucca Mountain is a bunch of crap, because frankly, the Department of Energy is probably one of the most politicized agencies in the federal government. And the fact is that way back in the early years of this process there were places in consideration for a nuclear waste depository that were taken out just because of political pressures, and I'm breaking cobwebs in the back of my brain trying to remember this stuff from the 80's, and I've slept since then. But I think it was -- was it Jim Wright? Was he out of Texas? I think there was a site in Texas that was just primo for this type of thing. Right out the door. They didn't want it there, you know. And there were others across the country, too. I think there was even one up in Wisconsin or Minnesota that was looking really nice.

And the thing about that was that those are so much closer to where these plants are. Most of them, I mean. I look at the map here and there's just a handful that are on the western side here of the country, but most of them are in the eastern part of the United States. I just had a quick perusal of the DEIS, I guess it is, and I'm looking over those transportation distances. It's outrageous. Why are we moving all this stuff to the West? Why are we dumping it on the West again? There have to be sites out in the east, and if not, we could do something about that. But the thing that scares me is this idea of transporting all this waste across all these miles. It's just a ridiculous decision.

I do think that it has been a long process, 17 years. People can go back and forth and say, yeah, when you're looking at nuclear waste, 17 years is a blink of an eye; and yeah, they may be right. But 17 years of hearings and different things that you folks are going through is a long time; but the fact is that Yucca Mountain deserves to be disqualified simply because of the fact that other sites that are more well qualified were taken off the map early in the political process that accompanied the Nuclear Waste Policy Act in the subsequent finding of a home for the temporary -- or the permanent storage of the waste.

I think that you are making a mistake in asking us to accept the waste out here in the West. You're going in an area -- and again, the politics of it all, I mean, Nevada, how many electoral votes do they have? How many electoral votes does Utah have? That's why these things get stuck out in the West. You couldn't stick it in Texas or

California if you tried to, and that's because of all the votes and such, irregardless of the geological features and population issues.

So I think it's a problem. I'm not for this site being utilized for this.

Response
Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1976, the Energy Research and Development Administration (another predecessor agency) began investigating geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and rocketing waste into the sun. Based on the results of these investigations, DOE determined in a Record of Decision (46 *FR* 26677, May 14, 1981) that it would pursue mined geologic disposal.

In passing the Nuclear Waste Policy Act of 1982, as amended in 1987, Congress determined that a geologic repository was the safest alternative for radioactive waste disposal (see Section 1.3 of the EIS for more information). For this reason, the Act specifically exempts DOE from considering in the EIS (1) the need for a repository, (2) alternative sites to Yucca Mountain, (3) alternative methods to geologic disposal, and (4) the time at which a repository could become available.

The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

1.2 (12743)
Comment - EIS001888 / 0218
[Summary of comments noted by Clark County Nuclear Waste Division staff at various citizens' meetings.]

Some seemed to think it was a done deal.

Concern over Yucca Mountain being the only site studied - seems like there is no way to stop it.

Disbelief that there is no other sites being considered.

Great concern, and even anger, on what they perceived as having Yucca Mountain shoved down their throats.

Concern that no other place is being studied and that it is a "done deal."

How can DOE force this on the people of Nevada?

Citizens were generally concerned and wanted to know if their efforts would fall on deaf ears.

It seems predetermined that the waste will come to Yucca Mountain, public comments seem perfunctory.

Indicated that it was depressing to think that the waste could be transported to Yucca Mountain because of feeling like it was a done deal.

Concerned that DOE does not really listen to what is being said, that they will go ahead even if it really isn't in the best interest of the public because so much money has been put into the project so far.

Concerned that comments will fall on deaf ears.

Concerned that because of the money that has been spent and other reasons, it will happen "no matter what."

Response
DOE issued the Draft EIS and sought public comments on the document and encouraged members of the public to attend public meetings conducted across the country. DOE has addressed every comment that was submitted and has made changes to the EIS as a result of the comments received. For example, DOE performed additional analyses regarding impacts along particular transportation corridors in Nevada and has included that information in the Final EIS.

As described in Chapter 1 of the EIS, Congress, through the passage of the Nuclear Waste Policy Act of 1982, determined that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act provides that the Federal Government must take precautions to ensure that these materials do not adversely affect the public health and safety and the environment for this and future generations.

The Secretary of Energy will consider the information and results of the DOE site characterization program, as well as the environmental analyses in the EIS and the views of the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, the State of Nevada and affected units of local government, and public comments in determining whether to make a recommendation to the President whether to develop a repository at Yucca Mountain. In the event of such a recommendation, the President would decide whether to recommend the site to Congress. If the President did so, the Governor or the Legislature of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site would be approved). Assuming the State submitted a notice of disapproval, the site would be disapproved unless, during the first 90 days of continuous session after the notice of disapproval, Congress passed a joint resolution of repository siting approval and the President signed it into law.

1.3 Purpose and Need for the Supplement to the Draft EIS

1.3 (12953)
Comment - 010249 / 0007
Explain key steps leading up to the preparation of the FEIS.

The explanation of the basis for the design changes provided in the SDEIS was a positive step in the direction of providing background information, however, the FEIS should also address the entire chain of events that led to this evaluation. This SDEIS is not an isolated NEPA activity in the Yucca Mountain decision-making process. It is, rather, a key link in an ongoing chain of actions leading up to a presidential decision in 2001 on whether to approve the progression of the repository project at Yucca Mountain to the next steps of completing the designs and seeking an NRC license. The actions that have preceded this SDEIS 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.

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998). That design focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. These scenarios were not intended to place a limit on the choices among alternative designs because, as stated in the Draft EIS, DOE expected the repository design to continue to evolve in response to ongoing site characterization and design-related evaluations. Rather, DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts.

Since issuing the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of flexible design. This design focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading), but the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain remain unchanged. DOE evaluated the flexible design in a Supplement to the Draft EIS, which was released for public review and comment in May 2001. Section 2.1.1 of the Final EIS summarizes the evolution of the Proposed Action design changes. DOE acknowledges in the EIS that the flexible design could be further modified or refined during the License Application process, if the site is approved for development. In this event, DOE will evaluate future repository design revisions in accordance with its regulations to determine whether it will conduct further National Environmental Policy Act reviews.

1.3 (12958)
Comment - 010249 / 0012
Explain the Step-Wise Process for Site Recommendation and Licensing

DOE needs to clearly explain in the FEIS that the NEPA [National Environmental Policy Act] process is not a substitute for the NRC [Nuclear Regulatory Commission] licensing process (NEI DEIS comment VI). At public hearings held recently on the SDEIS, DOE continued to receive comments asking that information that is not required until DOE applies for an NRC license be provided for public comment as part of the EIS process. In responding to these comments, DOE should put the role of NEPA in proper perspective with the subsequent repository licensing process and refer to the significant opportunity for public involvement that exists in the NRC licensing process.

Response
Section 1.3.2.3 of the EIS describes the repository decision process as established by the NWPA. A decision by the Secretary of Energy whether to recommend the site to the President will be made on the basis of a number of different types of information, including that contained in the Final EIS. Any recommendation would be accompanied not only by the Final EIS, but also by the other materials designated in Section 114 of the NWPA. These include, for example, a description of the proposed repository, preliminary engineering specifications for the facility, a description of the proposed waste form, an explanation of the relationship between the proposed waste form or packaging and the geologic medium of the site, a discussion of the site characterization data that relate to the safety of the site, preliminary comments of the Nuclear Regulatory Commission on the sufficiency of information for inclusion in any DOE License Application, and the views and comments of the Governor and legislature of any State or the governing body of any affected Native American tribe.

If the site designation becomes effective, the Secretary will submit a license application to the Nuclear Regulatory Commission for authorization to construct a repository and provide a copy to the governor and legislature of Nevada. The NWPA requires the NRC to issue a final decision approving or disapproving the construction authorization within 3 years after receiving the application. If the Secretary receives a construction authorization from the NRC, DOE can proceed with constructing the repository in accordance with NRC requirements. The Secretary can later submit to the NRC an amendment to the License Application requesting a license to receive and possess waste.

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100061	National Research Council 1990	National Research Council 1990. Rethinking High-Level Radioactive Waste Disposal, A Position Statement of the Board on Radioactive Waste Management. Washington, D.C.: National Academy Press. TIC: 205153.
100018	National Research Council 1995	National Research Council 1995. *Technical Bases for Yucca Mountain Standards.* Washington, D.C.: National Academy Press. TIC: 217588.
156712	National Research Council 2001	National Research Council 2001. *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges.* Washington, D.C.: National Academy Press.
104630	YMP 1997	YMP (Yucca Mountain Site Characterization Project) 1997. *Summary of Public Scoping Comments Related to the 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.* Las Vegas, Nevada: Yucca Mountain Site Characterization Office. ACC: MOL.19970731.0515.

2

Nuclear Waste Policy Act

2. NUCLEAR WASTE POLICY ACT

2 (100)
Comment - 37 comments summarized
Commenters stated that the EIS must recognize that the repository design has "evolved" from a multiple barrier system with a primary reliance on natural barriers to a repository design with primary reliance on an engineered barrier system. They believe DOE is violating the Nuclear Waste Policy Act's fundamental concept that the geologic setting be the principal barrier to waste reaching the environment, with engineered barriers providing only redundancy. They noted that the geologic formation at Yucca Mountain is now given almost no credit for isolating the waste, and that this change has effectively negated the purpose for considering the Yucca Mountain site. Commenters also noted that engineered barriers cannot ensure isolation of the waste for an adequate period. They believe that the EIS must prove beyond a doubt that radioactive material can be completely isolated or the project should be stopped.

Response
The repository design has evolved to reflect ongoing evaluations and other factors such as public comments and design- and performance-related reviews by external organizations, such as the Nuclear Waste Technical Review Board. If the Yucca Mountain site was approved and licensed for construction, the final design would balance the waste isolation abilities and associated uncertainties of the natural system with those of the engineered barrier system, based on an evaluation of their total system performance.

DOE believes that achieving this balance is in keeping with the NWPA. The Act directs DOE to investigate and potentially develop a permanent geologic repository for spent nuclear fuel and high-level radioactive waste in a deep subsurface location that would provide a reasonable assurance of adequate protection for the public and the environment. The Act encourages, rather than limits or otherwise prohibits, the use of engineered barriers for a geologic repository at Yucca Mountain by directing the Nuclear Regulatory Commission to develop criteria that would provide for the use of multiple barriers in the design of the repository [42 U.S.C. 10141(b)(1)(B)]. The Commission incorporated in its criteria (10 CFR Part 63) the requirement that the repository be predicated on the use of both natural and engineered barriers to enhance the resiliency of the repository and increase confidence that performance objectives would be met.

Given the current state of technology, it is impossible to design and construct a geologic repository that would provide a reasonable expectation that there would never be any releases of radioactive materials. However, DOE would design, construct, operate and monitor, and eventually close a repository that would meet public health and safety and radiation protection standards and criteria established by the Environmental Protection Agency and the Nuclear Regulatory Commission. Congress, in the Energy Policy Act of 1992, directed the Agency to develop public health and safety standards for the protection of the public from releases from radioactive materials stored or disposed of in a repository at the Yucca Mountain site. Congress also directed the Commission to publish criteria for licensing the repository that would be consistent with the radiation protection standards established by the Agency. These standards (40 CFR Part 197) and criteria (10 CFR Part 63) prescribe radiation exposure limits that the repository, based on a performance assessment, cannot exceed during a 10,000-year period after closure.

In this EIS, DOE has assessed the ability of the natural and engineered barriers system to isolate radioactive materials from the environment for thousands of years, and DOE would expect repository releases to the accessible environment to be orders of magnitude less than the prescribed radiation exposure limits during the 10,000-year period after closure. Based on the repository design and performance assessment, DOE believes that releases of radioactive materials for the first 10,000 years after repository closure would be limited, the result of incorporating a small number of waste package failures due to manufacturing defects into the Total System Performance Assessment.

DOE estimates that the peak annual individual dose to a hypothetical individual would not occur until about 410,000 years after closure and would be 620 (95th percentile peak dose). The mean peak annual individual dose within 1 million years was calculated to be 150 millirem at 480,000 years. On this basis, DOE has concluded that the repository would provide a high degree of long-term isolation of spent nuclear fuel and high-level radioactive waste.

2 (126)
Comment - 8 comments summarized
Commenters stated that the Proposed Action of constructing, operating and monitoring, and eventually closing a geologic repository at Yucca Mountain violates the Nuclear Waste Policy Act. One commenter stated that the statement on Page 2-86 of the DEIS, "In addition, DOE might not complete some of the studies and design development for the repository until after it has issued the Final EIS" is not consistent with the requirements of the NWPA. The commenter also stated that the Draft EIS was insufficient pursuant to the NEPA. One commenter stated that DOE must also be in compliance with the National Environmental Policy Act.

Response
The Nuclear Waste Policy Act of 1982 established a process for selecting sites for technical study as potential geologic repository locations. In accordance with this process, DOE identified nine candidate sites, the Secretary of Energy nominated five of the nine sites for further consideration and DOE issued environmental assessments for the five sites. DOE recommended three of the five sites, of which Yucca Mountain was one, for study as repository site candidates. In 1987, Congress amended the Nuclear Waste Policy Act of 1982 directing the Secretary of Energy to perform site characterization activities at the Yucca Mountain site, and, if the site is found suitable, make a recommendation to the President on whether to approve the site for development of a repository. Any approval recommendation is required to be accompanied by a final environmental impact statement.

The purpose of the National Environmental Policy Act is to promote an understanding of environmental consequences of Federal actions prior to their implementation. It requires Federal agencies to disclose to the public and agency decisionmakers the potential extent of environmental harm and any environmental benefits from the proposed action. The NWPA addresses how certain National Environmental Policy Act requirements apply to the proposed Yucca Mountain repository. In particular, the NWPA specifies that it is not necessary to consider in the EIS the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. Although the Act does not require an evaluation of alternatives to a repository in this EIS, DOE evaluated a No-Action Alternative to provide a baseline for comparison with the Proposed Action.

DOE, as directed by Congress in the NWPA, has complied and will continue to comply with all applicable regulations and guidelines during the process to determine the suitability of the Yucca Mountain site as a potential geologic repository. DOE believes that the EIS is consistent with NWPA and NEPA requirements. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions if information was incomplete or unavailable and if there were uncertainties, provide a meaningful assessment of environmental impacts consistent with the requirements.

2 (127)
Comment - 2 comments summarized
Commenters expressed concern that the Nation might commit a large amount of resources to a repository at Yucca Mountain, yet they stated that it will be only a temporary solution.

Response
As described in Chapter 1 of the EIS, Congress enacted the Nuclear Waste Policy Act of 1982 establishing the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste. Section 111(a)(7) of the Act states that the Federal Government must take precautions to ensure that these materials do not adversely affect public health and safety and the environment [42 U.S.C. 10131(a)(7)].

Given the current state of technology, it is impossible to design and construct a geologic repository that would provide a reasonable expectation that there would never be any releases of radioactive materials. However, DOE would design, construct, operate and monitor, and eventually close a repository that would meet public health and safety radiation protection standards and criteria established by the Environmental Protection Agency and the Nuclear Regulatory Commission. Congress, in the Energy Policy Act of 1992, directed the EPA to develop public health and safety standards for the protection of the public from releases from radioactive materials stored or disposed of in a repository at the Yucca Mountain site. Congress also directed the NRC to publish criteria for licensing the repository that would be consistent with the radiation protection standards established by the Agency.

In part, these standards (40 CFR Part 197) and criteria (10 CFR Part 63) prescribe radiation exposure limits that the repository, based on a performance assessment, cannot exceed during a 10,000-year period after closure.

Pursuant to 10 CFR Part 63, if the repository was constructed, DOE would submit an application to the Nuclear Regulatory Commission for a license amendment to close the repository sometime between 2060 and 2333. This application would be accompanied by such information as an update of the repository's performance assessment and a detailed postclosure monitoring program. If the Commission issued that license amendment, DOE would close the repository permanently (see Section 2.1.2 of the Final EIS).

2 (132)
Comment - 5 comments summarized
Commenters asked for additional description and analysis of the effectiveness and feasibility of the active and passive institutional controls described for use at the proposed repository. One commenter recommends that the Final EIS clarify the extent to which the Energy Policy Act of 1992 requires active institutional control of the Yucca Mountain site and estimate the environmental impacts associated with a scenario that incorporates such control. Another commenter believes that the passive institutional control of the Proposed Action and the No-Action Alternative provide for only 100 years of monitoring, which the commenter stated is illogical given the known half-life of the emplaced materials. The same commenter stated that the EIS is insufficient because the postclosure monitoring period is inadequate.

Response
DOE understands that ensuring public safety requires continued stewardship and has developed programs to ensure the long-term safety after closure. These programs would include, but would not be limited to, long-term monitoring of the site and maintaining the integrity and security of the proposed repository.

After repository closure, DOE would be responsible for maintaining institutional control over the repository, consistent with the Energy Policy Act of 1992. Neither the extent nor the length of this regulatory requirement is well defined at present. However, DOE intends to maintain appropriate institutional controls for as long as necessary.

DOE would design and implement a postclosure monitoring program consistent with the Nuclear Regulatory Commission regulations at 10 CFR Part 63. Prior to repository closure, DOE would submit a license amendment application to the Nuclear Regulatory Commission for review and approval. The license amendment application would include, among several items:

1. An update of the assessment of the repository performance for the period after closure

2. A description of the.postclosure monitoring program

3. A detailed description of the measures to be employed to regulate or prevent activities that could impair the long-term isolation of the spent nuclear fuel and high-level radioactive waste, and to preserve relevant information for use by future generations

The application also would describe DOE's proposal for continued oversight to prevent any activity at the site that would pose an unreasonable risk of breaching the repository's engineered barriers, or increase the exposure of individual members of the public to radiation beyond limits allowed by the Nuclear Regulatory Commission. This final EIS describes the types of monitoring and other institutional controls that would be contemplated; however, the details of this program would be defined during the consideration of the license amendment application for closure. This would allow DOE to take advantage of new technological information.

For impact analysis purposes only, the EIS assumed that passive institutional controls would be applied after repository closure, as described in Section 2.1.2.4. DOE chose to analyze passive institutional controls for the

postclosure period based on recommendations by the National Research Council of the National Academy of Sciences (consistent with the Energy Policy Act). The National Research Council concluded that:

"...because it is not technically feasible to assess the probability of human intrusion into a repository over the long term, we do not believe that it is scientifically justified to incorporate alternative scenarios of human intrusion into a fully risk-based compliance assessment that requires knowledge of the character and frequency of various intrusion scenarios." (DIRS 100018-National Research Council 1995)

The National Research Council recommended that the only human intrusion scenario to be considered is inadvertent drilling into the repository. DOE analyzed this scenario and described the results in Section 5.7.1 of the EIS. DOE believes that passive institutional controls such as land records and warning systems used for postclosure impact analyses are commensurate with the recommendation of the National Research Council. Moreover, the Environmental Protection Agency has adopted the National Research Council's intrusion principle in Agency regulations at 40 CFR Part 197. The Nuclear Regulatory Commission licensing criteria for a repository at Yucca Mountain (10 CFR Part 63) also adopt the recommendations of the National Research Council with regard to human intrusion.

The EIS assumed active institutional controls for at least 50 years and possibly more than 300 years under both the Proposed Action and Scenario 2 of the No-Action Alternative. After this time, it was assumed that passive institutional controls would be applied because the repository would be closed and active institutional control would end under No-Action Alternative Scenario 2. Because the impacts due to postclosure passive institutional controls would be less than those analyzed for the active control period, the EIS analyses have represented the range of impacts.

2 (169)
Comment - 2 comments summarized
A commenter stated that designating indefinite onsite storage as the No-Action Alternative would render it a major Federal action. The commenter stated that the 77 sites that would continue to manage spent nuclear fuel and high-level radioactive waste under the No-Action Alternative should qualify under Sections 116, 117 (b), and 118 of the Nuclear Waste Policy Act for Federal grants to perform timely and essential analyses not completed by DOE and the Nuclear Regulatory Commission. The commenter also said that considerations that have been extended to Nevada and second-site candidates should be extended to states, tribes, and communities near the 72 commercial and 5 DOE storage sites. The commenter stated that these grant opportunities must be provided immediately on the issuance of the Final EIS if it maintains the No-Action Alternative without the additional evaluation requested.

Response
As stated in Section 2.2 of the EIS, DOE recognizes that neither No-Action Scenario would be likely to occur in the event of a decision not to develop a repository at Yucca Mountain. The Department included the two scenarios in the EIS to provide a basis for comparison to the impacts from the Proposed Action, and because they reflect a range of impacts that could occur. Sections 116 through 118 of the Nuclear Waste Policy Act concern coordination with State and tribes affected by the identification and study of potentially acceptable sites for a repository. By the terms of the NWPA, "repository" is defined as "any system... that.. may be used for the permanent deep geologic disposal of high-level radioactive waste and spent nuclear fuel." The 77 sites covered under the No-Action Alternative do not qualify as potential repository sites and, therefore, Federal grants would not be available to affected entities, states, tribes, or communities near those sites for additional analyses.

2 (505)
Comment - EIS000097 / 0002
Each nuclear plant that operates must take responsible action in handling the waste that comes from their plant and not leave it to some unknown handlers to do their work. Where one is responsible, there is usually much better handling.

Response
As described in Chapter 1 of the EIS, Congress has determined through passage of the Nuclear Waste Policy Act of 1982 that the Federal Government has the responsibility to dispose of spent nuclear fuel and high-level radioactive waste permanently and to ensure that these materials do not adversely affect this and future generations.

2 (828)
Comment - EIS000218 / 0001
As you progress in making the final decision about Yucca Mountain based on this EIS, I want to reiterate that the U.S. Government, through the DOE, has a legal obligation to build and operate a central repository for spent fuel from commercial reactors and for the high level waste generated from the production of our nuclear weapons. This process has taken exceedingly too long.

Response
Chapter 1 of the EIS explains that the Nuclear Waste Policy Act of 1982 established the Federal Government's responsibility to provide a permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste and set forth a process and schedule for disposal of these materials in a geologic repository. In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository.

The DOE schedule for determining whether to recommend that the President approve the Yucca Mountain site for a monitored geologic repository depends primarily on the completion of site characterization activities. DOE is responsible for the ultimate disposition of spent nuclear fuel and high-level radioactive waste and needs to make its determination expeditiously. However, the Department will not rush to do so in the absence of needed information. If DOE recommended the site to the President, and if the President recommended the site to Congress, and if Congress approved the site, if necessary, DOE would not begin shipments of nuclear waste to Yucca Mountain until the Nuclear Regulatory Commission issued a construction authorization and a license to operate the repository.

2 (868)
Comment - EIS000252 / 0002
It is important because we don't have a decent waste policy within this country. So, I think that DOE needs to step back, and take another look, and rethink what the nuclear waste policy really is. And it shouldn't be the shell game. And it shouldn't be the one biggest, best hole in the ground, whether that [be in] New Mexico or Nevada.

Not having an overall nuclear waste policy is some of the biggest problems that are within the Department of Energy.

Response
Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1976, the Energy Research and Development Administration (another predecessor agency) began investigating geologic formations and considering different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and rocketing waste into the sun. Based on the results of these investigations and the analyses of the *Final Environmental Impact Statement Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980), DOE determined in a Record of Decision (46 FR 26677, May 14, 1981) that it would pursue mined geologic disposal. In passing the Nuclear Waste Policy Act of 1982, as amended in 1987, Congress determined that decades of research had been sufficient to conclude that a geologic repository was the safest alternative for waste disposal (see Section 1.3 of the EIS for additional information).

Virtually every expert group that has examined the disposal of high-level radioactive waste has agreed that a geologic repository is the best approach. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). Their May 2001 report, *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001), reaffirms this position. The National Research Council maintains that "geologic disposal remains the only scientifically and technically credible long-term solution available to meet the need for safety without reliance on active management." This long-term solution would minimize the burden placed on future generations and provide the greatest degree of security from outsiders.

In 1987, Congress amended the Nuclear Waste Policy Act and directed DOE to determine whether Yucca Mountain is suitable for a geologic repository. In response, DOE conducted a series of investigations and evaluations (the site

characterization program) to assess the suitability of the Yucca Mountain site as a potential geologic repository. The investigations and evaluations consisted of scientific, engineering, and technical studies (see Section 1.4.3.1 of the EIS). In addition, various independent entities including the Nuclear Waste Technical Review Board, Nuclear Regulatory Commission and other agencies, and the State of Nevada and affected units of local government have reviewed the results of the site characterization program. The results of the program have provided information for this EIS and other DOE documents.

2 (1097)
Comment - EIS000162 / 0004
The "No Action Alternative" violates the NWPA [Nuclear Waste Policy Act] by not removing the waste to a centralized repository.

Response
The NWPA specifies that it is not necessary for this EIS to consider the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. However, DOE chose to evaluate a No-Action Alternative to serve as a basis for comparing the magnitude of potential impacts with those of the Proposed Action.

If the President or Congress did not approve Yucca Mountain, DOE would prepare a report to Congress. That report, required by the NWPA, would contain recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority. Other than this action, the future course that Congress, DOE, and the commercial nuclear power utilities would take is uncertain. In light of these uncertainties, DOE decided to illustrate one set of possibilities by focusing its No-Action Alternative analysis on the potential impacts of two scenarios: long-term storage of spent nuclear fuel and high-level radioactive waste at the current sites with effective institutional control for at least 10,000 years, and long-term storage with no effective institutional control after 100 years. Although neither of these scenarios is likely, DOE selected them for analysis because they provide a basis for comparison to the impacts of the Proposed Action and because they reflect a range of impacts that could occur.

2 (1244)
Comment - EIS001888 / 0348
[Clark County summary of comments it has received from the public.]

Many commenters requested that DOE restructure the EIS's proposed action and alternatives stating that the NWPA [Nuclear Waste Policy Act] does not preclude DOE from examining: (1) the need for the repository, (2) alternatives to geologic disposal (including recycling, storing wastes at the vitrification site, developing methods of waste remediation and destruction, using the waste for beneficial purposes, and launching the waste into space), (3) alternative sites to Yucca Mountain (including at-reactor dry-cask storage, interim storage, leaving foreign wastes in countries that generate the wastes thereby linking nuclear proliferation with the consequences of waste disposal), and (4) the timing of repository availability. Consistent with this restructuring, commenters suggested that the EIS evaluate the disposal of more than 70,000 MTHM [metric tons of heavy metal], alternatives if less than 70,000 MTHM are disposed [of], the likelihood of a second repository, the disposal of additional wastes (surplus plutonium, highly enriched uranium, Greater than Class [C], and the impacts of developing a low-level waste repository at Yucca Mountain. In contrast, other commenters said the Congressional intent not to require such analyses in the EIS should be followed, waste forms examined should be limited to SNF [spent nuclear fuel] and HLW [high-level radioactive waste], and that the no-action alternative should not be examined.

Response
As discussed in Section 1.5 of the EIS, the NWPA includes four provisions relevant to the EIS. Under the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

Section S.6.1 of the EIS Summary explains that comments received from the public during the scoping process expressed the concern that commercial and DOE facilities would produce more spent nuclear fuel and high-level radioactive waste than the 70,000 metric tons of heavy metal (MTHM) accounted for in the Proposed Action. In response to these comments, DOE analyzed the cumulative impacts of emplacing additional inventories in the

repository (Inventory Modules 1 and 2). Chapter 8 describes the impacts of emplacing additional waste in the repository. DOE recognizes that the emplacement of more than 70,000 MTHM in a repository at Yucca Mountain would require legislative action by Congress.

2 (1339)
Comment - EIS000219 / 0004
Using engineered and natural barriers, the Yucca Mountain repository will protect public health and safety and the environment for years to come.

Response
DOE is designing the proposed repository to use natural and engineered barrier systems that would ensure the containment of radioactive contamination for as long as possible. DOE believes it can design a containment system that the Nuclear Regulatory Commission will find, with "reasonable expectation," would protect public health and safety and the environment.

2 (3882)
Comment - EIS001343 / 0001
For the past 20 years I have been attending the hearings about waste storage at Yucca Mountain. I am convinced that the DOE should become a bystander while an assortment of governmental and corporate representatives as well as a large cross-section of the citizenry discuss and come to an agreement about the best way to store this terrible waste.

Response
In 1982, Congress, in passing the Nuclear Waste Policy Act, determined that deep geologic disposal is the appropriate way to dispose of spent nuclear fuel and high-level radioactive waste. Under that Act, as amended in 1987, Congress directed DOE to determine whether Yucca Mountain is a safe place to develop a geologic repository. The Department must act in accordance with the law. If the Yucca Mountain site is approved and licensed by the Nuclear Regulatory Commission, DOE would then be responsible for constructing, operating and monitoring, and closing the repository.

2 (5041)
Comment - EIS001520 / 0009
The description of the proposed action indicates that active institutional controls (e.g., monitored and enforced limitations on site access) would be applied to the Yucca Mountain site only until permanent closure of the repository has been completed. This seems contrary to the provision of the Energy Policy Act of 1992 that directs the Secretary of Energy to "continue to oversee the Yucca Mountain site to prevent any activity at the site that poses an unreasonable risk...." The oversight mandated by the Energy Policy Act appears to require some degree of active institutional control of the site, which would cause environmental impacts not evaluated in the draft EIS. The [Nuclear Waste Technical Review] Board recommends that the final EIS clarify the extent to which active institutional control of the Yucca Mountain site may be required by the Energy Policy Act, and estimate the environmental impacts that would be associated with a scenario that incorporates such control.

Response
The Energy Policy Act of 1992 directed the National Academy of Sciences to conduct a study to provide findings and recommendations on reasonable standards for the protection of the public health and safety by including "whether it is reasonable to assume that a system for post-closure oversight of the repository can be developed based upon active institutional controls, that will prevent an unreasonable risk of breaching the repository's engineered barriers or increasing individual members of the public to radiation beyond allowable limits" [Section 801(b)].

The National Research Council (jointly managed by the National Academy of Sciences and the National Academy of Engineering for the purpose of conducting such studies) concluded that it is not reasonable to assume that a system for postclosure oversight of a repository based on active institutional control could be developed that would prevent an unreasonable risk of breaching the repository's engineered barriers (DIRS 100018-National Research Council 1995). The Academy based this conclusion on the absence of any scientific basis for making long-term projections of the social, institutional, or technological status of future societies. It also concluded that there is no technical basis for making forecasts about the long-term reliability of passive institutional controls, such as markers,

monuments, and records. However, the Academy went on to say that while there is no scientific basis for judging whether active institutional control could prevent an unreasonable risk of human intrusion, a collection of prescriptive requirements including active institutional control, recordkeeping, and passive barriers and markers would help reduce the risk of human intrusion at least in the near term.

DOE agrees with the National Academy of Sciences conclusions and believes it prudent to consider some forms of institutional control. Section 2.1.2 of the EIS and Sections 2.5, 4.1.5, and 4.6 of the Science and Engineering Report (DIRS 153849-DOE 2001) describe institutional controls such as land records and warning systems, monuments to delineate the repository area, and a program of continued oversight to prevent any activity that would pose an unreasonable risk of breaching the engineered barrier. The establishment and maintenance of postclosure institutional control would be consistent with the postclosure monitoring program described in 10 CFR 63.102. The details of this program would be defined during the process of the license amendment for permanent closure. DOE expects the direct environmental impacts associated with the long-term monitoring program would be small, consistent with the impacts associated with other monitoring programs such as the Early Warning Drilling Program DOE is conducting in cooperation with Nye County.

2 (5429)
Comment - EIS001887 / 0128
Page 2-69; Section 2.3.1 - Alternatives Addressed Under the Nuclear Waste Policy Act

The Draft EIS should not consider any plan to emplace more than 70,000 MTHM [metric tons of heavy metal] at Yucca Mountain for the reason stated in the third paragraph of this section, i.e., the NWPA [Nuclear Waste Policy Act] prohibits this action. Therefore, the discussion of this plan in Section 8 should be removed from the Draft EIS.

Response
Section S.6.1 of the EIS Summary explains that comments received from the public during the scoping process expressed the concern that generating facilities would produce more spent nuclear fuel and high-level radioactive waste than the 70,000 metric tons of heavy metal (MTHM) accounted for in the Proposed Action. In response to these comments, DOE analyzed the cumulative impacts of emplacing additional inventories in the repository (Inventory Modules 1 and 2). Chapter 8 describes the impacts of emplacing additional waste in the repository. DOE recognizes that the emplacement of more than 70,000 MTHM in a repository at Yucca Mountain would require legislative action by Congress or the availability of a second repository.

2 (6833)
Comment - EIS001668 / 0003
Where does it go instead?

Response
DOE believes the comment refers to alternatives to geologic disposal at Yucca Mountain. As discussed in Section 1.5 of the EIS, the NWPA includes four provisions relevant to the EIS. Under the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

2 (8196)
Comment - EIS001653 / 0112
Furthermore, an EIS can consider other alternatives not specifically authorized by Congress.

Response
This comment is correct. However, as discussed in Section 1.5, the NWPA includes four provisions relevant to the EIS. Under the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

2 (8224)
Comment - EIS001873 / 0022
1987 NWPA [Nuclear Waste Policy Act] amendments are contrary to the intent of NEPA [National Environmental Policy Act].

Response
DOE believes that this EIS appropriately describes the type and magnitude of environmental impacts that could occur if it constructed, operated and monitored, and eventually closed a repository at Yucca Mountain. As discussed in Section 1.5 of the EIS, the NWPA includes four provisions relevant to the EIS. Under the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

2 (9052)
Comment - EIS001866 / 0007
The section of the NOI [Notice of Intent] describing the "Proposed Action" (page 9) states -- "Spent nuclear fuel and high-level radioactive waste would be disposed of in the repository in a subsurface configuration that would ensure its long-term isolation from the human environment." None of the alternatives or options in this NOI would result in isolation of SNF [spent nuclear fuel] or HLW [high-level radioactive waste] from the human environment for the full period of the waste's hazardous lifetime. Existing and proposed standards and regulations allow for release of radiation, to some extent, during each step in the waste management system. Therefore, since waste isolation will not be achieved by a repository program, No Action should to taken until there is clear, convincing and irrefutable evidence that a waste management system has been designed that will provide permanent isolation.

Response
As described in Chapter 1 of the EIS, Congress has determined, through the passage of the Nuclear Waste Policy Act of 1982, that the Federal Government has the responsibility to dispose permanently of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. The Act recognized a need to ensure that spent nuclear fuel and high-level radioactive waste accumulating at commercial and DOE sites do not adversely affect public health and safety and the environment.

Given the current state of technology, it is impossible to design and construct a geologic repository that would provide reasonable assurance or a reasonable expectation that there would never be any releases of radioactive materials. However, DOE would design, construct, operate and monitor, and eventually close a repository that would meet public health and safety radiation protection standards and criteria established by the Environmental Protection Agency (40 CFR Part 197) and the Nuclear Regulatory Commission (10 CFR Part 63).

2 (9368)
Comment - EIS001888 / 0074
Clark County is joining cities and counties around the country who are starting to define a vision for their future that balances community economic, environment and social well being in order to improve the quality of life of its residents. These "sustainable" communities have developed specific goals and strategies to guide programs and governmental services to achieve this balance and quality of life for the long-term. The goals and visions of these local areas are based on the values and priorities of residents who live there.

A 1999 report by the White House* argues that the real challenge that the nation faces in the 21st Century is to build "livable cities." This involves enhancing economic growth, public safety, environmental quality, well being of families, and sense of community. As part of a national initiative, 70% of over 200 communities in the U.S. adopted policies to pursue "livable cities." Building on the work of the Community Empowerment Board and the President's Council on Sustainable Development, the Livable Communities Initiative mobilized 12 federal agencies to provide information, tools and monitoring support for community targeted assistance.

From the Federal perspective, the initiative is to broaden choices available to communities in order to sustain prosperity and expand economic opportunity, enhance quality of life, and build a strong sense of community. As part of the Livable Communities Agenda, the federal government has a set of principles that argues that the:

(1) decisions of how communities grow should be made by the communities themselves;

(2) appropriate role of the federal government is to inform and assist, not to direct; and,

(3) federal government should help provide information and tools to help communities anticipate and scope patterns of growth.

These initiatives base their efforts on earlier goals of sustainable development - environmental protection (reduce environmental threats), economic security (build on past investment in communities and broaden the economic base), and social well-being (encourage opportunities for all segments of society).
In effect, these initiatives and goals reflect the national policy set forth in 1969 with the adoption of NEPA [National Environmental Policy Act]. The purpose of the act was to:

- Declare a national policy which will encourage productive and enjoyable harmony between man and his environment;
- Promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man;
- Enrich the understanding of the ecological systems and natural resources important to the Nation; and,
- Establish a Council on Environmental Quality [CEQ] (NEPA, 42USC § 4321).

While the language of the statute is very short and general, Congress intended in NEPA:

To use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans. (NEPA, 42USC § 431(a)).

Clearly, NEPA has resulted in implementation of federal assistance programs to maintain and sustain livable communities. CEQ regulations require federal agencies to comply with the purpose, policy and mandates of NEPA in their planning processes, including the preparation of environmental impact statements and other procedural requirements.

It appears that DOE's proposed repository program with its present insensitivity to local issues is actually working against federal environmental. It is imperative that DOE assure that the Yucca Mountain Program and the description of potential effects from its actions is consistent with national environmental policies.

*The White House. Building Livable Communities: A report from the Clinton-Gore Administration. Washington, D.C., June 1999.

Response
DOE is familiar with the Livable Communities Initiative and is, in fact, part of it. In the "Building Blocks of the Future, Federal Commitments to Sustainability, National Town Meeting for a Sustainable America" (DIRS 155488-ENN 1999) then-Vice President Gore announced that DOE, in partnership with the Department of the Interior's National Park Service, will support the "greening" of the U.S. National Park System through the use of energy efficiency and renewable energy technologies. The idea is to use clean, cost-effective energy technologies to improve the environmental quality of our parks by reducing air pollution and greenhouse gas emissions, and by replacing conventional sources of power with clean, quiet renewable energy systems. In addition, the use of "green" energy in the Nation's parks will help educate millions of visitors annually to technologies and practices they can employ in their homes, schools, and businesses.

The purpose of the National Environmental Policy Act, as implemented by the Council on Environmental Quality regulations, is to promote an understanding of environmental consequences of Federal actions prior to their implementation. The Act and its implementing regulations do not prohibit activities that might harm the environment; rather, they require Federal agencies to disclose the extent of such environmental harm, and any environmental benefits, to the public and to agency decisionmakers. DOE has modified this EIS to reflect comments received and new information, including that provided by local governments and communities, since the publication of the Draft EIS. DOE believes that the EIS appropriately describes the type and magnitude of environmental impacts that could occur if it was to construct, operate and monitor, and eventually close a repository at the Yucca Mountain site.

2 (9889)
Comment - EIS001888 / 0439
[Clark County summary of comments it has received from the public.]

Commenters expressed the need for the EIS to identify institutional controls (e.g., markers) that would endure for very long periods of time, particularly given the likelihood that government agencies and the English language may not survive that far into the future. Justification for this endurance, such as would be demonstrated by research on their effectiveness, was requested.

Response
Section 2.1.2 of the EIS, and Sections 2.5, 4.1.5, and 4.6 of the Science and Engineering discuss repository closure activities, including the use of institutional controls such as land records and warning systems to limit or prevent intentional and unintentional activities in and around the closed repository. Monuments would be designed, fabricated, and placed to be as permanent as practicable. The analysis of potential environmental impacts in the EIS did not take credit for the effectiveness of these institutional controls. Section 5.7.1 examines the potential environmental impacts that could result from an involuntary human intrusion into the repository (such as a drilling operation). After closure, DOE would have the responsibility of maintaining institutional control over the repository, as required by the Energy Policy Act of 1992. Neither the extent nor the length of this regulatory requirement is well defined at present. However, consistent with Nuclear Regulatory Commission regulations [10 CFR Part 63, particularly Section 63.102(k)], DOE would maintain appropriate institutional control for as long as possible. As the Nuclear Regulatory Commission has noted, although designs can attempt to warn potential intruders or mitigate effects associated with intrusion that does occur, they cannot remove the potential for intrusion to occur (64 *FR* 8651, February 22, 1999).

Nuclear Regulatory Commission regulations [10 CFR 63.51(a)(1) and (2)] require the submittal of a license amendment for permanent closure of the repository. This amendment would have to specifically provide an update of the assessment for the repository's performance for the period after permanent closure, which would include consideration of the use and effectiveness of institutional control. The details of this program would be defined during the development of and approval process for a license amendment for permanent closure. Deferring a description of this program until the closure phase would enable the identification of appropriate technology, including technology that could become available in the future.

2 (9899)
Comment - EIS001888 / 0446
[Clark County summary of comments it has received from the public.]

Two commenters discussed a 5-step process for solving the nuclear-waste issue: (1) impose a moratorium on all shipments of nuclear waste; (2) establish a commission on nuclear waste; (3) pursue conservation and renewable energy sources and phase out nuclear energy; (4) establish a national nuclear-waste policy that respects the sovereignty of states, counties, and tribes; and (5) pursue an aggressive policy of nuclear-weapons disarmament.

Response
The NWPA requires DOE to prepare an EIS to accompany any site recommendation that the Secretary of Energy makes to the President. In compliance, DOE developed this EIS, which analyzes potential environmental impacts of constructing, operating and monitoring, and eventually closing a repository for the disposal of spent nuclear fuel and high-level radioactive waste. The five-step process described in the comment is outside the scope of the EIS.

2 (9983)
Comment - EIS001888 / 0489
[Clark County summary of comments it has received from the public.]

EIS must assess all subjects mentioned in Title V of the NWPA [Nuclear Waste Policy Act].

Response
Title V of the Nuclear Waste Policy Act establishes the Nuclear Waste Technical Review Board. DOE is uncertain of the comment's specific reference with regard to the EIS. The Nuclear Waste Technical Review Board has reviewed and commented on the Draft EIS, and DOE has responded to its comments in this Comment-Response Document.

2 (10442)
Comment - EIS002125 / 0001
I would like to address the NEPA [National Environmental Policy Act] violations here. We all know that it was a politically motivated thing that brought the Yucca Mountain dump to us.

Even more troubling than the politically based nature of the decision to target Nevada alone for high-level waste is the fact that to ensure approval of the Yucca Mountain site, Congress undermined key provisions of the National Environmental Policy Act with respect to the Yucca Mountain Project. The Nuclear Waste Policy Act as enacted limited the scope and extent of evaluation of potential environmental impacts normally required in an Environmental Impact Statement under NEPA.

Specifically that law exempts the Yucca Mountain Environmental Impact Statement from consideration of the need for repository, alternate sites to Yucca Mountain and alternatives to geologic disposal of high-level waste. In other words, Congress diminished the inherent value of conducting an Environmental Impact Statement in an apparent attempt to rubber stamp NEPA approval on the project.

The proposed Nuclear Waste Act of 1997 contains similar provisions. Knowing this project could never meet radiation guidelines established by the Environmental Protection Agency [EPA] and other regulatory agencies charged with protecting our health, Congress has included in the bill broad sweeping exemptions from local, state or federal environmental oversight of the transportation and storage process. It prevents EPA from creating environmental standards governing the Yucca Mountain site and raises limitations on the amount of radiation in drinking water near Yucca Mountain to a level twenty-five times higher than that of any other state. Obviously we should be following NEPA and the EPA should be leading us that way.

Response
In 1987, Congress amended the Nuclear Waste Policy Act by directing the Secretary of Energy to determine whether Yucca Mountain is suitable for a geologic repository, and it eliminated Deaf Smith County, Texas, and the Hanford Site in Washington, from consideration (Nuclear Waste Policy Amendments Act of 1987, Public Law 100-203, 101 stat. 1330).

DOE believes that this EIS appropriately describes the type and magnitude of environmental impacts that could occur if it constructed, operated and monitored, and eventually closed a repository at Yucca Mountain. As discussed in Section 1.5 of the EIS, the NWPA includes several provisions relevant to the EIS. Under Section 114(f) of the Act, the Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development.

In 1992, Congress further amended the Nuclear Waste Policy Act through the Energy Policy Act which requires the Environmental Protection Agency to promulgate specific radiation protection standards for Yucca Mountain based on and consistent with findings and recommendations of the National Academy of Sciences. In addition, Section 801(b) of the Energy Policy Act of 1992 requires the Nuclear Regulatory Commission to modify its technical requirements and criteria to be consistent with the Environmental Protection Agency's radiation protection standards.

Both the Environmental Protection Agency and the Nuclear Regulatory Commission have issued final rules [40 CFR Part 197, Environmental Radiation Protection Standards for Yucca Mountain, Nevada, and 10 CFR Part 63, Disposal of High-Level Radioactive Wastes in a Proposed Geological Repository at Yucca Mountain, Nevada, respectively].

2 (10473)
Comment - EIS001835 / 0002
Regarding the draft environmental impact statement meeting the requirements of the National Environmental Policy Act, NEPA as it's often called, it does indeed effectively satisfy the requirements of NEPA. I'm going to quote a few sections from the Nuclear Waste Policy Act regarding NEPA's application to this project.

Section 114 F states that the final environmental impact statement will accompany a recommendation to the President to approve a site for a repository. And in fact this draft is the first stop in that process, and DOE will issue a final impact statement sometime later this year after they take into consideration all the comments that they're hearing today and in all the other meetings across the country.

Compliance with the procedures and requirements of the Nuclear Waste Policy Act shall be deemed adequate consideration of the need for a repository, the time of initial availability of a repository and all alternatives, the isolation of high-level waste [and] spent nuclear fuel in a repository. For the purposes of complying with the requirements of NEPA and Section 114 of the Nuclear Waste Policy Act -- I know it's dry, this is regulatory language -- the secretary need not consider alternative sites to [the] Yucca Mountain site for the repository to be developed.

And the reason that this was put in the Nuclear Waste Policy Act to specifically limit the NEPA analysis and what DOE needed to consider in a Draft Environmental Impact Statement and the final environmental impact statement is because the federal government, DOE looked at those issues in 1980 when they issued a draft environmental impact statement and FEIS for the management of commercially generated radioactive waste. And in 1981 they issued a record [of] decision in which the federal government opted for more geologic disposal. This is the next step in our process.

Response
Thank you for your comment. DOE appreciates your understanding of the National Environmental Policy Act as specified in the NWPA.

2 (11188)
Comment - EIS000248 / 0003
A combination of natural geological and engineered barriers would prevent the release of radioactive materials back into the biosphere. These barriers include the use of fuel itself, which is a surround of material, which is designed to maintain its integrity and be leach resistant under [severe] conditions; such as heat, radiation, and chemicals that are anticipated in the repository.

Second barrier is the waste packaging, which is designed to isolate the used fuel material from the host media. This is a robust stainless steel canister. The host crop [rock] then isolates the nuclear fuel from groundwater and limits the rate [at] which release of material can migrate from the replacement [repository] site. And the shaft will be sealed after the site has been closed to prevent intrusion of [the] surface against humans. Finally a monitoring system will be in place to verify the integrity of this site after closure.

Response
DOE is designing the proposed repository to use natural and engineered barrier systems that would ensure the containment of radioactive contamination for as long as possible. DOE believes it can design a containment system that the Nuclear Regulatory Commission will find, with "reasonable expectation," would protect public health and safety and the environment.

2 (12021)
Comment - EIS000540 / 0012
Recognizing that alternative means must be fully explored for managing and disposing of high-level nuclear wastes to minimize health and safety risks for current and future generations.[(1),(2)]

[(1)]Makhijani A. Considering the Alternatives: Creating a framework for sound long-term management of highly radioactive wastes in the United States. Institute for Energy and Environmental Research. Science for Democratic Action, vol. 7 no. 3, April 1999.

[(2)]Makhijani A. Institutional Reform for Long-Term Nuclear Waste Management. Institute for Energy and Environmental Research. Science for Democratic Action, vol. 7 no. 3, April 1999.

Response
In a 1980 EIS, DOE examined different disposal alternatives for spent nuclear fuel and high-level radioactive waste, including mined geologic disposal, as well as disposal in salt domes, on islands, in oceanic trenches, within ice sheets, by transmutation, by injection into deep holes, and by launching the waste into space. The Department determined in a Record of Decision for that EIS (46 *FR* 26677, May 14, 1981) that it would pursue mined geologic disposal. As stated in Section 2.3.1 of this EIS, virtually every expert group that has looked at the nuclear waste problem has agreed that a geologic repository is the best approach for nuclear waste disposal. A panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). This conclusion was recently affirmed in the May 2001 Report *Disposition of High-Level Waste and Spent Nuclear Fuel: The Continuing Societal and Technical Challenges* (DIRS 156712-National Research Council 2001).

2 (12042)
Comment - EIS000540 / 0016
Urge Congress to financially support research for alternative methods to safeguard and manage the Nation's high-level nuclear waste and minimize the risks to public health for all generations.*

*Olson M, Piersma A. A Letter to Bill Richardson, Secretary of Energy. Signed by 219 environmental and consumer organizations. Washington, DC, November 19, 1998.

Response
As discussed in Chapter 9 of the EIS, DOE continues to evaluate new technologies (such as accelerator transmutation of waste) to reduce any potential adverse effects of the repository project by reducing volume and toxicity of waste that would ultimately require geologic disposal. However, the NWPA does not allow DOE to pursue such research as a substitute for developing a repository.

2 (13237)
Comment - 010244 / 0036
Under the DEIS and S&ER designs, the performance confirmation program which would continue through construction and license phases and until the closure phase would include elements of the site testing, repository testing, repository subsurface support facilities and waste package testing. The DOE should confirm performance of the repository prior to the siting of radioactive waste at Yucca Mountain.

Response
Consistent with the NWPA, DOE began site characterization activities to evaluate the suitability of the Yucca Mountain site for the location of a repository. As such, site characterization included activities the Secretary of Energy considered necessary to provide the data required for evaluation of the suitability of the site for submittal of an application to the Nuclear Regulatory Commission for a construction authorization for a repository. The Secretary will consider the information from the site characterization program, as well as the results of the environmental analyses of this EIS and public input, in determining whether to recommend development of the site to the President as a geologic repository.

The performance confirmation and testing program is an important part of the strategy for the development of the postclosure safety case for the proposed repository (DIRS 146976-CRWMS M&O 2000) and is designed to meet

specific regulatory requirements [10 CFR 63.102(m) and 10 CFR Part 63, Subpart F]. As defined, the program would consist of tests, experiments, and analyses to evaluate the adequacy of the information used to demonstrate compliance that the repository would meet performance objectives. The description of the performance confirmation and testing program is formally documented in the *Performance Confirmation Plan* (DIRS 146976-CRWMS M&O 2000) and described in Section 2.1.2.3 of the EIS. In accordance with applicable regulations, the performance confirmation period started during site characterization would extend until the beginning of repository closure activities, as discussed in Section 2.1.2 of the EIS. Key geologic, hydrologic, geomechanical, and other physical processes or factors (and related parameters) would be monitored and tested throughout repository construction, emplacement, and operation to detect any significant changes from baseline conditions. DOE would use these data to confirm that subsurface conditions were consistent with the assumptions used in performance analyses and that barrier systems and components operated as expected.

REFERENCES

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100011	NAS 1957	NAS (National Academy of Sciences) 1957. The Disposal of Radioactive Waste on Land. Publication 519. Washington, D.C.: National Academy of Sciences, Committee on Waste Disposal, National Research Council. TIC: 221455.
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100018	National Research Council 1995	National Research Council 1995. Technical Bases for Yucca Mountain Standards. Washington, D.C.: National Academy Press. TIC: 217588.
156712	National Research Council 2001	National Research Council 2001. Disposition of High-Level Waste and Spent Nuclear Fuel: the continuing societal and technical challenges. Washington, D.C.: National Academy Press. TIC: 250101.

3

Affected Environment

3. NATIONAL ENVIRONMENTAL POLICY ACT

3 (3227)
Comment - EIS000959 / 0003
We are strongly opposed to the nuclear industry's ongoing effort to establish a "permanent" high-level nuclear waste facility at Yucca Mountain for the following reason:

The dump will have far reaching consequences that no one can predict for tens of thousands of years.

Response
Congress tasked the U.S. Department of Energy (DOE or the Department) with the goal of finding a permanent, safe, deep-geologic-disposal site for spent nuclear fuel and high-level radioactive waste from commercial and defense-related nuclear energy programs and investigating the safety of candidate sites. The goal of deep geologic disposal is to isolate these materials from the near-surface environment for as long as possible. To achieve that end, DOE has instituted a process to utilize both natural and engineered systems to ensure that the proposed Yucca Mountain Repository would contain the waste as long as possible. The site characterization studies indicate that the repository would meet the technical criteria to provide this long-term isolation of the waste material with safety. These studies examined the present conditions in and near Yucca Mountain and the geologic history of the site to determine the most important characteristics in relation to long-term waste disposal.

The EIS describes and analyzes the means by which the geology of Yucca Mountain and the engineered systems designed to contain the waste would work together to provide maximum protection for the waste in the repository. It evaluates the safety measures that are part of the repository design and presents the calculations that analyze the effectiveness of that design. DOE used computer models to simulate the long-term performance of the repository. As a result of this evaluation, DOE would not expect the repository to exceed the prescribed radiation exposure limits during the 10,000-year period after closure. Further, DOE estimates that the average peak dose to a hypothetical individual from the repository would be less than the dose received from natural background radiation.

3 (6065)
Comment - 010242 / 0008
The Supplement states, "DOE invites comments on its intention not to address the Draft EIS design in the Final EIS." There was no "Draft DEIS design." In our view, the design information presented in the Draft EIS should be presented in the Final EIS as part of the full scope of the bounding alternatives considered. And the Final EIS must include a preferred design that is derived from among all the alternatives evaluated. The potential impacts of the DEIS design alternatives were presented in the DEIS, and the Supplement advances the analyses of those potential impacts through the use of Primary Impact Indicators, resulting in impact values that, in nearly all cases, are greater than those presented in the DEIS. The DEIS potential impact analyses form the basis of the impact values presented in the Supplement, and must be included in the Final EIS as part of a comprehensive analysis of potential impacts of all design alternatives considered.

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design whose central feature was areal mass loading.

Since it issued the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the flexible design that DOE evaluated in the Supplement to the Draft EIS and in this Final EIS. This design focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the

heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts. DOE has not identified a preferred operating mode, however, because it would resolve many of the issues related to how it would operate a repository only in the context of developing the detailed design for a possible License Application.

This Final EIS does not include thermal load scenarios, primarily because the design has evolved from one that focuses on areal mass loading (amount of spent nuclear fuel per unit area) to one that focuses on controlling the temperature of the rock. This flexible design offers reduced uncertainties in long-term repository performance, and improvements in operational safety and efficiency over a thermal load design.

3 (7346)
Comment - EIS001957 / 0007
Uncertainties underlying the proposal are not adequately disclosed. For instance, Section 5.2.3.5 obscurely states that confidence in models to predict radionuclide concentration reduction through both saturated and unsaturated zones is low, and that the significance of this uncertainty to the estimated repository performance is high. Importance of the uncertainty factors is not sufficiently discussed throughout. To foster uninformed readers' understanding of the proposal (and its effects), we urge that the many uncertainty factors—preventing scientists from saying much of anything with a high degree of confidence about overall safety—be clearly set forth in the beginning of the Summary and in the Findings.

Response
DOE prepared the Summary in accordance with the Council on Environmental Quality (CEQ) Regulations (40 CFR 1502.12) to summarize the major conclusions of the EIS, areas of controversy, and issues to be resolved. Section 5.2.4 of the EIS discusses uncertainties in the context of possible effects on the long-term performance impact assessment. DOE acknowledges that the results of analyses often have associated uncertainties and has described such uncertainties throughout the EIS. Further, as discussed in Section 2.5, to ensure an understanding of the status of its information, DOE has identified the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches.

3 (9195)
Comment - EIS001924 / 0018
The uncertainty analysis presented in section 5.2 of the DEIS is not clearly written. It would have been helpful to have created a diagrammatic explanation of the handling of the uncertainties involved. This is the linchpin of the document, since an informed decision of the proposed action rests firmly on the DOE's understanding of the repository functioning, geology, transportation cask performance, etc., which has associated uncertainties. How is the public to evaluate the DOE's understanding of the project if it cannot gain a firm grasp of the uncertainties within?

Response
DOE acknowledges in Section 5.2.4 of the EIS that there is a level of uncertainty associated with estimating impacts, especially over thousands of years. With regard to the long-term performance assessment of the repository discussed in Section 5.2, DOE considered the uncertainties associated with societal changes and climate, currently available data, and models and model parameters.

As discussed in Section 2.5 of the EIS, to ensure an understanding of the status of its information, DOE identified the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches. DOE acknowledges that the results of analyses often have associated uncertainties and has described such uncertainties throughout the EIS. In such instances, the EIS describes the basis for assumptions made for purposes of analysis. The Department chose the assumptions (and analytical methods) to represent conservatively the reasonably foreseeable impacts that could result from implementing the Proposed Action.

With regard to the presentation of information, DOE has taken a number of steps to make the EIS as understandable as possible to a wide range of readers. For example, the EIS includes explanatory text boxes, summary tables, illustrations, and comparative information to highlight potential environmental impacts.

3 (11326)
Comment - 010148 / 0003
In this document from what I've seen so far very important errors could have been corrected in the Supplement but were not, such as there's a green piece of paper back on the Citizen Alert table back there, a brand new article that apparently the NRC just randomly took 20 figures out of the Department of Energy's calculations and found out that oh, ten were wrong, including the 120 millirem doses at 550,000 years, right in the middle of the calculations errors in the NRC that they picked out. What else is wrong? This is just a random picking. The Department of Energy should withdraw this entire monstrosity. When you all know what you're doing, start again. We deserve better. And I think the Department is actually capable of better on that.

Response
DOE placed considerable effort into preparing a quality EIS. While some typographical and other minor errors could exist, the Department believes that the overall quality of the Final EIS is sufficient.

3 (11552)
Comment - 010396 / 0001
We support Citizens Alert and the positions they have taken on the draft and supplement to the draft EIS noted above. The positions of Citizens Alert are adopted herein and made a part hereof for all purposes.

Response
See DOE's responses to comments from Citizen Alert.

3 (12962)
Comment - 010249 / 0016
Response to DOE request for comment on whether or not the FEIS should include analysis referring to the DEIS design

Yes. The benefit of the additional design information in the SDEIS is that it provides an expanded design envelope, not simply a different design envelope. In keeping with the step-wise repository development process recommended by NAS [National Academy of Sciences], DOE should maintain a wide range of design options. This would preserve the opportunity to return to a higher temperature design concept should future information warrant such a change. In considering the FEIS, decision-makers should focus on the fact that all of the designs considered thus far in the NEPA [National Environmental Policy Act] process have been estimated to be in compliance with the recently finalized EPA [Environmental Protection Agency] standard. The decision that will be made based on this information is about whether or not the Yucca Mountain site is suitable for a repository, not about which specific repository design is most suitable.

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design whose central feature was areal mass loading.

Since it issued the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the flexible design that was evaluated in the Supplement to the Draft EIS and is evaluated in this Final EIS. This design focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected these lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts. DOE has not identified a preferred operating

mode, however, because many of the issues related to how a repository would be operated would be resolved only in the context of developing the detailed design for a possible License Application.

This Final EIS does not include thermal load scenarios, primarily because the design has evolved from one that focuses on areal mass loading (amount of spent nuclear fuel per unit area) to one that focuses on controlling the temperature of the rock. This flexible design offers reduced uncertainties in long-term repository performance, and improvements in operational safety and efficiency over a thermal load design.

3 (13168)
Comment - 010243 / 0015
In addition to its illegality, the construction of such a [surface aging] facility would require a separate EIS process. Certainly, it must be acknowledged that any additional surface facilities necessary to implement the *new proposed action* would require a separate EIS process. Indeed, as is the case with the Private Storage Facility in Utah, proposed for the Skull Valley Goshute Reservation, it would require a separate EIS. Ideally, the EIS processes for the DEIS and the SDEIS would have been programmatic in nature, and more comprehensively addressed all of the environmental issues inherent in what the DOE recognizes as "the largest public works project in history."

Response
The Council on Environmental Quality regulations state that an agency should analyze "connected actions" in one EIS. Connected actions are those that automatically trigger other actions that might require EISs, cannot proceed unless other actions are taken previously or simultaneously, or are interdependent parts of a larger action and depend on the larger action for justification. For this reason, in this Final EIS DOE has incorporated the surface aging facility into its analyses (as it has done for all such facilities germane to the Proposed Action).

3.1 Draft EIS - Presentation

3.1 (11)
Comment - 8 comments summarized
Commenters suggested specific corrections for maps and for information or terminology used with the maps. One commenter noted that the Draft EIS indicated there would be ingestion from groundwater 5 kilometers (3 miles) from the repository but goes on to point out that the 5-kilometer location is well within the repository boundary and would not be a viable access point.

Several commenters identified problems with the EIS depiction of the repository location and boundaries. One commenter noted that Figure 3-2 [Section 3.1.1.2] of the Draft EIS shows Yucca Mountain too far north. Another noted that Figure 1-6 [Section 1.4.1.] does not show the withdrawal area accurately. Commenters indicated the EIS should provide clear information on repository size and include map scales.

Two commenters indicated that the boundaries shown for the Nevada Test Site and Death Valley National Park were not accurate. Another commenter stated that the 3.5-square-kilometer (870-acre) repository operations area described in the Draft EIS does not agree with the description of disturbed land and repository subsurface areas listed in Table 8-4 [Section 8.1.2.1]. Commenters suggested adding features to the legend for Figure S-17 [Section 5.4.1.1]. One commenter suggested using the term "government administered," rather than "government owned," when referring to lands controlled by an agency of the Federal Government.

Response
Section 5.3 of the Draft EIS acknowledged that no people lived or accessed groundwater at the 5-kilometer (3-mile) distance downgradient from the repository. It also acknowledged that groundwater at this location is more than 100 meters (330 feet) deep and, therefore, is not accessible economically. DOE analyzed the distance with a hypothetical maximally exposed individual largely because the then-proposed Environmental Protection Agency (EPA) standard (40 CFR Part 197) identified the 5-kilometer distance as a compliance point. Since then, EPA has recognized that the long-term analysis need not consider points closer to the repository than the boundary of the controlled area. In 40 CFR Part 197, EPA defines the accessible environment as any point outside the controlled area, and allows the controlled area to extend no farther south in the predominant direction of groundwater flow than 36 degrees, 40 minutes, 13.6661 seconds north latitude. The point of compliance is where the maximum

concentration of a contaminant plume would cross the boundary. This is approximately 18 kilometers (11 miles) downgradient from the repository site and is near the junction of U.S. 95 and State Route 373 (an area formally called Lathrop Wells and now called Amargosa Valley). This is the closest point at which DOE estimated human health impacts from groundwater pathways in this Final EIS.

In response to these comments, DOE has:

- Corrected the location of Yucca Mountain in the figure in Section 3.1.1.2.
- Modified the figure in Section 5.4.1.1 to be consistent with Chapter 3.
- Corrected the insert to the figure in Section 1.4.1 to show the intersection of Lathrop Wells Road with U.S. 95.
- Modified the repository boundaries and surface and subsurface areas shown in the EIS where appropriate. (Sections 2.1.2.1 and 2.1.1.1 describe dimensions of repository surface and subsurface facilities, respectively.)
- Added scales to maps in the EIS where appropriate.
- Modified Section 10.1.2.1 to read "government administered or controlled" rather than "government owned."
- Reviewed the depiction of the Death Valley National Park and modified the figure in Section 3.1.1.2 to show additional lands now administered by the National Park Service.

DOE has concluded that it is not necessary for the Final EIS to analyze a hypothetical individual at locations closer than approximately 18 kilometers (11 miles) to the repository because it is unreasonable to assume that anyone would reside in this area because:

- To reach the water table an individual would have to install and operate a water well in volcanic rock more than 360 meters (1,200 feet) deep at costs significantly (perhaps prohibitively) above those several kilometers farther south where the water table is less than 60 meters (200 feet) beneath the surface through sand and gravel.
- Locations closer than 18 kilometers (11 miles) are in the controlled area defined in the EPA standard for a Yucca Mountain Repository and, therefore, not in the postclosure accessible environment defined by EPA.

3.1 (12)
Comment - 12 comments summarized
Commenters indicated they thought the EIS and EIS Summary were well organized, fairly represented the potential impacts associated with repository actions, and made effective use of graphics.

Response
DOE acknowledges the opinions of the commenters and their views on the EIS.

3.1 (15)
Comment - 24 comments summarized
Commenters said that DOE "obfuscated" the information in the EIS through confusing cross-references and redundancies in presentation, thus making the EIS hard to read and understand. Commenters said that the EIS, and in particular the Summary, should be rewritten in a reader-friendly manner or in a manner that can be better understood by the nonscientific community. Some commenters cited the Council on Environmental Quality guidance on page limits and indicated the EIS was too long. However, one commenter stated that the document's length was appropriate given the complexity of the issues. Some commenters believe the EIS should be written in "plain English."

Response
DOE has taken a number of steps to make the EIS as understandable as possible to a wide range of readers. For example, the Final EIS includes a Readers Guide in addition to a number of explanatory text boxes, summary tables,

illustrations, and comparison information that stresses and highlights potential environmental impacts. In addition, Chapter 14 of the EIS is a comprehensive glossary of technical terms. Further, technical appendixes comprise a substantial portion of the document volume. To reduce the number of pages in the main volume of the EIS, and help focus the reader on the most important material, DOE provided more technical discussions in these appendixes.

The EIS exceeds the page guidelines suggested in 40 CFR 1502.7, but the subject matter is complex and covers a range of issues.

3.1 (16)
Comment - 9 comments summarized
Commenters took issue with what they categorized as the tentative, imprecise, or qualitative use of terms to describe or compare the potential impacts described in the EIS. Some of the commenters deemed the terminology not appropriate because the EIS should be definitive and certain in its science. More explanations should be included for complex tables and charts. Commenters also stated that a spot check for consistency from one chapter or section to another revealed many errors and that the entire EIS should undergo a good quality control process and the inconsistencies eliminated. Similarly, commenters stated that the EIS should clarify, reference, and present text, tables, and figures consistently.

Response
Many sections of the EIS (for example, transportation-related health effects and air quality impacts from construction) provide quantitative estimates of potential impacts if there was enough information to support calculations and impacts that were likely to be of greater concern. In some cases DOE used quantification if it was appropriate from a scientific perspective to describe analysis results in terms of what would be likely to occur rather than what would absolutely occur. This is because the analysis estimated the future performance of engineered and natural systems over a long period. In contrast, some EIS comparisons are qualitative rather than quantitative (for example, see Section 3.1.10), either because the analytical techniques are not quantitative in nature or because the impacts would be of less concern.

For the Final EIS, DOE scrutinized the information in the Draft EIS to eliminate inconsistencies and ensure accuracy. Information was compared on a resource-by-resource (for example, land use) basis between the Summary, relevant sections of the Final EIS, and the Comment-Response Document. Thus, for example, DOE compared land-use impacts described in the Summary to similar information in Chapters 4 (construction, operation and monitoring, and closure), 8 (cumulative impacts), and 10 (unavoidable adverse impacts) to ensure consistency. Next, the Department compared its discussions of land-use impacts to its responses to the comments in this Comment-Response Document to ensure that the entire Final EIS is as consistent as possible.

3.1 (17)
Comment - 3 comments summarized
Commenters stated that the glossy paper on which the EIS is printed is very hard on their eyes and that some commenters must shift the pages to reduce glare. They would like the EIS to be printed on nonglare paper. Because of the size and weight of the two-volume Draft EIS, DOE should separate the Final EIS into several smaller booklets, so they are easier to handle, or make it less repetitive.

Response
DOE elected to use color in the Draft EIS Summary to convey certain information more effectively, as in the figures and supplemental information in text boxes; the Department used black-and-white print for the rest of the Draft EIS. DOE printed the Summary on coated (glossy) paper because this paper holds color better than nonglossy paper, and used nonglossy paper for Volumes I and II. The Supplement to the Draft EIS was printed on nonglossy paper.

For the same reasons, DOE elected to use color in the Final EIS Summary and to print the Summary on glossy paper. The remainder of the document does not use color and, therefore, has been printed on nonglossy paper.

DOE has published the Final EIS, which contains responses to public comments on the Draft EIS and the Supplement to the Draft EIS and provides new information and analyses, in four separate "books." These include the Readers Guide and Summary, Volume I (Chapters 1 through 15), Volume II (appendixes), and Volume III (this Comment-Response Document). The outline of Volume I is consistent with the requirements of the Council on

Environmental Quality; Volume II provides additional details in support of the information in Volume I; and Volume III provides DOE responses to public comments on the Draft EIS and the Supplement to the Draft EIS.

3.1 (19)
Comment - 5 comments summarized
Commenters stated that the Table of Contents, List of Figures, and List of Tables were difficult to read, in part because of the format. One commenter requested an index; another stated that the index provided in the Draft EIS was too brief.

Response
DOE has reformatted the Table of Contents, List of Tables and List of Figures to improve readability. Changes include reformatting chapter and appendix headings, increasing space between individual entries, and modifying the line formatting (including the use of bold type). Chapter 15 of the EIS contains an Index.

3.1 (21)
Comment - 7 comments summarized
Commenters noted inconsistencies or issues related to information presented in the Draft EIS for the alternative rail corridors. Commenters stated that while the Summary shows two railroad routes going through Pahrump, Pahrump is not shown on the map. Another commenter noted differences in the rail routes on two different maps. The commenter went on to question impacts on the operation of the Cortez Mine, Placer Dome, and other mining claims.

One commenter noted a discrepancy in the length of the Valley Modified rail corridor as listed in Section L.3.2 and the text box in Section S.4.2.2 of the Draft EIS.

A commenter indicated that the Union Pacific Railroad now owns both of the northern routes, and the Burlington Northern has shipping privileges on the northern route. Section 2.1.3.3 of the Draft EIS states that the Southern Pacific Railroad owns one of the northern routes and that the Union Pacific owns the other northern route and the southern route.

One commenter stated that State Route 318 intersects U.S. Highway 93 rather than State Route 375, as stated in Section 3.2.2.2.4.

One commenter suggested replacing the railroad figure in Section 6.2.1 of the EIS with the map of national rail routes distributed by DOE at the public hearing held in Chicago. Another commenter stated that the railroad routes shown in that figure did not seem proximate to eight sites in New Jersey and Maine.

Response
DOE has studied the information in the EIS to eliminate inconsistencies and ensure the accuracy of information related to alternative rail and heavy-haul truck corridors. Specifically, DOE modified transportation figures to include Pahrump and other geographic features.

DOE is aware of the Cortez Gold Mines operation in Crescent Valley, as well as other mining operations and claims. Sections 8.1.2.3 and 8.4.2 discuss the Cortez Gold Mines and describe possible impacts. At this time, however, more detailed information is not available for each particular transportation alternative. As indicated in Section 9.3.1, DOE would develop mitigation measures if construction and operation of facilities could result in (1) impacts to publicly used lands, (2) direct and indirect land loss, and (3) displacement of capital improvements.

Gold Acres and Tenebo are historic reference points in the vicinity of the Carlin Corridor. To avoid confusion, they have been deleted from the list of communities in the EIS.

Based on a review of the official map of the State of Nevada, State Route 318 intersects with State Route 375, which in turn intersects with U.S. Highway 93.

DOE used the railroad maps displayed at the public hearings for their scale and depth of detail. DOE has added tables to Appendix J of the EIS to list transportation impacts for each state, and has added maps for each route analyzed (see Section J.4).

3.1 (22)
Comment - 5 comments summarized
Commenters provided suggestions and noted inaccuracies in the EIS information on geology and hydrology. One commenter suggested that the term "groundwater" should be two words and that the terms "saturated zone" and "aquifer" should be defined. Another commenter believed that the reference to an average unsaturated-zone thickness (page 10-2 of the Draft EIS) is inaccurate. A commenter stated that the definition for "hydrographic area" seems to imply groundwater basins and hydrographic areas do not equate. The commenter suggested that the definition should come earlier in Chapter 3. One commenter stated that pages related to geologic and hydrologic information in Chapter 3 were missing from the Draft EIS.

A commenter identified an inconsistency in reported centimeters between pages 10-2 and pages 3-44 of the Draft EIS. Another commenter suggested including maps showing the location of surface water in relationship to transportation corridors, flow and discharge information, uses of permitted waters, recharge, and floodplain information.

A commenter questioned why, on the groundwater flow basins figure in Section 3.1.4.2.1, there is a question mark on the groundwater flow arrow from the Amargosa Desert area toward Death Valley National Park. The commenter stated that this is different from Figure 3-32 from D'Agnese, et al., which provides essentially the same information.

One commenter stated that the section labeling and content for Section 3.1.3.1, Physiography (Characteristic Land Forms), is confusing. The commenter suggested that the information on selection of repository host rock and potential for volcanism should be numbered subsections under the main section, 3.1.3, Geology, and not a subsection of Physiography.

Response
DOE recognizes that both "groundwater" and "ground water" are in common usage. DOE has elected to use the single-word form in keeping with agency convention.

As described in the Glossary (Chapter 14 of the EIS), "aquifer" is a type or subset of "saturated zone." Aquifer is "a subsurface saturated rock unit (formation, group of formations, or part of a formation) of sufficient permeability to transmit groundwater and yield usable quantities of water to wells and springs." Saturated zone is "the areas below the water table where all spaces (fractures and rock pores) are completely filled with water." The text has been revised to improve consistency in the use of groundwater area terminology. In addition, text has been added to better describe the relationship between basins and hydrographic areas as used in the EIS. Boundaries of hydrographic areas often do not precisely match those of groundwater basins and the finer division of sections because hydrographic areas generally reflect topographic divides (mountains and valleys) that, in some cases, do not correspond to divides based on groundwater movement. Hydrographic area designations are important because they are the basic units used by the State of Nevada in its water planning and appropriations efforts.

Because of the large areas involved, DOE has not provided maps with the level of detail requested in this comment. However, Section S.13 of the EIS presents color maps of the transportation corridors in considerably more detail than presented in the Draft EIS. DOE provided hydrographic information for each transportation scenario discussed in Chapter 6.

With regard to the use of an average unsaturated zone thickness in Chapter 10, DOE believes this is appropriate for discussions of impacts in the EIS. DOE has left the text in Section 10.1.1.3 as "about 300 meters (1,000 feet)." DOE believes that 1,000 feet is the appropriate conversion for "about 300 meters," because 980 feet would imply more accuracy (more significant numbers) than intended. One commenter correctly noted that "0.31" inch on page 10-2 of the Draft EIS should have been "0.3" inch to be consistent with page 3-44. DOE has modified the text in both locations as appropriate. DOE has removed the question mark from the referenced figure (Figure 3-15 of the Final EIS) to be consistent with Figure 3-32 in D'Agnese et al. (DIRS 100131-1997).

The purpose of Section 3.1.3.1 is to provide a broad overview of regional and site geology. The sections that follow address more specific issues of particular concern or interest to the public (that is, faulting and seismic activity) or that are a definite change of topic (mineral and energy resources). DOE agrees that the topics identified in this

comment could be in numbered sections, but made an editorial decision to not put them at the same level as topics with individual section numbers.

3.1 (337)
Comment - EIS000055 / 0001
Provide a larger-scale version of EIS Fig 2-33, pg 2-53.

Response
The Final EIS contains a larger version of that Figure in Section 2.1.3.3.3.2.

3.1 (440)
Comment - EIS000077 / 0001
On page 1-16, Amargosa Valley is located in the wrong place on the map.

Response
DOE has checked the location of Amargosa Valley the figure in Section 1.4.1 and has concluded that the location is correct as shown.

3.1 (584)
Comment - EIS000127 / 0001
The first comment is that it seems deliberately inadequate and deliberately deceptive, starting with the cover. As it was said before, it's not spent fuel, it's irradiated fuel.

From this statement all the way through, it's an inadequate and incomprehensible document, mostly.

Response
In passing the Nuclear Waste Policy Act, as amended (this EIS refers to the amended Act as the NWPA), Congress directed DOE to evaluate the potential for disposing of spent nuclear fuel and high-level radioactive waste in a geologic repository at Yucca Mountain. The Act provides the following definition: "The term 'spent nuclear fuel' means fuel that has been withdrawn from a commercial nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing." In using this term, DOE follows the statute that governs the proposal.

DOE has taken a number of steps to make the EIS as understandable as possible to a wide range of readers. For example, the EIS includes numerous explanatory text boxes, summary tables, illustrations, and comparison information that stress and highlight potential impacts. In addition, Chapter 14 of the EIS is a comprehensive glossary of technical terms.

3.1 (650)
Comment - EIS000124 / 0009
Whatever's in the Summary should at least be indicative with what is in the rest of the document.

Response
The Summary to the EIS stresses the major conclusions, areas of controversy, and issues to be resolved, and focuses on information and impacts of relevant significance. DOE prepared the Summary to be consistent with regulations of the Council on Environmental Quality (40 CFR 1502.12) and Departmental guidance on the preparation of summaries.

3.1 (1478)
Comment - EIS001521 / 0012
Page S-52, S.4.2 TRANSPORTATION, first paragraph--Reference to Figures 13 and 14 should be to Figures S-13 and S-14.

Response
Thank you for you comment. DOE has corrected the figure callouts in Section S.4.2 of the EIS.

3.1 (1479)
Comment - EIS001521 / 0016
Page 2-26, Figure 2-16--The low-thermal-load (l-t-l) expansion is not detailed in the text or figures in the Summary, pages S-14 through S-21. It is mentioned in the "THERMAL LOAD" blockout [text box], page S-14, that l-t-l conditions would cause an increase in the subsurface area and excavation of the repository, but the fact that the l-t-l build-out would more than double the size of the repository design is not mentioned. This expansion would encounter a greater number of faults, perhaps differing hydrogeologic conditions, and create additional radiological hazard scenarios, etc. These are very important l-t-l factors that deserve much more attention in the Summary.

Response
DOE has substantially revised the Summary for the Final EIS.

In May 2001, DOE issued a Supplement to the Draft EIS that analyzes the environmental impacts of the flexible design, which could be operated in a range of modes, from higher- to lower-temperature. The flexible design was carried forward to the Final EIS. The underground emplacement area for a lower-temperature mode (the environmental impacts of which are presented in the Final EIS) could be as large as the area associated with the low thermal load scenario presented in the Draft EIS.

DOE has identified candidate emplacement areas that could accommodate a larger underground footprint. These areas were identified in consideration of fault locations and geotechnical characteristics of potential host emplacement areas. Please refer to the Science and Engineering Report (DIRS 153849-DOE 2001) for additional information.

3.1 (2207)
Comment - EIS000620 / 0001
I would like to go on record as saying we need an alternative study to the proposed rail line. The members of Crescent Valley got together, and we found 60 unanswered questions in one hour. We feel that a rail line is inconsistent with the growth of this community. We found towns named that aren't here, and we found towns that were here that weren't really referred to.

Response
DOE cannot respond to unanswered questions without specific details, such as the reference to correct or incorrect town names in the EIS. With regard to a rail line being inconsistent with community growth, DOE has identified a number of areas in Crescent Valley that the proposed transportation corridors could affect. At this time, however, more detailed information is not available on the parcels of land that could be affected. As indicated in Section 9.3.1 of the EIS, DOE would develop mitigation measures if construction and operation of repository-related facilities could result in (1) impacts to publicly used lands, (2) direct and indirect land loss, and (3) displacement of capital improvements.

3.1 (2716)
Comment - EIS001005 / 0005
In conclusion, I just want to simply state: The information contained in the Draft Environmental Impact Statement clearly demonstrates how hazardous and insecure the entire process of disposal of spent nuclear fuel and high level radioactive waste is, beginning with the containers, through transportation and final repository.

Response
The introduction to Chapter 1 of the EIS explains the purpose of and need for the proposed repository at Yucca Mountain for the disposal of spent nuclear fuel and high-level radioactive waste.

In preparing the EIS, DOE has been continuously aware that it was analyzing design and disposal processes that would occur over long periods, and transportation scenarios that would represent nationwide activity. The primary focus of the Proposed Action analysis is to provide security against hazards to ensure that the spent nuclear fuel and high-level radioactive waste would not adversely affect public health and safety and the environment.

The EIS presents a balanced, informative analysis of the Proposed Action, hazards involved in the proposal, and efforts to minimize potential risks from those hazards. The EIS also presents opposing views on analytical issues, uncertainties that might exist in some results, and areas for further study.

3.1 (3064)
Comment - EIS000619 / 0004
On page 3-114 of the draft, it states that Native Americans live in the vicinity of two of the candidate rail corridors, Jean and Valley Modified, and this statement should be corrected to acknowledge that the Western Shoshone Dann sisters live in Crescent Valley in the vicinity of the proposed Carlin route.

Response
DOE has modified the statement referenced in this comment to indicate that Native American communities are present in at least two of the candidate rail corridors. In addition, DOE has added text to indicate that Western Shoshone families own land in Crescent Valley near the Carlin Corridor.

3.1 (3592)
Comment - EIS000715 / 0001
The DEIS is unacceptable and should be rewritten. The DOE is nonchalant about the potential impacts on the desert environment from the Yucca Mountain Project. The DEIS, by scattering and obfuscating information throughout the report, makes it difficult for those who care about this environment to form a clear picture of the overall impacts to desert lands and species.

Response
DOE has endeavored to use a plain and readable style that conveys information on technical issues. The EIS material on the desert environment reflects well over a decade of research by DOE and its contractors. The EIS presents information on the desert environment in all pertinent chapters. Chapter 3 describes the desert environment, including lands and species, potentially affected by the proposed project. Chapters 4 through 6 discuss potential impacts from various phases and segments of the proposal. Chapter 7 discusses potential consequences for the desert environment if DOE took no action to construct and operate a repository. Chapter 8 includes analyses of the potential for cumulative impacts to the desert environment from the repository added to other past, present, and reasonably foreseeable future actions. Chapter 9 discusses mitigation measures DOE is considering to reduce the potential for impacts to the desert environment. In addition, DOE has entered consultations with the U.S. Fish and Wildlife Service on the potential of the proposed project to affect the desert tortoise, a reptile species protected under the Endangered Species Act.

3.1 (3997)
Comment - EIS000724 / 0001
The Department of Energy's DEIS is simply unacceptable and should be rewritten. Not only does this report fail to adequately address the numerous public health, safety, and environmental issues associated with the Yucca Mountain Project, but it also buries the reader in a jumble of confusing cross-references and redundancies. This obfuscation makes it difficult, if not impossible, for interested parties to navigate the three-volume report and to provide specific and clear comments to the DOE regarding the improvement of the DEIS. The incomprehensibility of the DEIS deters all but the most determined citizens from participating in this important decision-making process. The lack of clarity in the EIS also makes it difficult for policy makers to make informed choices about the nuclear waste policy of the United States because it is nearly impossible to form a clear picture of the risk involved with a nuclear waste repository.

One example of this obfuscation appears in Section 6.3.2, "Impacts of Nevada Rail Transportation Implementing Alternatives." In the space of the five introductory paragraphs, the reader is referred to one figure, two chapters, four sections, one appendix, and six reference documents. In addition, the section is set up in sections that first explore impacts common to all of the alternatives, then impacts of each separate alternative. The DEIS does not specify which alternative it prefers, and it does not show the total impacts for any of the alternatives (that is, the reader is left to figure out how the common impacts and the separate impacts will accumulate). This is only one of many examples throughout the DEIS where information is presented in a confusing and frustrating manner.

Response
DOE has taken a number of steps to make the EIS as understandable as possible to a wide range of readers. For example, the EIS now includes a Readers Guide in addition to a number of explanatory text boxes, summary tables, illustrations, and comparison information that stress and highlight potential environmental impacts. Chapter 14 of the EIS is a comprehensive glossary of technical terms.

With regard to the presentation of information and content, DOE believes the EIS provides a balanced, informative analysis of impacts. In addition to presenting the results of the DOE analyses of the impacts of the proposed repository, the EIS describes opposing views on a number of analytical issues and uncertainties that exist in some technical areas, and identifies where further studies are needed or are under way.

With regard to the comments on Chapter 6 and specifically Section 6.3.2, DOE recognizes that the discussion of transportation issues is complex and covers a range of issues that could have effects nationwide and in Nevada. Section 6.3 of this Final EIS includes a summary table to assist the reader in understanding potential impacts across the range of alternatives. In addition, this Final EIS identifies mostly rail as the preferred transportation mode in Nevada.

3.1 (4220)
Comment - EIS001521 / 0091
Page I-16, Table I-11--Footnote references c and d appear to be reversed. "Solubility in repository water by EQ3 simulation" should reference Wolery, 1992, EQ3 code version, Version 7.0; and "EQ6 simulation of Alloy 22 corrosion" should reference Wolery and Daveler, 1992, EQ6 code, Version 7.0. Also, as noted in the References on page I-116, both are listed as code Version 7.0, not Version 7.2b as shown in footnotes c and d. Should additional references for code Version 7.2b be added to the References and referred to here?

Response
In the Draft EIS the footnotes were reversed. DOE used Version 7.2b, which is the latest version available. The latest documentation is as referenced for Table I-11 in the Draft EIS. However, this table is not in the Final EIS, and the footnotes no longer appear. DOE has corrected the appropriate references in the text.

3.1 (4263)
Comment - EIS001521 / 0014
Page 1-16, Figure 1-6--This figure should appear in the Summary on or near pages S-32 and S-33, in S.4.1 YUCCA MOUNTAIN SITE AND VICINITY, for reader clarification in understanding the size and extent of the land-withdrawal area.

Response
DOE agrees with this comment and has included a similar figure in Section S.4.1 of the EIS.

3.1 (4265)
Comment - EIS001521 / 0015
Page 2-15, Figure 2-9, and Page 4-2, Figure 4-1--These two identical milestone figures do not correlate well (or they don't appear to) with page S-19, Figure S-9 (showing expected sequencing) in the Summary. As examples, Figures 2-9 and 4-1 show construction beginning in 2005 whereas Figure S-9 shows NRC [Nuclear Regulatory Commission] construction authorization sometime between 2005 and 2010; Figures 2-9 and 4-1 show waste emplacement completion during 2033 and it appears on Figure S-9 that emplacement operations would end sometime between 2033 and 2110; and Figures 2-9 and 4-1 indicate that repository closure would be sometime between 2116 and 2125, but Figure S-9 seems to show that closure would be during 2125 (since that year is bracketed). These time schedules should be easily interpretable and relate from one to another, they are important!

Response
DOE has made the figure in the Summary consistent with the figures in Chapter 2 and 4 in the Final EIS.

3.1 (4308)
Comment - EIS001160 / 0118
Page 10-5, Section 10.1.2.1 Land Use, Paragraph 1, last sentence. The text here states "Most of the land along the corridors under consideration is government owned." White Pine County recommends that DOE use the term government-administered to describe land managed by the Bureau of Land Management.

Response
DOE has modified the language in the EIS from "government owned" to "government administered or controlled" when it refers to lands managed by the Bureau of Land Management. This section number has been changed to 10.1.3.1 in the Final EIS.

3.1 (4480)
Comment - EIS001632 / 0081
Page 14-8, definition of "controlled area": This definition is inconsistent with how this term is used in 40 CFR Part 191 (see 50*FR* 38085, September 19, 1985) and in proposed 40 CFR Part 197 (64 *FR* 47013, August 27, 1999). The definitions in EPA's [the Environmental Protection Agency's] rules limit the controlled area size to no more than five kilometers from the repository footprint. (There is an additional option in proposed 40 CFR Part 197 with which this definition is also inconsistent.) EPA recognizes that the size of the controlled area for physical control purposes during the active institutional control period might be different than the area used for performance assessment purposes, but if so, the distinction should be clarified on page 14-8 and in the appropriate places in the final EIS.

Response
This comment is correct. DOE has modified the definition of "controlled area" in the Glossary (Chapter 14) to be consistent with 40 CFR Part 197.

3.1 (4517)
Comment - EIS001521 / 0001
Page S-14, S.3.1.2 Performance Confirmation. Construction, Operation and Monitoring, and Closure, second paragraph--(Performance confirmation) The statement, "...activities would continue until after the closure of the repository," is confusing. It sounds as if the activity will stop at some point in time. Simply say the activities will continue "following" the closure.

Response
In accordance with Nuclear Regulatory Commission regulations (10 CFR Part 63), the performance confirmation period would extend until the beginning of repository closure operations. DOE modified Section S.3.1.2 of the EIS to clarify the end of performance confirmation.

3.1 (4518)
Comment - EIS001521 / 0002
Page S-17, Figure S-7--Label East Main, Exhaust Main and West Main as Drifts for clarity; and show the actual location of the north portal, as is done for the south portal.

Response
DOE has modified that figure in Section S.3.1.2 of the EIS Summary to indicate that the West, Exhaust, and East Mains are drifts, and to show the North and South Portals consistently.

3.1 (4519)
Comment - EIS001521 / 0003
Page S-33, first paragraph--Devils Hole appears to be "east" of Ash Meadows, not "south" as so stated (see page S-34, Figure S-17).

Response
DOE has corrected the text to reflect the relationship between Ash Meadows and Devil's Hole.

3.1 (4520)
Comment - EIS001521 / 0004
Page S-33, second paragraph--Lathrop Wells is not on page S-34, Figure S-17, nor should it be, as the community name no longer exists. During the late 1980's the community name was changed from Lathrop Wells to Amargosa Valley, which is shown on page S-34, Figure S-17. Lathrop Wells should not be referred to here or elsewhere in the DEIS.

Response
DOE has made global changes to the EIS and deleted references to Lathrop Wells except in an historical context.

3.1 (4565)
Comment - EIS001521 / 0079
Page 4-103, second paragraph--(Potential for Flooding) Because the actual location of the waste-retrieval and storage area is unknown (or at least ill defined), whether or not the facility would be affected by a pmf [probable maximum flood] event is not discernable. The approximate location of the waste-retrieval and storage area will have to be plotted on page 3-34, Figure 3-12, (and referenced) before the accuracy of this statement can be ascertained.

Response
DOE would not construct and operate critical facilities in floodplain zones. The figure in Section 3.1.4.1.2 of the EIS shows the approximate boundary for the regional maximum flood, which is essentially synonymous with the probable maximum flood. As site characterization activities conclude, DOE will plot appropriate adjustments, if any, to floodplain maps.

3.1 (4576)
Comment - EIS001521 / 0090
Page A-34 through Page A-35, A.2.3.2.2 Idaho National Engineering and Environmental Laboratory, first paragraph— "...treatment as well as alternative terminologies...," I assume, is referring to alternative technologies. If not, please explain.

Response
"Technologies" was the correct term. DOE has, however, deleted the material in question.

3.1 (4711)
Comment - EIS001230 / 0006
One final note: the INEEL CAB [Idaho National Engineering and Environmental Laboratory Citizens Advisory Board] commends DOE on the detailed descriptive information about SNF [spent nuclear fuel] and HLW [high-level radioactive waste] (including quantities and characteristics) as compiled in Appendix A to the Draft EIS (and cited references). Such a compilation is a significant improvement over other DOE environmental documentation and Integrated Data Base reports. The data should be incorporated into other databases, such as the one currently being prepared to support DOE's stewardship planning.

Response
Thank you for your comment. The information cited in this comment is available to the DOE Stewardship Planning Program.

3.1 (5158)
Comment - EIS001444 / 0011
Section 11-1, Page 11-2, Table 11-1, item 15
Table appears to say that a right-of-way reservation would be needed to allow construction of the facility; this is incorrect. While right-of-way reservations are appropriate for site characterization studies, and for transportation routes, the actual facility would be on land withdrawn from operation of the public land laws for that express purpose. Other places in the EIS talk about a land withdrawal for the facility site.

Please note that paragraph 2 under FLPMA [Federal Land Policy and Management Act] (page 11-4) references Table 11-1, item 14, not item 15.

Section 11-2-8 (Use of Land & Water Bodies), Page 11-16
Taylor Grazing Act paragraph: The Taylor Grazing Act is NOT the authority for rights-of-way, or for withdrawals.

Rights-of-way, including right-of-way reservations to Federal agencies, are authorized by Title V of the Federal Land Policy and Management Act of 1976 (FLPMA). Section 507 of FLPMA specifically addresses rights-of-way for Federal agencies.

Section 204 of FLPMA authorizes withdrawals.

Section 11.4 (Federal Regulations), Page 11-21, Table 11-3
43 CFR 4100 contains regulations pertaining to grazing administration.

Regulations for rights-of-way are found at 43 CFR Subpart 2800. Right-of-way reservations to Federal agencies are specifically addressed at 43 CFR 2807.

Response
This comment is correct that land withdrawal is required for the repository site. DOE has corrected the table at the beginning of EIS Chapter 11.

DOE has changed the reference in Section 11.1 of the EIS on the Federal Land Policy and Management Act to item 17, right-of-way reservations.

The discussion of the Taylor Grazing Act in Section 11.2.8 has been modified to state that regulations implementing that Act are codified in 43 CFR Part 4100. The comment is correct that 43 CFR Part 4100 deals with grazing administration. In the table in Section 11.4, the correct title for 43 CFR Part 4100 has been changed to "Grazing Administration, Exclusive of Alaska." Also in that table, the citation for Right-of-Way Reservation, 43 CFR Part 2800, has been changed, and the reference to 43 CFR Part 3600, Free Use Permit, has been changed to 43 CFR Part 3620. Incorrect references in the text have also been changed.

3.1 (5321)
Comment - EIS001887 / 0053
Page 1-13; Section 1.3.2.4 - Environmental Protection and Approval Standards for the Yucca Mountain Site

While the Yucca Mountain Draft EIS is not intended as a site suitability document, it must nevertheless address the site's ability to meet established health, safety, and environmental standards. The performance of the site in relation to such standards is, itself, a measure of impact on the physical and human environment. The final EIS must evaluate Yucca Mountain against the proposed Environmental Protection Agency radiation protection standards and must demonstrate that the Yucca Mountain site can meet the 15 millirem annual release standard and the 4 millirem groundwater protection standard. Failure to meet these EPA standards would constitute a significant project impact and would lead to the disqualification of Yucca Mountain as a candidate site.

Response
The Environmental Protection Agency promulgated radiation protection standards for the proposed repository (40 CFR Part 197) after DOE published the Draft EIS. Chapter 11 of this Final EIS describes the regulations and Chapter 5 provides comparisons (results of performance assessments) to the standards as appropriate.

3.1 (5323)
Comment - EIS001887 / 0054
Page 1-16; Figure 1-6 - Land Withdrawal Area Used for Analytical Purposes

The expanded map is not correct. The locations of the Lathrop Wells Road, its intersection with Highway 95, and Amargosa Valley are incorrect. The Lathrop Wells road exits the southern boundary of Area 25 of the Nevada Test Site and proceeds south to Highway 95, just west of the intersection with State Road 373 at Amargosa Valley.

Response
DOE has modified that figure, in Section 1.4.1 in the EIS, to show Lathrop Wells Road exiting the southern boundary of Area 25 of the Nevada Test Site and proceeding south to U.S. 95, just west of the intersection with State Route 373 at Amargosa Valley.

3.1 (5328)
Comment - EIS001887 / 0056
Page 1-20; Section 1.4.3.3 - Site Recommendation

The terms used in Sec. 114(a) of the NWPA should be used in describing the requirements for recommending the site:

Bullet 2 – "waste form" not "material forms"; and "form" not "forms";

Bullet 5 – "waste form" not "material form"; and "analysis seem to be sufficient" not "are sufficient"

Response
DOE has made the suggested changes to what is now Section 1.4.3.7.

3.1 (5455)
Comment - EIS001660 / 0012
The DEIS fails to include summary tables showing, for example, latent cancer fatalities (LCFs) for all alternatives and scenarios in one table, using consistent units. In Volume I alone, the reader must consider over 700 pages of text and almost 300 tables, making summary-level comparisons difficult if not impossible.

Response
The summary in Sections S.11.1 and 2.4 of the Draft EIS and the Final EIS summarize impacts for each alternative, including latent cancer fatalities. In addition, DOE has added in Section 2.4 a table listing a simple comparison of the health and safety impacts of the Proposed Action and the No-Action Alternative. Given the scope and complexity of the subject matter covered in this EIS, it is difficult to present all the information in a concise manner. DOE has made a number of modifications to the EIS to improve the structure and readability of the document, which include bold type in the Table of Contents, and a "crosswalk" showing where information listed in the Summary tables can be found in the EIS.

3.1 (5565)
Comment - EIS001887 / 0194
Page 3-99; Section 3.2.2 - Nevada Transportation

The description of the affected environment is also deficient because it does not include specific information for all specific communities and Native American reservations potentially affected by the shipment of spent fuel and HLW [high-level radioactive waste]. Such information should be included for every community along highway routes, main line rail routes, rail spur alternatives, and heavy-haul truck routes.

Response
DOE characterized the affected environment in the identified region of influence in Nevada at the county rather than community level. DOE believes that the EIS provides the environmental impact information necessary to make certain broad transportation-related decisions, namely the choice of a national mode of transportation outside Nevada (mostly rail or mostly legal-weight truck), the choice among alternative transportation modes in Nevada (mostly rail, mostly legal-weight truck, or heavy-haul truck with use of an associated intermodal transfer station), and the choice among alternative rail corridors or heavy-haul truck routes with use of an associated intermodal transfer station in Nevada. The Department would conduct future analyses consistent with the National Environmental Policy Act to determine potential impacts of specific routes and transportation operations in a specific area.

3.1 (5704)
Comment - EIS001887 / 0319
Page 6-19; Figure 6-8 - Map of U.S. Interstate Highway System

Figure 6-8 should be replaced with the map of national truck routes distributed by DOE at the Draft EIS Public Hearing in Chicago on February 1, 2000. (See Attachment X)

Response
DOE used the national truck route map at the public hearings because of its scale and depth of detail. That map includes detail not presented in the EIS, but reproducing it in the EIS is not feasible. However, DOE has revised this and other national maps to show only the routes analyzed, and provided greater detail in relation to transportation in Nevada.

3.1 (5768)
Comment - EIS001887 / 0373
SECTION 12. REFERENCES

There were twenty-seven important references regarding biological, ecological, and soil resources cited in the Draft EIS. Of these, three were professional publications reflecting work of the State of Nevada. There are other State of Nevada professional publications not included among the references cited in the Draft EIS. Among DOE's twenty-four other references are ten reports issued by TRW regarding environmental information for the Yucca Mountain Project. Of these, four are Environmental Baseline Files that draw upon additional sources of information. A key DOE citation in the Draft EIS is "TRW 1999k, Environmental Baseline File for Biological Resources." Section 4 (Opposing Views) and Section 5 (Major Issues and Data Needs) of TRW 1999k are attached to these comments. Section 4 identifies six opposing views to DOE's field studies raised by the State of Nevada and the NWTRB [Nuclear Waste Technical Review Board]. These are key issues regarding Yucca Mountain biological and ecological programs, which are not disputed in the Draft EIS. This is consistent with the earlier comment on the Draft EIS for page 3-59 that DOE failed to use an integrated ecosystem approach, thereby negating many of its field studies for the biological and ecological resource aspects of the Draft EIS. As noted in the comments on Section 1.5 of the Draft EIS, there are many publications concerning EIA [environmental impact assessment] and NEPA [National Environmental Policy Act] processes that should have been used as guidance by the DOE, cited, and referenced in the Draft EIS.

Response
DOE has reviewed the references cited in the EIS and in some instances has modified the reference list to show an original source document rather than an engineering or environmental baseline file. However, in most cases the Yucca Mountain Project references are appropriate because these are the documents in which DOE has synthesized information from other sources.

For the Final EIS, DOE has provided a reference list at the end of each chapter and has eliminated the reference list provided as Chapter 12 in the Draft EIS.

3.1 (5994)
Comment - EIS001879 / 0020
The statement "Drilling continues at a rate of about two wells a year (Buqo, 1999, page 34)" is incorrect and does not accurately reflect the referenced citation which states, "To date, about 7,000 domestic wells have been drilled in Pahrump Valley and new wells continue to be drilled at the rate of about 700 wells per year" (Buqo, 1999, pp. 35-36). The EIS needs to be revised to accurately reflect the information presented in this and any other source documents.

Response
DOE has modified the EIS to reflect the annual drilling rate described in Buqo (DIRS 103099-1999). New wells continue to be drilled at the rate of about 700 per year (DIRS 103099-Buqo 1999).

3.1 (6001)
Comment - EIS001879 / 0028
p. I-8

The Draft EIS states "Based on decay equilibrium calculations for the first 1,000,000 years after repository closures, the error from neglecting all other nuclides is about 5 percent of the total radiological dose rate (DOE 1998a, Appendix C, page C6-2 and Figure C6-1)". The reference citation is incorrect and should be changed to TRW 1998s.

Response
The text and reference cited in this comment no longer appear in the EIS.

3.1 (6003)
Comment - EIS001879 / 0029
The EIS should cite original source documents when citing references rather than citing DOE NEPA [National Environmental Policy Act] documents that summarize the information. Secondary citations of this type are numerous throughout the Draft EIS and make the task of verifying the content of the Draft EIS more difficult and very time consuming. The EIS should be revised to cite only original source documents and not intermediate DOE documents, especially when referring to data and other technical information.

Response
DOE has reviewed the references cited in the EIS and in many instances has modified the reference list to show the original source document rather than an engineering or environmental baseline file. However, in a few cases, an EIS reference to other than an original source document may be appropriate because these are the documents in which DOE has synthesized information from other sources.

3.1 (6400)
Comment - EIS001632 / 0001
EPA commends DOE for what is generally a well-organized and plain English document on a highly complex subject.

Response
Thank you for your comment.

3.1 (6452)
Comment - EIS001632 / 0017
Page 2-80, Table 2-8 [Section 2.4.4.1]: It appears that the dose equivalent listed in this table for the maximally exposed member of the public (2.4 rem) is an annual value. If so, EPA [the Environmental Protection Agency] assumes this value is listed in error. While EPA does not have transportation standards, compare this value to the limit for exposure to individuals of 0.015 rem per year (40 CFR Part 191) during the post-closure period of a repository.

Response
The value of 2.4 rem listed in the table in Section 2.4.4.1 of the EIS would be the dose to a hypothetical person assuming that exposure would be limited to 100 millirem per year. DOE has added a footnote to the table to include this information. Section 6.2.3.1 contains more information.

3.1 (6454)
Comment - EIS001632 / 0019
Page 2-81, Section 2.4.4.2, final bullet: This item should refer to the Section 6 discussion of assessing impacts on cultural resources of Native Americans.

Response
The purpose of the bullet in Section 2.4.4.2 referred to in this comment is to identify salient conclusions that can be drawn from the information in the summary table in that section. For this reason, DOE has not included modifications or references to other sections in the Final EIS.

3.1 (6620)
Comment - EIS001878 / 0022
Description of rail facilities and operations vague, incomplete. Because the Carlin rail corridor would pass directly through Eureka County, because the effects of such a corridor could affect the livelihoods of numerous residents, and because the DOE says a decision will be based on this DEIS, a complete description of the proposed action is important to Eureka County. (pp. 2-43 to 2-50) The maps of transportation routes in Nevada are so small that they created confusion in public meetings in the County. For example, attendees could not tell from the map on p. 2-48 which side of the Crescent Valley town site the rail line would be on.

In October 1998, the DOE provided Eureka County with rail alignment maps prepared by a contractor, at a scale of one centimeter equals one kilometer. It is the County's understanding that these maps were the basis of much of the rail corridor information in the DEIS. However, the maps in the DEIS (pp. 2-48, 6-59) are different and, therefore, misleading.

Response
A relatively short section of the Carlin Corridor crosses Eureka County from Beowawe through Crescent Valley. For its transportation analysis, DOE developed a list of assumptions to determine projected economic and demographic changes in Nevada from the construction and operation of the proposed repository. The analysis used a four-region model: Clark County, Nye County, Lincoln County, and the Rest of Nevada (including Eureka County).

For railroad construction, the analysis nominally assigned workers to base camps according to an even split by the number of camps. The analysis assumed that all railroad construction workers would commute weekly from Clark County to trailer camps outside Clark County and eat in local restaurants 5 days a week for about 46 weeks. Operations workers would live in the county where the route branched off the main line, with the exception of the Carlin routes, for which they would live in Elko County.

DOE has not provided maps in the level of detail requested in this comment. However, Section S.13 of the EIS presents color maps of the transportation corridors in considerably more detail than presented in the Draft EIS.

3.1 (6688)
Comment - EIS001632 / 0085
Page I-49, fourth full paragraph: The document described in the final sentence should be referred to as Federal Guidance Report No. 11.

Response
The text and reference cited in this comment do not appear in the Final EIS.

3.1 (6690)
Comment - EIS001632 / 0086
Page I-111, last reference. Please replace the authors' names in the first column with the EPA [Environmental Protection Agency] report number.

Response
The reference format that DOE used in the EIS is consistent with document traceability requirements the Department established for the Yucca Mountain Project. The Environmental Protection Agency report number is part of the reference text.

3.1 (7016)
Comment - EIS001887 / 0202
Page 3-129; Section 3.2.2.2.4 - Biological Resources

The second paragraph under the section dealing with the "Caliente Route" states that SR 375 intersects US 93; in fact, it is SR 318 that intersects US 93.

Response
The text has been changed to indicate that State Road 318 intersects with State Road 375 from the north, just west of where U.S. 93 veers east to Caliente.

3.1 (7179)
Comment - EIS001337 / 0068
Page 2-5 Figure 2-4. This figure should include a rail to legal-weight truck alternative.

Response
Section J.2.1 discusses a rail-to-legal-weight truck scenario. Rail-to-legal-weight truck is not one of the defined alternatives for transporting waste. Therefore, the Department has not modified the figure.

3.1 (7189)
Comment - EIS001337 / 0079
Page 2-59 Section 2.2. In addition to serving as a baseline, the text here should also recognize that the No-Action Alternative is a choice that could be selected for implementation by the Secretary of Energy in a subsequent Record of Decision.

Response
The purpose of No-Action scenarios 1 and 2, as defined in the EIS, is for use in the analysis and to provide a basis for comparison to the Proposed Action. Section 113(c)(1) of the NWPA directs the Secretary of energy to evaluate the suitability of the Yucca Mountain site for an application for authority to construct a repository at the site. If the Secretary decided not to recommend the Yucca Mountain site, the NWPA provides a process for DOE to follow. Section 113(c)(3)(F) of the Act states that if the Secretary at any time determines that the Yucca Mountain site is unsuitable for development as a repository, the Secretary, within 6 months, is to report to Congress "recommendations for further action to assure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste..." (See Section 2.2 and 7.1 of the EIS.)

3.1 (7218)
Comment - EIS001337 / 0095
Page 3-115 4th paragraph. The second sentence in this paragraph appears to be incomplete.

Response
DOE has deleted the incomplete sentence.

3.1 (7226)
Comment - EIS001337 / 0104
Page 4-4 3rd full paragraph. A fourth bullet needs to be added for Rail to Legal-Weight Truck. Such a scenario must be considered in the FEIS.

Response
This comment suggests adding a bullet describing a rail-to-legal-weight-truck scenario in Section 4.1 of the EIS, in the subsection on Repository Analytic Scenarios. This subsection discusses cask-receiving scenarios. Section J.2.1 of the EIS now discusses the DOE evaluation of a scenario in which all waste would arrive in Nevada in legal-weight truck casks on railcars and would transfer to legal-weight trucks to continue to Yucca Mountain.

3.1 (7248)
Comment - EIS001832 / 0002
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. The final EIS should 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 synthesize results to place both radiological and non-radiological risks in perspective by giving readers a basis for comparison.

Response
Thank you for your suggestions. DOE has substantially revised the EIS. Section 1.3 describes much of the background and basis for this EIS. The NWPA establishes a process leading to a decision by the Secretary of Energy on whether to recommend that the President approve Yucca Mountain for development of a geologic repository. As part of this process, the Secretary of Energy is to:

- Undertake site characterization activities at Yucca Mountain to provide information and data required to evaluate the site.

- Decide whether to recommend approval of the development of a geologic repository at Yucca Mountain to the President.

If the Secretary recommends the Yucca Mountain site to the President, the NWPA requires that a comprehensive statement of the basis for the recommendation, including the Final EIS, accompany the recommendation. DOE has prepared this Final EIS so the Secretary can consider it, including the public input on the Draft EIS and the Supplement to the Draft EIS, in making a decision on whether to recommend the site to the President.

With regard to the analytical and scientific processes that led to the conclusions reached in the EIS, Appendixes F, G, H, J, K, L, and I provide in-depth discussions of the more technical disciplines and the models and methodologies that DOE used.

Chapter 3 of the EIS describes the affected environment and establishes the environmental baseline for each environmental discipline. Section 2.4.1 compares the estimated incremental impacts associated with the Proposed Action to those for the No-Action Alternative.

3.1 (7257)
Comment - EIS001832 / 0004
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 [to] 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:

- 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.

Response
Appendix F of the EIS describes the details for estimating health impacts from Yucca Mountain Repository operations. Appendix I provides details on the long-term consequences of repository performance. Both appendixes

provide a description of assessment methods and models. Descriptions of how DOE performed the analyses in terms of the uncertainties or how the uncertainties influenced the conclusions occur throughout the EIS (see Section 2.5 for an overview of how DOE addressed uncertainties). Chapter 13 contains a list of preparers. DOE and the independent Nuclear Waste Technical Review Board, which was created by Congress in the NWPA, reviewed the EIS.

3.1 (7298)
Comment - EIS001957 / 0005
The draft EIS is well-written—as far as it goes—and represents considerable work on the part of the U.S. Department of Energy (DOE) and its contractors concerning potential environmental impacts arising from operating a proposed long-term high-level nuclear waste storage facility at the Yucca Mountain site.

Response
Thank you for your comment.

3.1 (7365)
Comment - EIS001957 / 0012
Section 3.1.1.1 Regional Land Ownership -- This section indicates the NPS [National Park Service] manages Death Valley NP [National Park] (approximately 22 miles southwest of Yucca Mountain). However, Figure 3-1 does not show the correct boundary for Death Valley NP (it depicts the pre-1994 boundary of the former Death Valley National Monument). Additional lands now administered by NPS could potentially be affected by the release of contaminants from the proposed repository. This greater effect must be assessed in the final EIS.

Response
DOE has modified the figure in Section 3.1.1.1 of the EIS to show the current boundary of Death Valley National Park.

3.1 (7467)
Comment - EIS001969 / 0014
Page 3-14, Section 3.1.3.1 Physiography (Characteristic Land forms).

This section label and content are confusing. The unnumbered subsections on Site Stratigraphy and Lithology, Selection of Repository Host Rock, and Potential for Volcanism at the Yucca Mountain site should be numbered subsections under the main section 3.1.3, Geology, and not the subsection of Physiography, to which they have little relation.

Response
The purpose of Section 3.1.3.1 is to provide a broad overview of regional and site geology. The purpose of the subsections that are part of Section 3.1.3.1 is to address specific issues of particular concern or interest to the public (such as faulting and seismic activity) or that are a definite change of topic (for example, mineral and energy resources). DOE agrees that it could put the topics identified in the comment in separately numbered sections, but made an editorial decision not to do so.

3.1 (7474)
Comment - EIS001969 / 0016
"Paleozoic and Precambrian" need to be substituted for "pre-Cenozoic" in order to correspond with the wording in the referenced Table 3-6, page 3-19.

Response
DOE has revised the text of Section 3.1.3.1 of the EIS such that the parenthetical explanation "(that is, Paleozoic and Precambrian)" follows the reference to Pre-Cenozoic.

3.1 (7508)
Comment - EIS001969 / 0019
Page 3-22, Figure 3-7, General bedrock geology of the proposed repository Central Block area.

This figure is inaccurate and does not correctly correspond to Figures 3-8, 3-10, or the original geologic map (Day and others, 1998). The following changes and/or additions need to be made:

a. The configuration of the Drill Hole Wash fault needs to be mapped as shown in Figure 3-10.

b. The Ghost Dance fault needs to continue to the southwest and not abruptly terminate as shown [in] this Figure (see Figure 3-10).

c. The zone of intense faulting between the Bow Ridge and Ghost Dance faults is missing. This zone connects with the Dune Wash fault. These faults are shown in the cross-section (Figure 3-8).

d. The small intra block faults need to be included in the Figure because the contacts are drawn incorrectly without them. Figure 3-8 cannot be reconciled with Figure 3-7 without these mapped faults.

e. For clarity, the cross-section line in Figures 3-7 and 3-8 should be named A-A', not B-B', because there is only one cross section on these maps.

f. Because no lower block is shown, the "upper block" text needs to be deleted from the "Proposed drift boundary" in the Legend.

Response
DOE has updated the general bedrock geology figure in Section 3.1.3.1 in the EIS as described in the comment to show additional faults in the repository block area. The figure is now consistent with the simplified geologic cross-section figure that follows it.

This comment suggested that the cross-section line in these figures should be named A-A', not B-B'. DOE has made this modification.

DOE provided the upper block label in the figure to help the reader identify the area shown because the EIS discusses other blocks.

3.1 (7509)
Comment - EIS001969 / 0020
Page 3-23, Figure 3-8, Simplified geologic cross-section of Yucca Mountain, West to east.

The mismatch of contacts between units, which appears as wiggles, is incorrect. The Figure needs to show these contacts correctly.

Response
The maps in Chapter 3 of the EIS depicting fault information are simplified and show only selected faults. However, DOE has added more faults to the general bedrock geology in Section 3.1.3.1 to make it more consistent with the cross-section figure that follows.

3.1 (7519)
Comment - EIS001969 / 0024
Day and others 1996 should be changed to 1998, both here [Section 3.1.3.2] and in the References (page 12-8).

Response
DOE has updated the subject reference.

3.1 (7525)
Comment - EIS001912 / 0054
Throughout Chapter 3 DOE repeatedly referenced other EISs or other documents for more specific information. In certain circumstances, the referenced information is important to the review of the action. It is questionable whether DOE has met the intent of 40CFR1502.21. Reference by incorporation is made when the effect will be to cut down on bulk without impeding agency and public review.

Response
DOE has summarized reference material pursuant to 40 CFR 1502.21. Because of the size or complexity of the supporting documents, the reader might need to pursue additional information in a DOE Reading Room or other location.

3.1 (7541)
Comment - EIS001969 / 0029
Page 3-27, Figure 3-10, [Section 3.1.3.2] Mapped faults at Yucca Mountain and in the Yucca Mountain vicinity.

In the legend, the strike-slip fault symbol should have arrows showing relative sense of lateral motion (as on map), as well as an explanation of the strike-slip symbol. As it is, the legend only shows the dip-slip component on these faults.

Response
DOE has changed the legend on the mapped faults figure in Section 3.1.3.2 to label the arrows in the figure as strike-slip faults.

3.1 (7559)
Comment - EIS001969 / 0031
Page 3-29, Section 3.1.3.3 Modern Seismic Activity.

The seismicity map with faults needs to be shown here as a numbered Figure.

Response
During EIS preparation, DOE decided to omit a seismicity map in favor of a simpler presentation. The Department made this decision with the understanding that more detailed seismic information is available in the *Yucca Mountain Site Description* (DIRS 151945-CRWMS M&O 2000). With regard to showing faults on a seismic map, seismic events do not correlate with mapped surface traces or Quaternary faults, as indicated in Section 3.1.3.3 of the EIS.

3.1 (7617)
Comment - EIS001912 / 0078
Section 6.1.2.6 needs more complete descriptions of the terms in the tables of this section.

Response
The EIS Glossary (Chapter 14) contains definitions of "maximally exposed individual" and "latent cancer fatality."

3.1 (7638)
Comment - EIS001928 / 0005
First, we would like to thank DOE for including summary documents, especially for voluminous EIS's. The summary document makes the EIS more reader-friendly and probably elicits more reader interest than the daunting, multi-volume EIS proper. However, one problem that might crop up in using a summary is that the reader might submit questions and comments that would have been clarified in the main document. But, if time constraints or other reasons preclude a thorough study of the EIS, then the reader will be left with the questions raised by issues presented in the summary document. Therefore the first suggestion I would like to make is that the authors cross-reference material in the summary to the applicable sections and page numbers in the EIS. Granted, with only two volumes in the Yucca EIS, this is not as big of a problem, but for EIS's with 6-8 volumes and about as many appendices, a cross-reference system would be very valuable.

Response
DOE has added pointers to the summary tables in Section 2.4 of the EIS to show where a reader can find information in the summary tables.

3.1 (7640)
Comment - EIS001928 / 0006
pg. S-2 - last sentence - add Tribes to "state and local government consultations". Tribes should stand alone and not be lumped into the category of "local government".

Response
In the Final EIS, DOE has included tribes as a separate category along with state and local governments when discussing consultations.

3.1 (7797)
Comment - EIS001227 / 0001
The three documents contain several scores of maps which appear in the Figures. Forty-one of the maps include boundary lines which supposedly enclose the U.S. Department of Energy's Nevada Test Site (NTS) which is both adjacent to and a part of the Yucca Mountain study site. As of the release date of the draft EIS the displayed boundary lines in all 41 maps were in error according to the public land use and administration records that are maintained by the U.S. Department of Interior's Bureau of Land Management (DOI/BLM) which serves as the official keeper of this country's public land use records. The boundary discrepancies were far from trivial since they involved a total of approximately 144,640 acres (~58,536 hectares; ~87.26 sq. Km.), or 3.7 times the area occupied by Washington, D.C. A listing of the faulty figures appears at the bottom of the reference citations.

Long after the DEIS was issued, on October 5, 1999, Public Law No: 106-65 was signed by President Clinton. (1) Not until then did the boundaries, depicted in the 41 maps in the draft EIS, resemble those described in Pub.L. 106-65. The following comments address the draft EIS accuracy at the time of its issuance.

The public lands which make up the NTS are withdrawn from general public use under provisions contained in four Public Land Order [PLO] notices that are contained in the National Archive's *Federal Register*. (2) These lands remain withdrawn for nuclear explosive testing purposes despite the fact that the nuclear testing program was terminated almost seven years ago.

The NTS area depiction, in the Yucca Mountain Draft EIS, should have excluded the approximately 106,240 acre area that is commonly referred to as "Pahute Mesa." This is the baseball cap shaped area adjacent to the northwest corner of the legally defined NTS boundary. An approximately 38,400 acre rectangular block of land that includes the northeast corner of the NTS should have appeared in the Draft EIS documents. If any of the boundary exclusions or falsification was justified for purposes of protecting the national security, that fact should have been clearly stated in the EIS. The general public, and the public's elected representatives, should have been informed of such actions, along with the statutory basis behind the decision to falsify the map boundary depictions.

On 6 November 1986 the Military Lands Withdrawal Act [MLWA] of 1986 was enacted. Associated with that Congressional act was a map and supporting legal boundary descriptions. (3) The map and legal description indicated that the "Pahute Mesa," area was assigned to the Air Force and not to the DOE for conducting nuclear explosion tests. The map indicated that the lands, described in PLO 1662, remained assigned to the U.S. DOE as part of the NTS. The recently issued Final Legislative Environmental Impact Statement reaffirmed the fact that Pahute Mesa remains assigned to the Air Force as an integral part of the NAFR [Nellis Air Force Range] and PLO 1662 lands remain assigned to the DOE's NTS. (4) The DOE should have no excuse for not depicting the NTS boundaries correctly since the correct map appears in the DOE's own Final EIS document that recently analyzed the NTS. (5) These last two references were cited in the Yucca Mountain Draft EIS Reference section. For well over three years I have been submitting formal comments to the DOE, urging them to render the NTS maps correctly. (6) It has become obvious that the DOE has no intention of following the existing laws in this regard. According to the DOI/BLM public records the Pahute Mesa and PLO 1662 lands have been illegally used for over 35 years by the DOE and the Air Force. (7) The congressional act, that enacted the MLWA of 1986, superseded any agreements the DOE may have had with the Air Force in regards to the use of Pahute Mesa.

For decades the DOI/BLM has issued maps that depict the NTS according to its public land use records. (8) For decades the Nevada State Department of Transportation has distributed tens of thousands of complementary official highway maps which also depict the NTS properly. (9) Despite the issuance of all these official maps the DOE continues to act on its own by filling tons of its official reports with bogus depictions of the NTS.

Under pressure from State Regulatory Officials, the DOE and the Air Force have formulated the recently issued plan for the renewal of the Nellis Air Force Range (NAFR) so that land administration changes will occur upon the passage of a Congressional Act. (Ref. 4, see Alternatives 1B and 2B maps). These changes will likely make moot the last 35 years of illegal land use by shifting the land administration so it conforms with DOE's depiction and use

of the NTS. The congressional legislation is crafted by the Air Force in such a way that the vast majority of the voting members of Congress will have no idea that their actions will shift the administration for large segments of withdrawn public lands between powerful and secretive executive agencies.

The DOE is supporting this plan since it will get it out of some potentially very hot water. The maps in the Yucca Mountain Draft EIS should have conformed with the existing public records maintained by DOI/BLM and should not have been based upon congressional legislation which is still pending.

1. Pub.L. 106-65, Div. C, Title XXX, Subtitle A,
   § 3011 (b) (1) (A-C), Oct. 5, 1999, 113 Stat. 886-887.
   § 3012 (a-c), 113 Stat. 890.

2. PLO 805, February 12, 1952, *Federal Register*, February 19, 1952, Pages 1522-1523, (17 *FR* 1522/1523)

   PLO 1662, June 20,1958, *Federal Register*, June 26, 1958, Page 4700, (23 *FR* 4700)

   PLO 2568, December 19, 1961, *Federal Register*, December 23, 1961, Page 12292, (26 *FR* 12292)

   PLO 3759, August 3, 1965, *Federal Register*, August 7, 1965, Page 9881, (30 *FR* 9881)

3. "Nellis Air Force Range Withdrawal – Proposed," January 1985, Military Lands Withdrawal Act of 1986 (Public Law 99-606, Nov. 6, 1986, as amended) [Section 1(b)(2) and Section 2]

   "Legal Description of Nellis Air Force Range Withdrawal; NV," January 13, 1987, Bureau of Land Management, *Federal Register*, January 26, 1987, Page 2772-2773 (52 *FR* 2772-2773)

   "Withdrawal and Reservation of Lands; Nevada," September 20, 1988, Bureau of Land Management *Federal Register*, September 20, 1988, Pages 38099-38100, (52 *FR*38099-38100) ["Groom Mountain Addition"]

   "Withdrawal of Public Land to the United States Air Force; Nevada," April 10, 1995, Bureau of Land Management, *Federal Register*, September 29, 1988, Pages 38099-38100 (60 *FR*18030) [White Sides addition]

4. "Renewal of the Nellis Air Force Range Land Withdrawal: Legislative Environmental Impact Statement," Air Combat Command, U.S. Department of the Air Force, U.S. Department of Defense, Nellis Air force Base, Nevada. [Volume 1, page 1-15, Figure 1-1. NAFR Location Map, and page 1-14, Table 1.2-2, NAFR History

5. "Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada," DOE/EIS-0243-F, Nevada Operations Office, Las Vegas, Nevada. [Volume 1, page 4-8, figure 4-3. NTS land withdrawals and Memorandum of Understanding; page 4-9, Figure 4-3 (continued). Legend for NTS land withdrawals and Memorandum of Understanding]

6. Public Comments on the "Draft Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (DOE/EIS 0243), January 1996, by Vernon J. Brechin, April 29, 1996.

7. Master Title Plats, U.S. Department of Interior, Bureau of Land Management, Nevada State Office, Reno, Nevada.

8. "State of Nevada," Surface Management Status map, U.S. Department of the Interior, Bureau of Land Management, Nevada State Office, Reno, Nevada, 1990.

9. "Nevada: 1999 Official Highway Map," Map Section, Room 206, Nevada Department of Transportation, Carson City, Nevada 89712, 1999.

Response
DOE believes that this comment refers to two parcels of land with a total area of approximately 580 square kilometers (225 square miles) (the comment's presentation of spatial equivalencies might be inaccurate). The first parcel, known as Pahute Mesa, is part of Public Land Order 99606, which was withdrawn for the use of Nellis Air Force Base but has been used historically by the Nevada Test Site for underground nuclear weapons testing under a Memorandum of Understanding. This parcel is in the upper northwest corner of the Nevada Test Site. The second parcel, known as the Groom Range, is part of Public Land Order 01662, which provided land for nuclear testing activities by the Atomic Energy Commission (a DOE predecessor agency). This parcel has been used historically by Nellis Air Force Base for flight operations under an understanding with the Nevada Test Site. The land transfer referred to in the Legislative EIS (accomplished by recent legislation) was a transfer of jurisdiction to match actual use with ownership. That is, Pahute Mesa was transferred to the Nevada Test Site and the Groom Range was transferred to the Air Force. This transfer entails no change in activities from those evaluated in the EIS and does not affect the analysis of potential impacts.

When preparing the EIS, DOE was aware of the pending legislation. President Clinton signed the bill into law somewhat less than halfway through the EIS public comment period.

Regarding the concern over the accuracy of maps at the time of publication, the gist of the comment appears to be that the maps reflect uses but not jurisdictional control as of August 1999, and that they were accurate in all respects as of the time of the comment. The comment does not challenge the accuracy of the maps and provides no basis for altering them.

Comments on the political process and administration of land withdrawals at the Nevada Test Site and Nellis Air Force Range (now called the Nevada Test and Training Range) are outside the scope of this EIS.

3.1 (7856)
Comment - EIS001227 / 0005
Increase Conceptual Impact Scope

In the Final EIS, the maps showing the surface contamination and the 921 underground detonation sites should display "Pahute Mesa" as described in the public records of the BLM [Bureau of Land Management]. If it remains recorded as an integral part of the U.S. Air Force's Nellis Air Force Range (NAFR), it should be shown as such. That means that approximately 70 of the pockets of nuclear explosion debris could still exist outside the legal boundaries of the NTS [Nevada Test Site] despite DOE's frequent insistence that they have not detected underground contamination beyond the NTS boundaries. A series of maps that displays the locations of the underground detonation sites should also display predictions of the plume extent for various radionuclides for 50, 100, 1,000, 10,000 and 100,000 years from the year 2000. The Final EIS should include a similar set of maps that covers the potential migration of radionuclides away from buried waste canisters in Yucca Mountain. Predicted plume extent maps for the NTS are likely available since DOE contractors have spent several years developing the computer models. The general areas that may be impacted by underground nuclear detonations should be rendered on NTS maps that consist of the legal boundaries. These potentially contaminated areas are shown in the 1996 NTS EIS on Page 4-82, Figure 4-22. Location of underground testing areas and number of tests on the NTS. The diagram of the typical test sequence and cross-section, provided in Figure 4-23, should also be provided in the Yucca Mountain Final EIS. The location of the plutonium dispersal experiments is displayed in Figure 4-29 on page 4-97. The approximate areas where surface plutonium contamination exceeds 10pCi/g [picocuries per gram] [are] displayed in Figure 4-30 on page 4-98.* These contamination plots should be provided in the Yucca Mountain Final EIS.

Note: Plutonium-239 contamination levels of greater than 2.5 pCi/g can, in some situations, be considered as requiring clean-up actions by the EPA [Environmental Protection Agency].

* "Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada," DOE/EIS-0243-F, Nevada Operations Office, Las Vegas, Nevada. [Volume 1, page 4-8, figure 4-3. NTS land withdrawals and Memorandum of Understanding; page 4-9, Figure 4-3 (continued). Legend for NTS land withdrawals and Memorandum of Understanding]

Response
DOE has modified the figure in Section 3.1.1.2 of the EIS to show the location of Pahute Mesa. Because groundwater plumes associated with the Nevada Test Site have not been mapped in the requested detail, DOE performed a conservative analysis that did not rely on an exact plume from the Test Site to estimate its contribution in the future (see Section 8.3.2.1). Because the Nevada Test Site EIS is readily available, DOE has not reproduced information from that document, but has included pertinent information by reference. DOE recognizes that plutonium-239 levels higher than 2.5 picocuries per gram can, in some situations, require cleanup actions.

3.1 (7933)
Comment - EIS001903 / 0004
Figure S-9 [Section S.1.3.1.2]. The connections between dates and items below the time line should be clarified. For example, the figure makes it appear that emplacement begins sometime between 2010 and 2031 and ends sometime between 2033 and 2110. This is inconsistent with text references for emplacement beginning in 2010 and ending 2033.

Response
DOE has revised the figure in Section S.3.1.2 to show the analyzed timeline for the project phases more clearly.

3.1 (7935)
Comment - EIS001903 / 0006
Table 1-1 [Section 1.5.1]. The table contains a list of related environmental documents. The Purpose and Need section of this EIS should also identify relevant legal agreements. These include the 1995 court settlement between the State of Idaho, DOE, and the Department of Navy. This settlement specifies several deadlines related to removal of wastes from the INEEL [Idaho National Engineering and Environmental Laboratory]. The INEEL is also subject to a Consent Order signed October 31, 1995, which makes the INEEL Site Treatment Plan a legally binding agreement.

Response
The NWPA describes the national concerns that form the purpose and need for the Proposed Action (see Chapter 1). The Idaho agreements mentioned in the comment do not address locations to which DOE would transport spent nuclear fuel subject to the Consent Order when it leaves Idaho, and do not expand on the underlying need for the action.

The purpose of the table in Section 1.5.3 in the EIS is to list National Environmental Policy Act documents that provided the bases for decisions associated with the monitored geologic repository program and investigations of Yucca Mountain as a potential repository site. Although DOE intends to abide by the requirements of settlement orders and compliance agreements (see Chapter 7), the EIS does not consider whether implementing the Proposed Action would satisfy any terms of such agreements.

3.1 (7939)
Comment - EIS001903 / 0007
Table 1-1 references a "Draft EIS, Idaho High-Level Waste and Facilities Disposition (in preparation)." This document is now complete and the title is: Idaho High-Level Waste and Facilities Disposition Draft Environmental Impact Statement (DOE/EIS-0287D) (EIS-2000-001), dated December 1999.

Response
DOE has modified the EIS to note that it has issued the *Idaho High-Level Waste and Facilities Disposition Draft Environmental Impact Statement* (DIRS 155100-DOE 1999).

3.1 (7946)
Comment - EIS001903 / 0010
Table 11-2. DOE Order 435.1 should be added to this table and Order 5820.2A possibly deleted. Other parts of the EIS may also require modification to be consistent with the new Order.

Response
DOE approved Order 435.1 after issuing the Draft EIS. The table in Section 11.3 now lists this Order, which replaces and cancels Order 5280.2A.

3.1 (7952)
Comment - EIS001903 / 0014
Section J.1.4.1.2, p. J-51, paragraph 1. "Idaho National Environmental and Engineering Laboratory" should be "Idaho National Engineering and Environmental Laboratory."

Response
DOE has changed "Idaho National Environmental and Engineering Laboratory" to "Idaho National Engineering and Environmental Laboratory" as appropriate in the EIS.

3.1 (8121)
Comment - EIS001653 / 0076
Section 6.1.2.6 needs more complete description of the terms in the tables of this section.

Response
The Glossary (Chapter 14 of the EIS) contains definitions of key terms in the cited tables, such as "lost workday cases," "recordable cases," "latent cancer fatalities," and "maximally exposed individual." Section F.1.1 discusses radiation and human health. Section F.2 discusses occupational health and safety impacts.

3.1 (8357)
Comment - EIS001873 / 0042
P.3-105. The fact that the Meadow Valley Wash flows to the Colorado River should be included.

Response
The purpose of the table in Section 3.2.2.1.3.1 in the EIS is to identify the surface-water resources nearest each candidate rail corridor. It is not to provide a comprehensive description of the flow patterns of each surface-water body listed.

3.1 (8703)
Comment - 010005 / 0001
I'm duly impressed with the fact you sent me not one (1), but two (2) copies of the "Supplement to the DEIS, et al," coupled with the parallel fact that, however inexplicably, my name is not included among the roster of recipients on the distribution list in the rear pages of the report.

Response
Distribution lists provided in EISs typically include Congressional Representatives, Federal Agency Managers, Local Officials, State Governors, and Public Interest Groups. The Distribution List provided in Appendix D to this EIS is a subset of the much larger mailing list, which includes members of the general public. DOE compiles its mailing lists from many sources, including signup sheets at public hearings, mail received during public comment periods, and information requests from individuals and organizations. DOE makes every effort to ensure that all interested individuals and organizations are on the mailing list, and regrets any inconvenience caused by duplications.

3.1 (8847)
Comment - EIS002087 / 0001
Previously I indicated under appendix G 12-13 states that copies of DEIS was sent to all governors and states, but not to tribes within those states except by request. That statement actually is somewhat true. However, reading, examining the section in the EIS, it states here that Native American groups, and I think that that should probably be clarified to say Native American tribes or any tribes or whatever, because groups can mean organizations or what have you. So I would recommend that that change be indicated in there. And that's on actually D-1, in the very introduction.

Response
DOE has changed the term "Native American groups" to "Native American tribes", as appropriate, throughout the EIS.

3.1 (8850)
Comment - EIS002087 / 0002
On page D-12 it identifies all the different Native American groups. And for the Las Vegas Indians, it has the title for Mr. Jesse Leeds, his organization – chairperson, was the official title. His particular position is Chairman of the Board. So I would recommend that that be changed and this be consistent with all the other accurate titles that are placed there for everyone else.

Response
In Appendix D of the EIS, DOE has changed Mr. Leeds' position to read "Chairman of the Board of Directors."

3.1 (9176)
Comment - EIS001924 / 0008
The DEIS is full of imprecise language like "very unlikely," "sufficient quantity," probably would," etc. How are we to make a sound decision on a project of enormous scope as Yucca Mountain when we can't be certain of the science contained within.

Response
Many sections of the EIS provide quantitative estimates of potential impacts if there was enough information to support calculations. However, even if the analysis used quantification, it is appropriate from a scientific perspective to describe results in terms of what would be likely to occur or what could occur rather than what would absolutely occur. This is because the analysis estimated the future performance of engineered and natural systems over a long period. Further, DOE believes it is appropriate to use conditional language (could, would, should, etc.) to describe the estimated impacts of a proposed action, such as the repository, that has not received approval to proceed.

Some EIS comparisons are qualitative rather than quantitative, and in some cases the interested reader will need to consult the EIS references because of the size or complexity of the supporting documents. Information on the references is available in the DOE Reading Rooms listed in Appendix D and on the Internet (*http://www.ymp/gov)*. In the Final EIS, DOE has attempted to provide a more consistent application of qualifying statements.

3.1 (9193)
Comment - EIS001924 / 0016
Much of the information is not clearly laid out resulting in miscommunication. For example, Table S-1 in the Summary DEIS, which also appears in the DEIS, is intended to be an overview of the impacts of the preferred action and no-action scenarios. However, there are numerous figures listed in the table without a sample calculation as to how they were arrived at or a convenient reference to the appropriate page of the DEIS that explains the calculation. Further, numbers are used along a row which have different definitions and should not be compared directly, but this is not explained either. As a result the table gives little useful information directly, and would tend to create a confusing picture of the impacts except possibly to those who manufactured the DEIS.

Response
The summary table 2-7 in Section 2.4 of the Final EIS now provides a cross reference to the specific sections from which the impacts are summarized. It is not feasible, however, to provide sample calculations in these tables. The reader can refer to the appendixes for discussions of the methodologies DOE used to estimate the potential impacts discussed in the EIS. DOE has reviewed and modified the information in the summary tables to ensure consistency across alternatives.

3.1 (9196)
Comment - EIS001924 / 0019
Citizen Alert recommends that the DOE use a focus group approach in the future composed of average citizens of various professions and trades to review the document before general release. In this way many ... problems with

readability will be resolved before the formal process begins and more effective public comment and involvement will ensue.

Response
Thank you for your suggestion and observations on the readability of the EIS. DOE has taken a number of steps in the Final EIS to improve its readability, such as improving the structure of the Table of Contents, providing standardization of qualifying terms and accident descriptions, adding words to the glossary, and clarifying text where lay terms could replace technical jargon.

3.1 (9410)
Comment - EIS001888 / 0105
Other databases are similarly flawed. In 1998, Clark County received geographic data files from DOE that were being used for the proposed implementing alternatives through Nevada to Yucca Mountain. Cartographers from Clark County's Geographic Information Systems Department found that the files provided by the DOE incorrectly located major transportation features (e.g., Interstate 15).

Response
The geographic data files referred to in this comment were coarse preliminary data sets DOE provided to Clark County for the purpose of early communication. The Department knew these files required corrections and did not use them in the preparation of the EIS. DOE used corrected geographic data sets in the EIS preparation.

3.1 (9898)
Comment - EIS001888 / 0445
[Clark County summary of comments it has received from the public.]

One commenter hinted the DOE was not "environmental conscious" by failing to use recycled paper products.

Response
DOE printed the Draft EIS, the Supplement to the Draft EIS, this Final EIS, and related documents with soy ink on recycled paper.

3.1 (10003)
Comment - EIS001295 / 0002
My first comment is on the definition of "disposal" in the glossary, stating that it is "isolation of the waste from the accessible environment". In my opinion, this definition should require isolation from the environment as a whole, not just the environment which the DOE allows us access to, and this includes the accessibility of that environment when there is no longer a DOE or anyone alive who knows what the DOE is.

Response
The Glossary (Chapter 14 of the EIS) provides two definitions for "environment" that relate to the definition of "disposal." The first of these is a general definition that applies to "environment" as used in the comment:

"environment
(1) Includes water, air, and land and all plants and humans and other animals living therein, and the interrelationship existing among these...."

Under the Proposed Action, the waste would be emplaced in the land mass of the planet. It would be incorrect to say that the waste would be entirely separated from the environment. The purpose of the Proposed Action is to emplace waste in a part of the overall environment that would make it inaccessible to people.

3.1 (10627)
Comment - EIS001906 / 0010
The DEIS fails the NEPA [National Environmental Policy Act] requirement for an Environmental Impact Statement that is "concise, clear, and to the point" (40 CFR Sec. 1502.2(b). Volumes I and II of the DEIS ramble on for hundreds of pages, but it is extremely difficult or impossible to find succinct passages which analyze and summarize environmental impacts. NEPA regulations state: "most important, NEPA documents must concentrate on the issues

that are truly significant to the action in question, rather than amassing needless detail" [40 CFR Sec. 1500.1(b)]. Instead, the DEIS is padded with multiple complex scenarios instead of a coherent single Proposed Action, and completely worthless No Action alternatives instead of reasonable alternatives to the proposed project. NEPA Regulations also state under the heading Writing: "Environmental Impact Statements shall be written in plain language and may use appropriate graphics so that decisionmakers and the public can readily understand them" [40 CFR Sec. 1502.8]. Clearly, this section of NEPA regulations [was] ignored.

Two examples of DOE's practice of obscuring important information will be given. In the section Unavoidable Adverse Impacts: Hydrology 10.1.1.3, one has to wade through nearly two pages of narrative to reach the gist of the Unavoidable Adverse Impact: "Eventually, groundwater with varying concentrations of different radionuclides would reach locations in the hydrologic (groundwater) region of influence where the water could be consumed" (DEIS, p. 10-3).

This buried statement should have been accompanied with a map clearly depicting groundwater contamination reaching the affected areas, such as wells in the Amargosa Valley and springs in Death Valley. Radioactive contamination of the springs in Death Valley will directly [affect] the health of Timbisha Shoshone tribal members, many of whom live in Death Valley.

Another example can be found in the down-played reference to [chlorine]-36 studies buried (with no reference in the index or contents) on pp. 3-46 to 3-47 in the DEIS. Page 3-47 of the DEIS states: "About 13 percent of the samples (31 samples) had high enough [chlorine]-36-to-total-chlorine ratios to indicate the water originated from precipitation occurring in the past 50 years (that is, nuclear age precipitation)" (DEIS, p. 3-47). This means that in some places, surface water has rapidly reached the unsaturated zone level where the nuclear waste would be placed.

This in itself is a disqualifying condition according to the current DOE General Guidelines for the Recommendation of Sites for the Nuclear Waste Repositories, 10 CFR Part 960: "Disqualifying Condition: A site shall be disqualified if the pre-waste-emplacement groundwater travel time from the disturbed zone to the accessible [environment] is expected to be less than 1,000 years along any pathway of likely and significant radionuclide travel" [10 CFR 960 Sec. 960.4-2-1(d)].

Not surprisingly, the DOE is currently proposing to change these guidelines so that such a disqualifying condition would be deleted in relation to site suitability. At the time the DEIS was published, the DOE had not decided to propose the new guidelines. Issuing the new guidelines for public comment at the same time as the DEIS places an unfair burden on the Timbisha Shoshone Tribe as well as the general public.

On p. S-65 of the DEIS Summary it is stated under the heading Areas of Controversy: "DOE obtained and evaluated the best information available to prepare this EIS. However, some information is from ongoing studies (such as the chlorine-36 studies used to assess the rate and quantity of water that flows from the surface to the groundwater) and, therefore, is incomplete or unavailable" (DEIS, p. S-65). Yet the DOE uses other ongoing studies and a high level of incomplete or uncertain information to determine its conclusions. If the ongoing studies question the viability of Yucca Mountain as a nuclear waste repository, then they are excluded as a potential environmental impact. This creates a very biased DEIS.

Response

DOE has taken a number of steps to make the EIS as understandable as possible to a wide range of readers. For example, the Final EIS includes a Readers Guide in addition to a number of explanatory text boxes, summary tables, illustrations, and comparison information that highlight potential environmental impacts. In addition, the EIS contains a comprehensive glossary of technical terms (Chapter 14). While DOE acknowledges the EIS exceeds the page guidelines in 40 CFR 1502.7, the subject matter is complex and covers a range of nationwide issues.

Concerning the presentation of information, DOE believes the EIS provides a balanced, informative analysis of impacts. In addition to presenting the results of the analysis of the proposed repository, the EIS describes responsible opposing views on a number of analytical issues and uncertainties that might exist in some technical areas, and identifies areas where further studies are necessary or are under way.

DOE disagrees with this comment's assertion of DOE obscuring important information in the EIS. Chapter 5 and Appendix I are devoted entirely to potential long-term impacts to groundwater and health impacts to individuals and populations, along with the location of groundwater wells. Sections S.4.1.4, 3.1.4.2.1 and 5.3 describe and contain figures of the potentially affected groundwater basins. Quantitative estimates of potential long-term impacts to individuals and populations within 80 kilometers (50 miles) of the repository are in Chapter 5.

DOE recognizes that a small fraction of the groundwater might flow through fractures in the relatively impermeable Precambrian rocks in the southeastern end of the Funeral Mountains toward spring discharge points in the Furnace Creek area of Death Valley. Sparse potentiometric data indicate that a divide could exist in the Funeral Mountains between the Amargosa Desert and Death Valley. However, DOE believes that even if part of the flow from Yucca Mountain mixes with the carbonate pathway that supplies the Furnace Creek springs, it would be too little to have a noticeable effect on the chemistry of the springs. Considering the small fraction of water that would infiltrate through the repository footprint, compared to the total amount of water flowing through the basin (approximately 0.3 percent), and the large distances involved [more than 60 kilometers (37 miles) from the source], the potential impacts of any component of the flow from Yucca Mountain in this long and complicated flowpath would be very small.

DOE also recognizes that studies of chlorine-36 suggest that there might be rapid pathways through the unsaturated zone. The chlorine-36 studies, as described in Section 3.1.4.2.2 of the EIS, have shown that in some locations there are relatively fast pathways (less than 50 years) for water infiltrating Yucca Mountain to reach the depth of the proposed repository. These results, however, must be viewed in their proper context regarding the question of whether waste can be stored safely at Yucca Mountain. Overall, most of the water that infiltrates Yucca Mountain moves much more slowly through the matrix and fracture network of the rock. Only a small fraction has moved through the connected portion of the fracture network with relatively fast travel times. Carbon isotope data from water extracted from the matrix correspond to residence times as long as 10,000 years. The elevated values of bomb-pulse chlorine-36 detected in the subsurface correspond to increases of between about two to eight times the amount of naturally occurring background chlorine-36. This background signal is the amount observed in the regional aquifers and the matrix waters of rocks in the unsaturated zone. Furthermore, even elevated bomb-pulse values represent exceedingly minute increases in the amount of chlorine-36. Naturally occurring ratios of radioactive chlorine-36 to the other isotopes of chlorine (chlorine-35 and -37) are on the order of one chlorine-36 atom to approximately 2 trillion other chlorine atoms. Their detection is more a tribute to the precision of the analytical methods used in this study (accelerator mass spectrometry) than it is an indication of an unsuitable environment for the emplacement of spent nuclear fuel and high-level radioactive waste. To ensure the correct interpretation of this subtle chemical signal, studies are under way to determine if independent laboratories and related isotopic studies can corroborate this detection of elevated amounts of chlorine-36.

Another important factor regarding the safety of emplaced waste concerns whether percolating water would actually come in contact with waste packages. The process of drift excavation would create a capillary barrier that would divert percolating water around the drift opening, further reducing the amount of water potentially capable of contacting waste packages. DOE is conducting a series of experiments to determine the seepage threshold, which is the amount of water necessary to overcome the capillary barrier caused by excavation. Results to date suggest that the amounts of percolating water at the waste-emplacement level could be insufficient to exceed the existing capillary barrier.

Additional evidence of the overall lack of observable fluid flow in the subsurface is the fact that throughout the excavation of more than 11 kilometers (6.8 miles) of tunnels (Exploratory Studies Facility and cross drifts) and testing alcoves, only one fracture was moist. No active flow of water was observed. Analysis of the moisture from this fracture detected no bomb-pulse chlorine-36. Only background levels of chlorine-36 were evident, indicating old water. Further observations from testing alcoves that are isolated from the effects of tunnel ventilation for several years confirm the lack of observable natural seepage at the repository level. In summary, despite encountering millions of fractures in the course of excavation activities, there is scant evidence that even modest quantities of water penetrate to the depth of the repository horizon.

Section 112(a) of the Nuclear Waste Policy Act of 1982 requires the Secretary of Energy to issue general guidelines for use in recommending potential repository sites for detailed characterization. DOE issued these guidelines in 1984 (10 CFR Part 960). The guidelines described DOE policies that were applicable to the three sequential stages

of the siting process in the Act (preliminary site screening, nomination of sites, and site selection for recommendation to the President). DOE published proposed amendments to the guidelines in 1996 to reflect the prevailing scientific view on how to evaluate the suitability of the Yucca Mountain site for the development of a nuclear waste repository (61 *FR* 66158, December 16, 1996). Because Congress had by this time required DOE to focus only on Yucca Mountain, the proposed DOE amendments dealt with provisions of the guidelines applicable to the site recommendation stage. In November 1999, DOE revised its 1996 proposal (64 *FR* 67054, November 30, 1999).

DOE revised its proposal for three primary reasons:

1. To address comments that criticized the omission of essential details of the criteria and methodology for evaluating the suitability of the Yucca Mountain site.

2. To update the criteria and methodology for assessing site suitability based on the most current technical and scientific understanding of the performance of a potential repository, as reflected in the DOE report, *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998).

3. To be consistent with the then-proposed site-specific licensing criteria for the Yucca Mountain site issued by the Nuclear Regulatory Commission (the Commission has since promulgated these criteria at 10 CFR Part 63), and the then-proposed site-specific radiation protection standards issued by the Environmental Protection Agency (the Agency has since promulgated these standards at 40 CFR Part 197).

In 2001, DOE promulgated its final 10 CFR Part 963 guidelines to establish the methods and criteria for determining the suitability of the Yucca Mountain site for the location of a geologic repository. These final guidelines are essentially the same as those proposed in 1999.

With regard to disqualifying conditions at Yucca Mountain, the 1984 DOE site suitability guidelines included explicit disqualifiers to guide the Department's assessment of multiple sites under consideration for repository development. At that time, failure to meet the qualifying condition of any guideline was a basis for disqualifying a site. Under the NWPA, Congress directed DOE to focus only on Yucca Mountain and, as discussed above, directed the Environmental Protection Agency and the Nuclear Regulatory Commission to promulgate standards to protect public health and safety. Failure to meet the Environmental Protection Agency standards or the Nuclear Regulatory Commission criteria for licensing would disqualify the Yucca Mountain site. Chapters 1, 5, and 11 of the EIS contain more detail about the final regulations at 10 CFR Part 63 and 10 CFR Part 963.

DOE's original 1984 site suitability guidelines (10 CFR Part 960) have been superseded by Yucca Mountain-specific guidelines (10 CFR Part 963) promulgated by DOE in 2001. Even though 10 CFR Part 960 no longer applies to Yucca Mountain, DOE believes that information and analyses do not support a finding that the site would have been disqualified under the groundwater travel time disqualifying condition at 10 CFR 960.4-2-1(d). Under that condition, a site would be disqualified if the expected groundwater travel time from the disturbed zone (the area in which properties would change from construction or heat) to the accessible environment would be less than 1,000 years along any pathway of likely and significant radionuclide travel. The definition of groundwater travel time in 10 CFR 960.2 specifies that the calculation of travel time is to be based on the average groundwater flux (rate of groundwater flow) as a summation of travel times for groundwater flow in discrete segments of the system. (In this case, the geologic and hydrologic subunits comprising the unsaturated and saturated zones.) As a practical matter, this definition provides for the consideration of the rate at which most of the water moves through the natural system to the accessible environment.

As part of its site characterization activities, DOE has undertaken various studies to identify and consider characteristics of the unsaturated (above water table) and saturated (water table) zones, such as the flow of water and transport of radionuclides, that are relevant to analyzing groundwater travel times. DOE also has considered physical evidence such as the chemistries and ages of water samples from these zones. Because of the inherent uncertainties in understanding such natural processes as groundwater flow, DOE has developed numerical models to represent an approximation of these processes and to bound the associated uncertainties.

Based on these models, which incorporate the results of these studies and available corroborating physical evidence, DOE estimates that the median groundwater travel times would be about 8,000 years, and average groundwater travel times would be longer. These models indicate that small amounts of water potentially moving in "fast paths" from the repository to the accessible environment could do so in fewer than 1,000 years. However, the models and corroborating physical evidence indicate that most water would take more than 1,000 years to reach the accessible environment. Given this, DOE believes that the site would not have been disqualified under the groundwater travel condition at 10 CFR 960.4-2-1.

The Department continues to evaluate fast paths through the mountain through experimentation and verification of chlorine-36 sampling described in Section 3.1.4.2.2 of the EIS. DOE developed the EIS using the best available information for hydrochemical and geochemical characterization. Many experiments are under way, and the EIS contains some of the resulting data.

3.1 (11430)
Comment - EIS002277 / 0001
On the Volume II, J-69, Page J-69, they talk about a small fraction of the accidents could generate forces capable of damaging the casks. Again, "could generate."
Another adjective. Adjectives do not belong in engineering documents.

Response
The EIS is not an engineering document. Its purpose is to present information on scientific and engineering topics that is understandable to a wide range of individuals. When discussing estimated impacts over a long period, the language used in the EIS is acceptable from a general understandability perspective and from a scientific perspective. DOE does not wish to imply a level of accuracy greater than that supported by the data and analytical techniques that are available.

3.1 (11450)
Comment - 010096 / 0008
Table S-2 – For some impact parameters addressed in Table S-2 a range of impacts are provided and for [others] a single impact estimate is offered. A range of impacts should be offered for all impact parameters included in Table S-2.

Response
The summary tables in Section 2.4 of the Final EIS provide a range of impacts for various resources where such an approach facilitates the summarization of information. A range of impacts also is presented for aspects of the Proposed Action for which options remain under consideration. For example, DOE has reported the range of impacts associated with the seven lower- and higher-temperature operating mode scenarios analyzed.

3.1 (11736)
Comment - 010379 / 0004
Your team is doing a great job on a tough job.

Response
Thank you for comment.

3.1 (11807)
Comment - EIS001888 / 0594
Maps in the DEIS fail to depict urban Clark County properly since they give the incorrect impression that a route using the beltway does not pass near urban Clark County. These maps also depict Las Vegas as a point, without illustrating the great expanse of urbanized Clark County. All of these concerns contribute to the impression that the report was prepared disregarding the most basic research standards and current information.

Response
DOE is unclear about which maps concern the commenter. In general, the Department believes the EIS acknowledges the urban nature of Clark County and Las Vegas in its presentation of socioeconomic parameters in Chapter 3. However, DOE has modified several figures throughout the EIS that show the Las Vegas metropolitan

area to include updated detail (see, for example, the map in Section S.3.1.3 that shows potential legal-weight truck routes to Yucca Mountain).

3.1 (11809)
Comment - EIS001888 / 0596
The DEIS' maps fail to depict urban Clark County properly. The maps in the DEIS give the incorrect impression that a route using the beltway does not pass near urban Clark County. The maps in the DEIS depict Las Vegas as a small point, without depicting all of urbanized Clark County. All of these concerns contribute to the impression that the report was prepared in an amateurish way that disregarded the most basic standards for research.

Response
DOE is unclear about which maps concern the commenter. In general, the Department believes the EIS acknowledges the urban nature of Clark County and Las Vegas in its presentation of socioeconomic parameters in Chapter 3. However, DOE has modified several figures throughout the EIS that show the Las Vegas metropolitan area to include updated detail (see for example, the map in Section S.3.1.3 that shows potential legal-weight truck routes to Yucca Mountain).

3.1 (12650)
Comment - EIS001227 / 0003
Promotional Map

On Page 8-11 is Figure 8-3 [Section 8.1.2.2]. Potential locations of proposed cumulative activity associated with VentureStar® at the Nevada Test Site [NTS]. This map is a reference to private corporation plans for use of portions of the NTS. The VentureStar® space launch facility plans involve the Nevada Test Site Development Corporation, Kistler Aerospace Corporation and Lockheed Martin Corporation. Numerous references to Figure 8-3 appear on page 8-74. Here a listing of seven categories of activities [appears] that have resulted in radioactive contamination or have the potential to result in radioactive and nonradioactive contamination. Item number 2. Underground Nuclear Testing, indicates that approximately 800 underground nuclear test locations appear in Figure 8-3. Not a single site appears on that figure. Item number 6. Crater Disposal., indicates that the location of the Area 3 Radioactive Waste Management Site appears in Figure 8-3. It does not. Item number 7. Greater Confinement Disposal., indicates that the location of the Area 5 Radioactive Waste Management Site appears in Figure 8-3. It does not.

Each of the seven items should be shown on properly rendered maps of the Nevada Test Site that are of identical scale. In addition numerous other existing and proposed contaminating activities should be added to the list and shown on maps. This includes the Spill Test Facility which regularly releases massive quantities of toxic chemicals into the environment of Frenchman Flat and into the U.S. Fish and [Wildlife] Service, Desert National Wildlife Range. The experimental facilities at the Ula "LYNER Complex" site, that host the subcritical test program should be included. The Big Explosives Experimental Facility (BEEF) needs to be listed and shown as well since it is expected to be a source of heavy metal toxins, beryllium and radioactive material releases. The Yucca Mountain Draft EIS should also have included proposed experimental facilities such as the "Fire Experiment Facility" that may be located at Frenchman Flat.

According to a reference (Nakos, 1998) in the Environmental Assessment report, planning for this project began over seven months before the release of the Draft EIS.

Response
As suggested by this comment, DOE has corrected references to figures in Chapter 8 and clarified the text with regard to what the figures show. The EIS does not show the locations of individual underground tests, but the figure in Section 3.1.1.2 does show the areas of the Nevada Test Site where the tests occurred. Areas 3 and 5 of the Test Site host the Crater Disposal Site and the Greater Confinement Disposal Site, respectively, and are now shown on that figure. The figure in Section 8.1.2.2 now shows the proposed Venturestar® site.

3.1 (12764)
Comment - EIS001969 / 0030
Page 3-28, Table 3-8 [Section 3.1.3.2], Characteristics of major faults at Yucca Mountain.

Define the late Quaternary in years for clarity.

Response
DOE believes that it has made the table in Section 3.1.3.2 of the EIS more accurate by removing the word "late" from the column heading related to Quaternary displacement.

3.1 (12765)
Comment - EIS001521 / 0017
Page 3-6, Figure 3-1--Following this page, the Chapter 2 pages 2-65 through 2-88 are repeated; followed by a repeat of Chapter 3 pages 3-1 through 3-6; and pagination resumes with page 3-39. Therefore, Chapter 3 pages 3-7 through 3-38 (containing much of the geologic and hydrologic information in the Affected Environment chapter) were missing from the copy of the DEIS that I received. Hopefully this was not the case for too many copies of the DEIS that were mailed out. The missing pages were copied from the DEIS www-site, and hopefully others had access to this site. Given that about 30 pages were omitted from Chapter 3 in the copy of the DEIS that I received, a final qc [quality control] run-through was needed prior to mailing.

Response
A bindery error, as described in the comment, affected a very small number of Draft EIS copies. To the extent possible, DOE identified recipients of those copies and forwarded a replacement copy to each. DOE regrets any inconvenience this error caused.

3.1 (12787)
Comment - 010329 / 0002
Also, I'd like to see Amargosa Valley more on the maps. We're never on the map. I don't know why that is, but we never seem to make the map. I'd really appreciate if in the future in these things this community can be more considered.

Response
DOE acknowledges that in some places in the EIS it identified Amargosa Valley as Lathrop Wells. In the Final EIS DOE has made global changes and deleted references to Lathrop Wells as a community except in an historical context.

3.1 (13298)
Comment - 010317 / 0003
The Draft EIS was rather vague in describing the Site-Related Terms as appears in the inset box at the top of page l-14. On this same page is Section 1.4.1 Yucca Mountain Site which is also short on specifics of the lands that are proposed to be withdrawn from the public domain for, essentially, forever. Some more specifics appear in Section 3.1.1 Land Use and Ownership. Unfortunately, detailed descriptions of the various administrative boundaries are lacking though there are notes suggesting that more details can be obtained from the administrating agencies. The FEIS should include, in the appendix, specific cited references to all the land use agreements, right-of-way reservations, permits, claims, and Public Land Orders involved in the ongoing and proposed Yucca Mountain repository operations. A developmental history of the legal manipulation of the lands used for this repository should also be presented in this appendix. Each of the existing Public Land Orders, that are involved, should be cited along with the purpose for which the land was withdrawn. Any overlapping withdrawals should be fully explained.

Response
As discussed in Sections 3.1.1 and 4.1.1 of the EIS, regulations promulgated by the Nuclear Regulatory Commission require that land for the repository be either under the jurisdiction and control of DOE or permanently withdrawn and reserved for its use (10 CFR 63.1210). The size of the potential withdrawal area is based on compliance with the Environmental Protection Agency's radiation-protection standards for Yucca Mountain (40 CFR Part 197). For this reason, the boundary of the potential withdrawal area shown in the EIS extends to the southern boundary of the

Nevada Test Site, approximately 18 kilometers (11 miles) south of the repository site. This would be the southern boundary of the controlled area as defined in 40 CFR Part 197. As mandated by the Environmental Protection Agency, DOE used a conservative controlled area (a subset of the land withdrawal area) to extend control toward the closest populated area, the Town of Amargosa Valley, Nevada, thus preventing future encroachment as the basis for analysis in this EIS. The final identification of a controlled area boundary would be defined during the licensing process conducted by the Nuclear Regulatory Commission (consistent with the controlled area requirements of 40 CFR Part 197) if there was a decision to construct a repository at Yucca Mountain. DOE has revised Section 3.1.1.3 of the EIS to provide a clearer explanation of the rationale for the size of the potential land withdrawal area.

As described in Section 3.1.1.3 of the EIS, the size of the potential land withdrawal is about 600 square kilometers (230 square miles or 150,000 acres). All but 1 square kilometer of the area is under the control of three Federal agencies: DOE, the U.S. Department of Defense, and the U.S. Department of the Interior. The remaining 1 square kilometer is private land at the southern end of the withdrawal area. There are no State or tribal lands within the withdrawal area.

About two-thirds of the withdrawal area is already withdrawn from use by the general public for DOE operations at the Nevada Test Site and for U.S. Air Force operations at the Nevada Test and Training Range (formerly called the Nellis Air Force Range). The remaining one-third of the withdrawal area is public land administered by the Interior Department's Bureau of Land Management.

DOE believes that EIS adequately analyzes the impacts of the location and size of a potential withdrawal for the repository. If Congress does ultimately withdraw land for the repository, the information requested by the commenter would be compiled as part of the withdrawal legislation.

3.1 (13538)
Comment - 550012 / 0001
The boundary line coordinate points of the Proposed Land Withdrawal Area should be provided in the FEIS. Those coordinates should be provided in the Nevada State Plan, Central, Datum: NAD 27 and in universal coordinates that are specified in degrees.

Response
The extent of the proposed land withdrawal is shown in Figures 1-6 and 3-8 of the EIS. DOE identified this area to comply with regulations issued by the Nuclear Regulatory Commission concerning land ownership and control for a repository at Yucca Mountain (10 CFR Part 63). The safety of the repository requires DOE to demonstrate with reasonable assurance that the long-term performance of the repository can meet the environmental radiation-protection standards established by the Environmental Protection Agency.

If Yucca Mountain site was approved for a repository, the dimensions of the actual land withdrawal could be different than those proposed by DOE in the EIS. For this reason, DOE did not consider it necessary to include in the EIS precise legal descriptions of the boundaries of the proposed withdrawal. Current ownership and use of the proposed withdrawal area is described in Section 3.1.1.3 of the EIS.

3.1 (13538)
Comment - 550012 / 0002
An appendix in the FEIS should provide the formal legal description of the Nevada Test Site boundaries as well as the legal description of the presently configured Nellis Air Force Range.

Response
If the Yucca Mountain site was approved for a repository, the dimensions of the actual land withdrawal could be different than those proposed by DOE in the EIS (see Figures 1-6 and 3-8). For this reason, DOE did not consider it necessary to include precise legal descriptions of the boundaries of the proposed withdrawal described in the EIS, nor legal descriptions of the boundaries of the Nevada Test Site and the Nellis Air Force Range.

3.2 Draft EIS - Adequacy

3.2 (9)
Comment - 20 comments summarized
Commenters stated that the National Environmental Policy Act infers that a goal of national environmental policy is to work toward sustainable resources and economics through ecosystem management. Commenters questioned the lack of an ecosystem management approach in the Draft EIS and raised the following issues: The Draft EIS gives an overly broad view of the National Environmental Policy Act that focuses on procedure and avoids the intent, purpose, substance, and spirit of the Act. The Draft EIS is insufficient because it does not have a unifying environmental goal and a strategy for DOE to achieve that goal, and because an interdisciplinary impact analysis methodology that relied on an ecosystem approach was not used. Such an approach is mandated by the National Environmental Policy Act and required by the Federal Ecosystem Management Initiative. The Draft EIS should have used a comprehensive and integrated holistic approach that was based on natural ecosystem and landscape boundaries; evaluated impacts on long-term ecosystem function, integrity, and biodiversity; and considered humans in the natural environment. Predictive simulation models of the natural ecosystem that considered global climate change and extended far into the future should have been used. An ecosystem approach also requires open, meaningful stakeholder involvement and regional land use planning and coordination. DOE has refused for many years to adopt these and other aspects of ecosystem management. Commenters felt that, because an interdisciplinary ecosystem approach was not used, impacts on sustainable development could not be evaluated properly and impacts were evaluated in a piecemeal fashion.

Response
DOE believes that the assessment methodology it used in the development of the EIS is sufficient for evaluating potential impacts of the Proposed Action. This methodology relied on interdisciplinary collaboration and included the concept of ecosystem management when applicable and appropriate, as suggested by the Federal Ecosystem Management Initiative and the Council on Environmental Quality (see for example, *Incorporating Biodiversity Considerations into Environmental Impact Analysis Under the National Environmental Policy Act* (DIRS 155275-CEQ 1993).

As described in Chapter 1 and elsewhere, the EIS supports the unifying national environmental goal of the NWPA: to dispose of the Nation's spent nuclear fuel and high-level radioactive waste in a manner that ensures that these materials do not adversely affect public health and safety and the environment for this or future generations. The EIS evaluation of the environmental impacts that could occur under the Proposed Action is an important part of the national strategy for achieving that goal.

Consistent with Council on Environmental Quality regulations (40 CFR 1502.7), DOE used an interdisciplinary approach to evaluate the impacts. When appropriate, analysts from different disciplines collaborated to fully understand and evaluate potential impacts. For example, the assessment conducted to evaluate the environmental consequences of long-term repository performance (Chapter 5 of the EIS) was a complex evaluation that required the collaboration of many disciplines including hydrology, geology, health physics, biology, and engineering. The resulting predictive simulation model of the natural ecosystem considered global climate change (see Section 5.2.4.1) and predicted impacts as far as 1 million years into the future. DOE did not conduct piecemeal evaluations; rather, it organized the EIS into separate sections and subsections for each discipline or segment of the environment to explain the evaluation results most clearly.

DOE incorporated applicable principles of ecosystem management, such as those discussed by the Council on Environmental Quality (DIRS 155275-CEQ 1993), in the EIS analysis methodologies. The Department believes these methods were sufficient for evaluating impacts on the ecosystem, including those on sustainable development of resources summarized in Chapter 10 of the EIS. As described in Section 3.1, the regions of influence considered for each resource area were based on potential impacts to a resource or system, not on political boundaries. Therefore, the evaluations used appropriate natural ecosystem and landscape boundaries. Impacts on long-term ecosystem function, integrity, and biodiversity were evaluated at appropriate scales and levels of organization. For example, the evaluation of the impacts of repository construction on biological resources concentrated primarily at the species level of ecological organization because impacts to biological resources would be localized and most likely to occur at that level. Section 4.1.4 of the EIS states that the removal of vegetation from the relatively small

area required for the Proposed Action and the very small impacts to some species would not affect regional biodiversity or ecosystem function. Potential long-term effects of repository performance on biological resources were evaluated on the larger scale of the hydrological basin and required interdisciplinary collaboration with hydrologists. Interrelationships between humans and ecosystems were considered throughout the EIS. For example, the evaluation of long-term repository performance in Chapter 5 considered the effects of groundwater contamination on people who relied on that important resource. Chapter 5 also considers the influence of human intrusion of the repository on the ecosystem.

DOE believes that its approach to stakeholder involvement and regional land-use planning and coordination is consistent with the National Environmental Policy Act, Council on Environmental Quality and DOE regulations, and the needs of ecosystem management. DOE has conducted meetings to inform the public of progress and plans on the Yucca Mountain Project since the Project's inception. The DOE Nevada Operations Office has participated in regional land use planning activities, such as development of right-of-way reservations, with regional land management and resource management agencies. As indicated in Appendix C of the EIS, interactions between DOE and other Federal agencies during the development of the EIS were extensive and consistent with the regulatory framework mandated by 40 CFR 1502.25 and 10 CFR 1021.341(b).

DOE has adopted and incorporated applicable aspects of ecosystem management in the Yucca Mountain Project, consistent with DOE Policy 430.1, "Land and Facility Use Planning." For example, the Department has conducted extensive studies of the ecosystem at and around Yucca Mountain for many years, and has used the results of those studies to make decisions necessary to maintain or improve ecosystem integrity and diversity and in the development of the EIS to predict future impacts of the Proposed Action. In addition, DOE has coordinated with Federal and state agencies to ensure protection of the ecosystem (for example, with the Fish and Wildlife Service to protect desert tortoises and with the National Park Service to protect pupfish).

3.2 (32)

Comment - 3 comments summarized

Commenters stated that DOE should have prepared a programmatic EIS for the repository project and then tiered (linked) separate EISs to it for the Yucca Mountain repository facilities, the rail corridor selection, the selection of national and Nevada highway and rail routes, and the selection of an intermodal transfer facility, as appropriate. This approach, according to the commenters, would have enabled DOE to deal more directly and effectively with the wide range of uncertainty presented by each aspect of the program.

Response

Congress, in Section 111(b) of the NWPA, acknowledged "the Federal responsibility, and a definite Federal policy, for the disposal of ... waste and spent fuel."

DOE has developed the information about environmental impacts that could result from either the Proposed Action or the No-Action Alternative for the Secretary of Energy's consideration in determining whether to recommend Yucca Mountain as the site of this Nation's first monitored geologic repository for spent nuclear fuel and high-level radioactive waste. In making that determination, the Secretary would consider not only the potential environmental impacts identified in this EIS, but also other factors as provided in the NWPA.

As part of the Proposed Action, the EIS analyzes the potential impacts of transporting spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site from 77 sites across the United States. This analysis includes information on such matters as the impacts of truck and rail transportation nationally and in Nevada, as well as impacts in Nevada of alternative intermodal (rail-to-truck) transfer stations, associated routes for heavy-haul trucks, and alternative corridors for a branch rail line.

DOE believes that the EIS adequately analyzes the environmental impacts that could result from the Proposed Action. DOE also believes that the EIS provides the environmental impact information necessary to make broad transportation-related decisions, namely the choice of a national mode of transportation outside Nevada (mostly rail or mostly legal-weight truck), the choice among alternative transportation modes in Nevada (mostly rail, mostly legal-weight truck, or heavy-haul truck with use of an associated intermodal transfer station), and the choice among alternative rail corridors or heavy-haul truck routes with use of an intermodal transfer station in Nevada.

DOE has identified mostly rail as its preferred mode of transportation, both nationally and in the State of Nevada. At this time, however, the Department has not identified a preference among the five candidate rail corridors in Nevada.

If the Yucca Mountain site was approved, DOE would issue at some future date a Record of Decision to select a mode of transportation. Therefore, for example, if mostly rail was selected (both nationally and in Nevada), DOE would then identify a preference for one of the rail corridors in consultation with affected stakeholders, particularly in Nevada. In this example, DOE would announce a preferred corridor in the *Federal Register* and other media. No sooner than 30 days after the announcement of a preference, DOE would publish its selection of a rail corridor in a Record of Decision. A similar process would occur in the event DOE selected heavy-haul truck as its preferred mode in Nevada. Other transportation decisions, such as the selection of a specific rail alignment within a corridor, would require additional field surveys, State and local government and Native American tribal consultations, environmental and engineering analyses, and NEPA reviews.

3.2 (51)
Comment - 58 comments summarized
Commenters stated that the DOE failure to consider a range of alternatives violates the National Environmental Policy Act and presents the public and decisionmakers with no real comparative analyses of other possible alternatives. Commenters stated that just because the NWPA says that DOE "need not consider" other alternatives, this should not prohibit DOE from doing so. Other alternatives suggested for evaluation were disposal at other sites, onsite storage at current sites, transmutation, interim storage at existing sites and/or one or more centralized locations, volume reduction and consolidation at existing sites, other available technologies for storage, and alternatives to minimize impacts.

Commenters stated that the National Environmental Policy Act requires an analysis of all reasonable alternatives, and could include those that are beyond the jurisdiction of DOE or that might require new legislation. One commenter stated that the Draft EIS included an analysis of a larger inventory of nuclear waste than is currently allowed under law and asked that the Final EIS acknowledge that emplacement of the larger volume of waste would require a change in legislation and "is an abandonment of the original 1982 compromise of geographic equity envisioned as part of our Nation's nuclear waste policy." Commenters stated that the No-Action Alternative was unreasonable because, as DOE recognizes in the EIS, the scenarios evaluated for purposes of analysis would be unlikely.

One commenter stated that the Draft EIS effectively satisfies the requirements of the National Environmental Policy Act and the NWPA.

Response
The NWPA [Sections 114(f)(2) and (3)] provides that DOE need not consider in the EIS the need for a geologic repository or alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository (see Section 1.5 of the EIS). In addition, the EIS does not have to consider any site other than Yucca Mountain for development of a repository. For these reasons, this EIS does not analyze alternatives other than the Proposed Action and No-Action Alternative.

Prior to the passage of the Nuclear Waste Policy Act of 1982 (Public Law 97-429, 96 Stat. 2201), Congress based its decision to pursue geologic disposal, in part, on the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980). In that EIS, DOE examined the environmental impacts that could occur from the implementation of various technologies for the management of spent nuclear fuel. That EIS evaluated mined geologic disposal, very deep hole waste disposal, mined cavity disposal from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, and space disposal. In its Record of Decision (46 *FR* 26677, May 14, 1981), DOE announced its decision to pursue mined geologic disposal repositories.

The NWPA prohibits the Nuclear Regulatory Commission from authorizing the emplacement of more than 70,000 metric tons of heavy metal (MTHM) until a second repository is in operation. However, in response to comments received during the EIS scoping process (see Section 1.5.1.1 of the EIS), DOE evaluated the disposal of more than 70,000 MTHM as a reasonably foreseeable future action. The cumulative impacts discussion in

Chapter 8 acknowledges that the emplacement of more than 70,000 MTHM would require legislative action by Congress unless a second licensed repository was in operation.

DOE analyzed the No-Action Alternative to serve as a basis for comparing the magnitude of potential environmental impacts of the Proposed Action (see Chapter 7 of the EIS). Under the No-Action Alternative, and consistent with the NWPA, DOE would terminate activities at Yucca Mountain and undertake site reclamation to mitigate significant adverse environmental impacts. In addition, DOE would prepare a report to Congress containing DOE's recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority. Under any future course that would include continued storage at the generator sites, commercial utilities and DOE sites would have an obligation to continue managing these materials in a manner that protected public health and safety and the environment. However, the future course that Congress, DOE, and the commercial utilities would take if Yucca Mountain was not approved remains uncertain.

DOE recognizes that a number of possibilities could be pursued, including continued storage of spent nuclear fuel and high-level radioactive waste at existing sites and/or one or more centralized locations, study and selection of another location for a deep geologic repository, the development of new technologies, or reconsideration of alternatives to geologic disposal. One such possibility, the proposed Private Fuel Storage Facility for commercial spent nuclear fuel on the Reservation of the Skull Valley Band of Goshute Indians, is proceeding through the Nuclear Regulatory Commission's licensing process for the construction and operation of an independent spent fuel storage installation. The Nuclear Regulatory Commission has issued a Draft EIS and a Safety Evaluation Report concerning the Private Fuel Storage Facility, and has conducted other licensing-related actions such as evidentiary hearings. The Nuclear Regulatory Commission has yet to issue a Final EIS or a decision on whether to grant a license. The cumulative impacts of these and other reasonably foreseeable actions are included in Section 8.4 of the EIS.

In light of these uncertainties, DOE decided to illustrate the possibilities by focusing the No-Action analysis on the potential impacts of two scenarios – long-term storage of spent nuclear fuel and high-level radioactive waste at the current sites with effective institutional control for at least 10,000 years, and long-term storage with no effective institutional control after about 100 years. Although neither of these scenarios would be likely, DOE selected them for analysis because they provide a basis for comparison to the impacts of the Proposed Action and because they reflect a range of impacts that could occur.

DOE believes that the EIS adequately analyzes the potential environmental impacts that could result from either the Proposed Action or the No-Action Alternative. This belief is based on the level of information and analysis, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions where information is incomplete or unavailable, or where uncertainties exist.

3.2 (55)

Comment - 10 comments summarized

Commenters believe that DOE should identify its preferences for elements of the Proposed Action calling for the identification of a preferred alternative, a preferred scenario, and a preferred transportation mode. Commenters state that the EIS should provide an analysis of why a particular alternative or scenario is preferred, and should include a final plan.

Response

In the Draft EIS (see Section 2.6), DOE indicated its preferred alternative was to proceed with the Proposed Action to construct, operate and monitor, and eventually close a repository for the disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain. DOE has now identified mostly rail as its preferred mode of transportation, both nationally and in the State of Nevada. (See Section 2.6 of the Final EIS.)

At this time, DOE has not identified a preference for a specific rail corridor in Nevada. The Department would identify a preferred corridor only if the Yucca Mountain site was approved under the NWPA, and then only after consultation with affected stakeholders, particularly the State of Nevada. DOE would announce its preferred

corridor in a *Federal Register* notice, and would announce any decision to select a rail corridor in a Record of Decision it would issue no sooner than 30 days after the announcement of a preference.

DOE has not identified other preferences under the various scenarios presented in this Final EIS. Many of the issues relating to how a repository would be operated and how the spent nuclear fuel and high-level radioactive waste would be packaged would be resolved only in the context of developing the detailed design for a possible License Application.

3.2 (59)
Comment - 24 comments summarized
Commenters stated that the Draft EIS is not capable of supporting a decision by the Secretary of Energy to recommend the Yucca Mountain site to the President as a geologic repository. The document fails to analyze a sufficient range of alternatives; ignores comments raised during scoping; analyzes incomplete, imagined plans and scenarios; or has too many uncertainties. Therefore, DOE cannot use the document as the basis for choosing a specific design for submittal to the Nuclear Regulatory Commission for licensing. As DOE acknowledges in the Draft EIS, field surveys, state and local government consultations, environmental and engineering analyses, and additional National Environmental Policy Act reviews will be necessary. This demonstrates that the EIS is not complete. Decisions are being based on an inadequate geologic site and the use of nonexistent, untested transportation and storage casks on unknown routes. Neither members of the public nor Congress can make a decision when DOE does not know the repository design, how much waste is going to go into the repository, or how it is going to get there.

Similarly, the EIS cannot support DOE decisions on transportation modes and routes. In particular, commenters stated that the analysis of transportation impacts in Nevada fails to include a broad range of implementing alternatives and, thus, is insufficient for making modal, corridor, and route decisions. In addition, the floodplain analysis is insufficient for corridor and route selection. A new EIS is required before DOE can make these decisions.

Response
DOE believes that the EIS adequately analyzes the environmental impacts that could result from either the Proposed Action or the No-Action Alternative. This belief is based on the level of information and analysis, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions where information is incomplete or unavailable, or where uncertainties exist.

For the same reasons, DOE believes that the EIS provides the information necessary to make decisions on the basic approaches to transporting spent nuclear fuel and high-level radioactive waste (such as rail or truck shipments), as well as the choice among alternative rail corridors in Nevada. However, follow-on implementing decisions, such as the selection of a specific rail alignment in a corridor, or the specific location of an intermodal transfer station or the need to upgrade heavy-haul truck routes, would require additional field surveys; State, local, and Native American government consultations; environmental and engineering analyses; and National Environmental Policy Act reviews.

As discussed in Section 2.1.1 of the Draft EIS, the Proposed Action included the then-current design for the repository and for the construction, operation and monitoring, and closure of the repository. However, since the publication of the Draft EIS, DOE improved its understanding of the interactions of potential repository features with the natural environment, and the advantages of a number of design features (such as titanium drip shields) to enhance waste containment and isolation. DOE published a Supplement to the Draft EIS that focused on the most recent design enhancements (called the flexible design), including various operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste.

The NWPA requires DOE to use casks certified by the Nuclear Regulatory Commission when transporting spent nuclear fuel and high-level radioactive waste to a repository. The Commission certifies that a cask meets the requirements of 10 CFR Part 71, which prescribes cask testing. As part of its detailed technical review, the Commission decides what level of physical testing or analysis is appropriate and necessary for each cask design. If the applicant for a certificate fails to demonstrate compliance with the regulations, the Commission will not issue a

certificate. Therefore, if full-scale testing is necessary, it will occur before the Commission issues a certificate of compliance.

DOE developed implementing alternatives and analytical scenarios to ensure that it considered the range of reasonably foreseeable environmental impacts that could result from the Proposed Action. In developing the scope of the Proposed Action, DOE considered the comments and information received and modified the analytical approach to the EIS accordingly (see Section 1.5).

For the EIS, DOE used information from a broad range of studies to obtain or evaluate the information needed for the assessment of Yucca Mountain as a monitored geologic repository. In addition, the Department received input from a number of organizations including universities, other Federal agencies, the State of Nevada, counties, municipalities, other local governments, and Native American tribes. Section 2.5 of the EIS indicates that the results and conclusions of these studies and associated analyses often have associated uncertainties. Uncertainties could be the result of assumptions, the complexity and variability of the process, the use of incomplete information, or the unavailability of information. In such instances, the EIS describes the uncertainties associated with the results.

If information is incomplete or unavailable or if uncertainties exist, analysts commonly identify assumptions to enable their evaluations to proceed. In such instances, the assumptions (and analytical methods) in the EIS conservatively represent (that is, tend to overestimate) the reasonably foreseeable impacts that could occur from the Proposed Action or the No-Action Alternative.

For example, in Section G.1.1 of the EIS, the total nonradiological air quality impacts are the sum of the calculated maximum concentrations, regardless of wind direction. This conservatively maximizes air quality impacts. As another example, DOE based the estimated radiological impacts from the transportation of spent nuclear fuel and high-level radioactive waste on the maximum allowable radiation dose rate from the side of a transport vehicle. DOE applied this type of approach to conservative estimates of impacts to other resources, as discussed in the EIS.

As noted, DOE would undertake additional field surveys; State, local, and Native American government consultations; environmental and engineering analyses; and National Environmental Policy Act reviews for certain transportation-related implementing decisions, such as the selection of a specific rail alignment in a corridor.

3.2 (64)
Comment - 119 comments summarized
Many commenters said that the No-Action Alternative is not reasonable because neither scenario would ever be seriously considered, much less implemented. The resulting impacts from the two No-Action scenarios are, therefore, overstated and, by comparison, make development of a repository at Yucca Mountain seem safe and reasonable. Commenters stated that if an alternative is not reasonable then the comparison is not reasonable. Therefore, comparing the impacts of the No-Action Alternative to the impacts of the Proposed Action is meaningless and in violation of the requirements of the National Environmental Policy Act and its Council on Environmental Quality implementing regulations.

Some commenters said DOE should develop reasonable No-Action Alternatives such as centralized or regional interim storage, onsite above-ground monitored storage, and waste encapsulation. Others said the No-Action Alternative should assume that the waste would remain at the generator sites and that the utilities would continue to manage it. Using 10,000 years for the No-Action Alternative seemed arbitrary to some. They suggested instead that the No-Action timeframe should be the foreseeable future, and it should consider the development of new technologies, as well as onsite waste storage buildings that would last much longer than 100 years. Some commenters stated that DOE is obligated to rigorously explore and objectively evaluate all reasonable alternatives, even if these alternatives are outside the scope of what Congress has approved or funded. In this way the findings of the EIS can serve as the basis for modifying the Congressional mandate to dispose of nuclear waste in a mined geologic repository. Others said that DOE should have developed and evaluated the No-Action Alternative to a level of detail that is equivalent to the Proposed Action. Similarly, some commenters said the impacts of the No-Action Alternative should be examined on a site-specific basis, rather than using representative sites and mathematical models. Others said that the impact analyses for the No-Action Alternative did not go far enough in evaluating social, economic, and political impacts. The unbalanced treatment of the Proposed Action and the No-Action Alternative, in the view of some, cripples informed decisionmaking. Still others said that the NWPA

describes a process that would occur if the Yucca Mountain site was determined to be unsuitable. Therefore, DOE should have developed a "best guess" as to the type of nuclear waste program that would replace Yucca Mountain, and then evaluate it under the No-Action Alternative. This could be some form of at-reactor storage for 50 to 100 years combined with waste-reduction technologies, followed by a process to site and construct storage and disposal facilities.

Some commenters stated that leaving waste at current storage facilities is not reasonable because the facilities were never intended to become permanent storage sites, and if the No-Action Alternative was implemented it would result in unacceptable health effects. These commenters stated that if waste was left at current storage locations, this action would be contrary to the NWPA, which requires DOE to dispose of the waste in a repository.

Response

In the NWPA, Congress acknowledged that the Federal Government is responsible for the permanent disposal of spent nuclear fuel and high-level radioactive waste (see Section 1.3.2 of the EIS). To that end, Congress directed the Secretary of Energy to determine whether to recommend approval of the Yucca Mountain site to the President. In that connection, the NWPA does not direct DOE to examine any other methods of storage or disposal or continuing storage at existing sites because this is not the policy of the Federal Government. The NWPA does, however, direct DOE to prepare an EIS to accompany any Site Recommendation to the President. In that connection, the NWPA specifies that DOE need not consider in the EIS the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain (see Section 1.5 of the EIS). Although the NWPA does not require an evaluation of alternatives to a repository in this EIS, DOE evaluated a No-Action Alternative to provide a basis for comparison to the Proposed Action.

With regard to the reasonableness of the No-Action Alternative, DOE considered guidance in the Council on Environmental Quality's "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (46 *FR* 18026, March 23, 1981). This guidance defines the No-Action Alternative as "... no change from current management direction or level of management authority...." For this reason, DOE believes that continuing to store spent nuclear fuel and high-level radioactive waste at 77 commercial and DOE sites is an appropriate conceptual descriptor of the No-Action Alternative.

As stated in Section 2.2 and Chapter 7 of the EIS, if Yucca Mountain was not approved, DOE would terminate activities at the site and undertake site reclamation activities. In addition, DOE would prepare a report to Congress, with DOE's recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority. Under any future course that would include continued storage at the generator sites, commercial utilities and DOE would have to continue managing spent nuclear fuel and high-level radioactive waste in a manner that protected public health and safety and the environment. However, the future course that Congress, DOE, and the commercial utilities would take if Yucca Mountain was not approved is uncertain.

DOE recognizes that a number of possibilities could be pursued, including continued storage of spent nuclear fuel and high-level radioactive waste at existing sites and/or one or more centralized locations, study and selection of another location for a deep geologic repository, the development of new technologies, or reconsideration of alternatives to geologic disposal. One such possibility, the proposed Private Fuel Storage Facility for commercial spent nuclear fuel on the Reservation of the Skull Valley Band of Goshute Indians, is proceeding through the Nuclear Regulatory Commission's licensing process for the construction and operation of an independent spent fuel storage installation. The Nuclear Regulatory Commission has issued a Draft EIS and Safety Evaluation Report concerning the Private Fuel Storage Facility, and has conducted other licensing-related actions such as evidentiary hearing. The Nuclear Regulatory Commission has yet to issue a Final EIS or a decision on whether to grant a license. The cumulative transportation impacts of these and other reasonably foreseeable actions were included in Section 8.4 of the Final EIS.

However, in light of these uncertainties, DOE decided to illustrate the possibilities by focusing the analysis of the No-Action Alternative on the potential impacts of two scenarios—long-term storage of spent nuclear fuel and high-level radioactive waste at the current sites with effective institutional control for at least 10,000 years, and long-term storage with no effective institutional control after about 100 years. Although neither of these scenarios is likely, DOE selected them for analysis because they provide a basis for comparison to the impacts of the Proposed Action

and because they reflect a range of the impacts that could occur. For example, the impacts associated with the first 100 years of effective institutional control (Scenario 1 or 2 of the No-Action Alternative) enable direct comparison to the impacts of the Proposed Action during the first 100 years after the repository was closed.

DOE's assumption of a loss of institutional control after approximately 100 years is based on a review of generally applicable Environmental Protection Agency regulations for the disposal of spent nuclear fuel and high-level radioactive waste (40 CFR Part 191), Nuclear Regulatory Commission regulations for the disposal of low-level radioactive material (10 CFR Part 61), and the National Research Council report on standards for the proposed Yucca Mountain Repository (DIRS 100018-National Research Council 1995), which generally discount the consideration of institutional control for periods longer than 100 years in performance assessments for geologic repositories. As noted above, assuming no effective institutional control after 100 years provides a consistent analytical basis for comparing the No-Action Alternative to the Proposed Action.

Chapter 7 and Appendix K of the EIS contain additional information about the No-Action Alternative scenarios.

In determining the most appropriate approach to examining the human health impacts from the No-Action Alternative, DOE considered the mechanisms that would most affect the release rate of the radionuclide inventory at the 77 DOE and commercial sites. The release rate would depend primarily on the interactions between environmental conditions (rainfall, freeze-thaw cycles) and engineered barriers (see Section K.2.1.6 of the EIS). Rather than perform 77 separate analyses, DOE chose to simplify its approach by dividing the country into five regions, each region containing a single hypothetical site that would store all spent nuclear fuel and high-level radioactive waste existing in that region. However, to ensure that the regional analyses reflect actual conditions, DOE used the spent nuclear fuel and high-level radioactive waste inventories, engineered barriers and environmental conditions for each of the sites in each region. Weighting criteria also were developed such that the results of the analyses for the hypothetical sites were representative of the sum of the results of each actual site, if they had been analyzed independently.

In addition, because the purpose of the No-Action Alternative is to provide a basis for comparison with the Proposed Action, DOE has tried to be consistent with the analyses of the Proposed Action, as appropriate. Regarding long-term analyses, for example, Section K.1 notes that DOE did not want to influence the results to favor the Proposed Action, and thus used assumptions for the No-Action Alternative that minimized predicted impacts. Section K.4 of the EIS discusses examples of these assumptions and their effects on the outcome of the impact analyses. Based on the above, DOE believes that the environmental impacts of the No-Action Alternative discussed in Chapter 7 and Appendix K are not overstated.

3.2 (69)

Comment - 12 comments summarized

Commenters stated that DOE should examine a worst-case accident during transportation and at the repository. Some commenters suggested that a worst-case analysis was required given global warming and other future climate changes, and the use of arbitrary cultural and economic scenarios in the analysis of long-term performance of the proposed repository. Others said a worst-case scenario should include varying assumptions about the critical group population, and that impacts to resources such as land use, water use, population growth, and loss of property values cannot be dismissed. One commenter asked what the EIS considered to be the worst-case accident and how it assessed the impacts.

Response

Worst-case scenarios are by their very nature extremely unlikely to occur and, thus, their analysis would not prove helpful to decisionmakers. Thus, for example, not even the Council on Environmental Quality regulations require the analysis of worst-case accident scenarios. This requirement was withdrawn in 1986 (51 *FR* 15618, April 25, 1986).

The EIS analyzes a variety of accident scenarios that could occur during the operation of the repository, one of which is the maximum reasonably foreseeable accident, an earthquake event, as discussed in Section 4.1.8.1. Sections 6.2.4.2.1 and 6.2.4.2.2 discuss the maximum reasonably foreseeable accident scenarios related to transportation by truck and rail, respectively. These extremely unlikely events represent potential accident scenarios with the largest consequences that could reasonably be expected to occur.

DOE also considered the potential impacts of an aircraft crash into a shipping cask (Section J.3.3.1). No credible releases of radioactivity from the cask would be expected.

For the long term, the EIS examines impacts from an undisturbed repository and from various disruptive events such as a human intrusion, volcanic disturbance, or nuclear criticality. DOE prepared these analyses, which focused on environmental impacts that are predictable (impacts to humans and biota) in the long term, consistent with Environmental Protection Agency regulations (40 CFR Part 197). The Environmental Protection Agency regulations indicate, for instance, that DOE should not estimate future changes to society, the biosphere (other than climate), human biology, or changes in human knowledge or technology. Rather, these factors should remain constant over time and should be considered as they exist at the time of assessment. In contrast, however, these standards require DOE in its performance assessment to vary factors related to geology, hydrology, and climate based on cautious, but reasonable, assumptions of the changes that could affect the proposed repository over the next 10,000 years. Chapter 5 and Appendix I of the EIS discuss assumptions, analytical techniques, the bases for the analyses, and the results of these analyses.

3.2 (75)

Comment - 18 comments summarized

Commenters stated that the purpose of the National Environmental Policy Act is to protect, restore, and enhance the environment. These commenters believe that the proposal to construct and operate a nuclear waste repository at Yucca Mountain violates these policies. They also believe that the document gives a view of the National Environmental Policy Act that focuses on procedure and avoids the intent and spirit of the Act. In addition, there is no indication that DOE followed applicable guidance in conducting the environmental impact assessment process or in preparing the Draft EIS. New guidelines and techniques for improving the National Environmental Policy Act process, such as those suggested by Salk, Tolbert and Diskerman, Caldwell, and Clark and Canter, appear not to have been used. The Draft EIS seems to have been prepared without proving that DOE can permanently dispose of nuclear waste in a manner that protects public health and safety and the environment.

Response

The National Environmental Policy Act seeks to promote an understanding of the environmental consequences of Federal actions before agencies take action. The statute does not prohibit activities that could harm the environment; rather, it requires Federal agencies to disclose the extent of such environmental harm, and any environmental benefits, to the public and to agency decisionmakers. DOE believes that this EIS adequately describes the type and magnitude of potential environmental impacts that could occur if it constructed, operated and monitored, and eventually closed a repository at the Yucca Mountain site.

Preparers of the EIS considered guidance documents issued by the Council on Environmental Quality and the DOE Office of NEPA Policy and Compliance. For example, DOE's *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (DIRS 104601-DOE 1993) and the Council on Environmental Quality's *Considering Cumulative Effects Under the National Environmental Policy Act* (DIRS 103162-CEQ 1997) were considered in the preparation of the entire EIS and Chapter 8, respectively. In addition, preparers consulted guidance and methods documents germane to the resource of interest (see for example, DIRS 103242-EPA 1995). DOE is aware of and has reviewed many of the documents cited by the commenters, and has, in effect, used their suggested methods in the preparation of the EIS. For example, Salk, Tolbert, and Diskerman (DIRS 152242-1999) offers eight tools that address problem definition and problem assessment. As examples, Tool 1 offers insights into implementing early project planning, planning the work effort, and creating multidisciplinary teams; and Tool 4 provides tips to identify issues of concern to stakeholders such as early notification and effective solicitation of stakeholder concerns. DOE used such tools in the preparation of the EIS, and in the scoping and public comment processes.

The Secretary of Energy will determine whether to recommend to the President approval of the Yucca Mountain site for development of a repository. As discussed in Section 2.6, this recommendation would be made, in part, in consideration of potential environmental impacts identified in this EIS and of the factors and comments provided through public input on the Draft EIS and the Supplement to the Draft EIS. If the Secretary made such a recommendation, and in accordance with the NWPA, the President would determine whether to recommend the site to Congress. If the site was approved, the Nuclear Regulatory Commission would decide, on the basis of a License

Application prepared by DOE, whether and under what conditions the Department could dispose of nuclear waste in a manner that protects public health and safety and the environment.

3.2 (80)
Comment - 179 comments summarized
Commenters stated that the Draft EIS is inadequate, does not provide sufficient information, and is substantively and legally deficient. Some commenters stated that the document does not conform to the National Environmental Policy Act (NEPA), the NEPA implementing regulations promulgated by the Council on Environmental Quality, or DOE's NEPA implementing regulations. Some commenters noted that the Yucca Mountain Repository program is unprecedented in its scope, but that DOE treats it in the Draft EIS as just another Federal program. Other commenters stated that the Federal Government requires a level of detail from private industry for projects on Federal lands, but then exempts itself from that same level of detail in the EIS.

Commenters identified deficiencies and inadequacies in general, but without technical, analytical, or regulatory specificity. Rather, they concluded that the Draft EIS was insufficient and inadequate, and recommended that DOE withdraw the Draft EIS and issue for public comment a revised or supplemental draft that would meet the requirements of the NWPA, the National Environmental Policy Act, the Atomic Energy Act, and all other statutes pertaining to present and future health, safety, and quality of the environment.

On the other hand, some commenters stated that the Draft EIS was comprehensive and that DOE's analysis demonstrates that the Federal Government is adequately studying the science and examining the impacts that a geologic repository at Yucca Mountain would have on the environment. Further, some commenters thought that the scope of the document was appropriate, and stated that DOE has done a complete job of trying to evaluate potential risks to the public and workers in both the handling of the waste at the facility and the transportation aspects. One commenter stated that the Draft EIS has overstated potential impacts in several respects and that, without the use of conservative assumptions, the impacts would have been much smaller, if not zero.

Response
DOE believes that the EIS is consistent with NEPA and NWPA requirements. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions to address incomplete or unavailable information or uncertainties provide a meaningful assessment of environmental impacts consistent with the applicable requirements.

As discussed in Section 1.5.1 of the EIS, DOE initiated public scoping in 1995, eventually holding public meetings in 15 locations across the country. The purpose of this process was to determine the scope of the EIS and to identify significant issues this EIS would analyze in depth. The Draft EIS was the outcome of this process.

DOE agrees that the scope of the Yucca Mountain Project and, thus, the EIS is complex and has unique features. In recognition of this complexity, DOE has analyzed a variety of implementing alternatives and scenarios under a Proposed Action to construct, operate (including transportation) and monitor, and eventually close a repository at Yucca Mountain. These alternatives and scenarios reflect potential repository design and operating modes, waste packaging approaches, transportation modes, and corridors/routes for shipping spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site from 72 commercial and 5 DOE sites around the nation. DOE included a No-Action Alternative that analyzed two scenarios to provide a basis for comparison with the Proposed Action and reflect the range of impacts that could occur.

For both the Proposed Action and No-Action Alternative, the EIS evaluates the affected environments and estimates potential environmental impacts in regions of influence for the resource areas. DOE selected these regions and resource areas for analysis consistent with Council on Environmental Quality regulations (40 CFR 1502.15) that indicate that the data and analyses should be commensurate with the likely importance of the potential impact. Thus, the EIS addresses the various potential environmental impacts in proportion to their potential significance. Clearly insignificant or minor impacts are addressed in less detail.

In the EIS, DOE used the best available data and information from a broad range of studies to obtain or evaluate the information needed for the assessment of Yucca Mountain as a monitored geologic repository. These include, for

example, reports and studies sponsored by DOE, other Federal agencies, the State of Nevada, universities, the National Academy of Sciences, and affected units of local government (see Chapter 3 for more information).

Further, as discussed in Section 2.5 of the EIS, DOE identified the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches. In addition, the Department acknowledges that the results of analyses often have uncertainties and has described such uncertainties throughout the EIS.

To resolve some of the uncertainties and to provide information on the repository design that became available after publication of the Draft EIS, DOE published in May 2001 the Supplement to the Draft EIS and made it available for public review. While aspects of the design evolved from those in the Draft EIS, the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain remained unchanged. For this reason, the Supplement focused on the most recent design enhancements, including various operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste.

DOE considered each public comment it received in its development of this Final EIS. In response to comments, DOE has modified the EIS in a variety of ways, including clarifications or changes to the text, new or more recent information (such as 2000 Census data and population projections), and modified analyses (such as those for transportation impacts in which it modified the characteristics of the representative commercial spent nuclear fuel and accident source terms). DOE also modified the EIS to include new information obtained since it issued the Draft EIS. The Department obtained such information from site characterization activities and design evaluations, including, for example, updated radon emanation data and the most recent design features.

3.2 (84)

Comment - 47 comments summarized

Commenters stated that in developing the EIS, DOE largely ignored information, analyses, and issues presented by counties, communities, the State of Nevada, and other entities during the scoping period for the EIS. Some commenters stated that DOE should adopt the views, analyses, and mitigation measures identified by counties and other entities near the Yucca Mountain site, rather than simply referencing or otherwise presenting them in the EIS as opposing views. Several commenters submitted information and lists of plans, resolutions, and technical documents they believe DOE should incorporate or reference in the Final EIS. Commenters said the EIS is largely unresponsive to issues of most concern to the communities. Commenters point to information provided during the scoping process that addressed the lack of emergency response capabilities in the communities, pointed out the need for DOE to identify adverse impacts that could not be mitigated and those that could cause a loss of tourism, called for analysis of the effects of volcanism and transportation on individual communities, and identified local economic and demographic models. Commenters said that, without an evaluation of this information for each community, DOE decisions will be invalid.

Response

As discussed in Section 1.5.1 of the EIS, DOE received input during the scoping process from the public and a number of organizations. DOE considered the comments and information received during scoping, issued a summary of scoping comments (DIRS 104630-YMP 1997), and modified the analytical approach to the EIS accordingly. In addition, DOE identified comments and information it believes are unrelated to the scope or content of the Proposed Action (such as the constitutional basis for disposal in Nevada) or would have resulted in uncertain or speculative analyses that would not have been meaningful to any decisionmaker.

As discussed in Section 2.5 of the EIS, DOE received input from a number of organizations including universities, other Federal agencies, the State of Nevada, counties, municipalities, other local governments, and Native American tribes. This input included documents that present research or information that in some cases disagrees with the views DOE presented in the Draft EIS. DOE reviewed these documents and evaluated their findings for inclusion as part of the EIS analyses. If the information represented a substantive view, DOE made every effort to incorporate that view in the EIS and to identify its source. If the view was not incorporated in the analyses, DOE attempted to identify and address that opposing view. For example, in Section 3.1.4.2.2, DOE recognized the view by several investigators that the water table near Yucca Mountain has risen in the past to much higher than present-day levels, and in Section 3.1.5, DOE recognized the opposing view that there was no systematic interdisciplinary environmental program to characterize potential irreversible alterations prior to the initiation of site characterization.

DOE has modified the EIS by incorporating by reference and using new information as appropriate (for example, see Section 3.1.7.1, where more recent state- and local-based population information has been incorporated).

3.2 (90)
Comment - 34 comments summarized
Commenters stated that the Draft EIS evaluated preliminary or conceptual designs that did not represent the more recent design (that is, identified by DOE after publication of the Draft EIS) and might not have bounded the impacts as claimed, either because of the preliminary nature of the designs or because of design uncertainties. A detailed final design and complete details that describe the Proposed Action, including relevant transportation-related information, are needed. Commenters questioned the feasibility of, or the ability to implement, these designs, although some believe the designs are feasible. For these reasons, commenters argued that the Draft EIS was flawed or premature, and the ability of the public to comment on the designs and to judge their environmental impacts and the degree of waste isolation was compromised. These commenters also said that DOE has not limited itself to choosing a design among those analyzed, and that the final or preferred design that would be used in a possible License Application to the Nuclear Regulatory Commission is needed for decisionmaking. All aspects of this final design (for example, cask handling and retrieval, concrete drift lining) must be analyzed in the Final EIS or in a revised Draft EIS according to the commenters.

Conversely, other commenters believe that a final design is not necessary for decisionmaking and that DOE should identify the role of the EIS in future design evolution. Others suggested that a future EIS might be needed to assess the final design.

Response
DOE noted in the Draft EIS (in Section 2.1.1.5, for example) that the analyzed designs were preliminary and were likely to evolve in various ways. Since it issued the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the Science and Engineering Report flexible design. This design focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading) but the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain remain unchanged. DOE evaluated the flexible design in a Supplement to the Draft EIS, which was released for public review and comment in May 2001.

Aspects of the design presented in the Supplement to the EIS (as well as this Final EIS) are likely to continue to evolve, particularly in relation to the means of controlling heat generated by spent nuclear fuel and high-level radioactive waste. Under Section 114(a) of the NWPA, DOE must provide a description of the proposed repository, including preliminary design specifications, as part of any Site Recommendation. If the Yucca Mountain site was approved, a more refined flexible design would be determined only at the time of License Application to the Nuclear Regulatory Commission. That design probably would continue to change as a result of the License Application process. In this event, DOE would evaluate future repository design revisions in accordance with its regulations to determine whether it would conduct further National Environmental Policy Act reviews.

DOE based the design details discussed in the EIS (such as waste handling and treatment, underground ventilation, and waste confinement) on requirements and practices that have been in use for several decades in the mining and commercial utility industries and at DOE sites. Even the more unusual aspects of the design, such as titanium drip shields and Alloy-22 disposal containers, would take advantage of the fabrication experience of commercial vendors that design and build radioactive waste transport packages and other specialty equipment for commercial nuclear utilities. Based on this experience, DOE is confident that the designs under consideration would protect worker and public health and safety and the environment.

DOE analyzed various alternatives and scenarios (such as waste handling facilities, heat management scenarios, and transportation implementing alternatives and scenarios) that comprise elements of the Proposed Action. The purpose of these scenarios and implementing alternatives, which reflect potential design considerations, waste packaging approaches, and modes for transporting spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site, was to: (1) provide the full range of potential environmental impacts; (2) reflect potential decisions, such as the mode of transport, that the EIS would support; and (3) retain flexibility in the design of the repository to

maintain the ability to reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency.

To construct the analytical basis for evaluation of repository impacts in the Final EIS, DOE used widely accepted analytical tools, coupled with the best available information, and cautious but reasonable assumptions where uncertainties exist, to estimate potential environmental impacts. This included applying conservative assumptions to the set of reasonable operating scenarios identified in the *Yucca Mountain Science and Engineering Report* (DIRS 153849-DOE 2001) to ensure that the EIS did not underestimate potential environmental impacts and to accommodate the greatest range of potential future actions. DOE believes that the EIS adequately analyzes each design element investigated, the resulting short- and long-term environmental impacts, and mitigation measures. Further, the analyses incorporate conservative assumptions that tend to overestimate impacts, as identified in the EIS. For example, in Section G.1.1 the total nonradiological air quality impacts were the sum of the calculated maximum concentrations regardless of wind direction. This conservatively maximized air quality impacts. This type of approach to estimate impacts conservatively was applied to all other resources, as appropriate.

Because of the various implementing alternatives and scenarios analyzed as well as the conservative nature of the analyses, DOE believes that the analyses represent a realistic upper bound of environmental impacts that could occur from the implementation of the Proposed Action.

DOE has modified Chapter 9, which identifies actions that DOE would consider to reduce or mitigate adverse impacts to the environment, to reflect the designs analyzed in the Final EIS.

3.2 (336)
Comment - EIS000056 / 0002
In total, the United States has implemented a policy of permissible pollution upgradient of the communities of Amargosa Valley and Pahrump and absolute preservation of the groundwater quality and quantity in the areas downgradient of these communities. Nye County, in their water resource planning efforts is between the proverbial rock and a hard place. Yucca Mountain will perpetuate the policy of permissible pollution and will further reduce the quantity of water that is available to meet future water demands in the County.

Under 40 CFR 1508.18(b)(3) NEPA [the National Environmental Policy Act] mandates that the impacts of federal policies must be evaluated in an EIS. The Yucca Mountain EIS must be revised to address the impacts of these contrasting federal water resource policies.

Response
Based on the results of analyses in Chapter 5 of the EIS on the long-term performance of the proposed repository at Yucca Mountain, which considered the effects of existing fractures and future earthquakes, DOE believes that the repository would operate safely. The Department recognizes that some radionuclides and potentially toxic chemicals would, after long periods, enter the environment outside the repository. Nevertheless, modeling of the long-term performance of the repository indicates the combination of natural and manmade barriers would keep such releases within the regulatory limits established by 40 CFR Part 197.

DOE recognizes the importance of water to the inhabitation and development of land in Southern Nevada. The EIS points out that groundwater availability is a concern in many areas that the repository or associated transportation actions could affect. Section 3.1.4.2.1 notes that current water appropriations for the Amargosa Desert are higher than some estimates of perennial yield for that area (though actual withdrawals are much less). The EIS identifies hydrographic areas classified as "Designated Groundwater Basins" (see Section 3.2.2.1.3.2). The State of Nevada places this designation on hydrographic areas where permitted groundwater rights approach or exceed the estimated annual recharge, and the water resources are being depleted or require additional administration, including State declaration of preferred uses (municipal and industrial, domestic supply, agriculture, etc.). The table in Section 3.2.2.1.3.2 indicates that the Las Vegas Valley and Amargosa Desert are Designated Groundwater Basins, and that the Jackass Flats area, from which DOE would withdraw water for the proposed repository is not. However, Section 4.1.3.3 of the EIS recognizes that groundwater withdrawn at Jackass Flats would to some extent reduce the amount of and flow that would reach downgradient areas. In addition, it indicates that the Amargosa Desert would be the first areas to experience such an impact and that the amount of water required by the repository

would be very small in comparison to the amount already being withdrawn in that area. Chapter 8 of the EIS analyzes a reasonable range of possible cumulative impacts to water resources.

3.2 (436)
Comment - EIS000080 / 0007
Risks are based upon models instead of measurements. The data is only now being selected to go in and put into the models so that they can come up with a meaningful result, and when we go back, there was a peer review process that looked at the Department of Energy's models and came back with very scathing comments, in fact, talking about a deluge of models in a drought of data and pseudo-sophisticated models and that sort of thing.

So these models are being used to come up and say here's what the risk is. I don't put much faith in those models, and I think that uncertainty should be much more clearly stated in the EIS.

Response
Because much of the concern over risk from the proposed repository extends to the distant future, DOE must base portions of its risk analysis on modeling results. DOE acknowledges in the EIS that there is a substantial amount of uncertainty associated with estimates of long-term repository performance. DOE handled this uncertainty in two ways. First, where the uncertainty was considered very important to the outcome, DOE used conservative assumptions that tended to overstate the risks that would be obtained by a more realistic model. Second, DOE used ranges of data in a probabilistic sampling routine to produce ranges of results that reflected the effect of the range of inputs. This ensures that the long-term performance estimates are conservative.

Section 5.2.4 of the EIS discusses uncertainties associated with the analysis of long-term repository performance, including the uncertainty due to currently unavailable data and the uncertainty associated with models and model parameters.

Furthermore, Congress created the Nuclear Waste Technical Review Board as an independent organization to evaluate the technical and scientific validity of site characterization activities related to the packaging and transportation of spent nuclear fuel and high-level radioactive waste (NWPA Section 503).

3.2 (476)
Comment - EIS000069 / 0008
The Draft EIS does not identify in precision and with certainty many, many issues that are of concern to Nye County. The transportation corridors, the mitigation efforts. How can we expect to go forward? How can the nation expect this valley and these folks and these residents here in this valley, 1,500 people who have chosen to live here because they like to be here, how can this country expect them to bear this burden and to go forward in future generations and prosper and be happy in this valley with the vague, imprecise and inadequate information that's contained in this document?

Response
For each alternative, the EIS evaluates the affected environment and estimates potential environmental impacts in regions of influence for a variety of subjects. DOE selected these regions and subjects consistent with Council on Environmental Quality regulations (40 CFR 1502.15) that indicate that the data used and analyses undertaken should be commensurate with the likely importance of the potential impact. Thus, DOE has addressed the environmental impacts in proportion to their potential significance. The EIS discusses clearly insignificant or minor impacts with less detail. DOE believes that the methods and approaches used, along with bounding assumptions to address incomplete or unavailable information or uncertainties, represent conservatively the reasonably foreseeable impacts that could occur. For these reasons, DOE believes that the EIS adequately analyzes each element of the Proposed Action (such as waste handling facilities, heat management scenarios, transportation implementing alternatives and scenarios).

3.2 (544)
Comment - EIS000102 / 0005
Some of the models that were used to draw conclusions about risk or the safety considerations for the repository are ill founded.

Response
DOE developed its models and data input processes to reflect processes that could affect waste isolation and determine environmental impacts. These models and data have undergone independent reviews, and the results of the reviews have been used to effect improvements in the models and data input processes. For this reason, DOE believes that it has used its models and data to reflect appropriately the potential health and safety impacts from the Proposed Action and No-Action Alternative.

3.2 (592)
Comment - EIS000127 / 0009
This EIS needs to decide a design and follow it. Follow it through. You can't throw out all these possibilities and then pick a different one later.

Okay. Here's what I was looking for. In the actual Environmental Impact Statement, we have a different picture. This one shows three blocks and three sets of tunnels, not just the one that's shown in the draft. This is in the impact statement. This is the appendix to the impact statement.

This picture and some of the others show blocks labeled up to block 8, and this is what it might look like under the low thermal load design.

It's not even in the impact statement, let alone in the draft that people are supposed to read. That's illegal.

Response
DOE noted in the Draft EIS (see Section 2.1.1.5, for example) that the analyzed designs were preliminary, and that it was investigating various design options and features to improve repository performance and to reduce associated uncertainties. The Supplement to the Draft EIS, which DOE prepared to provide updated information to the public, focused on a more recent base design (called the flexible design) that included various heat management scenarios.

DOE believes that the EIS is consistent with National Environmental Policy Act requirements. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions if information was incomplete or unavailable or if there were uncertainties, provide a meaningful assessment of environmental impacts consistent with the regulations.

The design presented in the Supplement and the Final EIS will continue to evolve, particularly the means of controlling the heat generated by spent nuclear fuel and high-level radioactive waste. Under Section 114(a) of the NWPA, DOE must provide a description of the proposed repository, including preliminary design specifications, as part of any Site Recommendation [42 U.S.C. 10134(a)]. If the Yucca Mountain site was approved, a more refined design, which by regulation would have to be selected from among the design features and options considered in the EIS, would be determined only at the time DOE submitted a License Application to the Nuclear Regulatory Commission. The design probably would continue to evolve as a result of the License Application process.

With regard to the repository blocks, the commenter apparently is referring to figures that describe the underground layouts of the three thermal loads in Section 2.1.2.2 of the Draft EIS and the layout figures in Appendix I (Figures I-2 through I-7). These figures show layouts for the Proposed Action (Figures I-2, I-4, and I-6) and for Inventory Modules 1 and 2 (Figures I-3, I-5, and I-7). The layouts for the Proposed Action are the same as those described in Section 2.1.2.2. Section 8.2 analyzes the inventory modules. Based on provisions of the NWPA, which prohibits the Nuclear Regulatory Commission from authorizing the disposal of more than 70,000 metric tons of heavy metal, DOE could dispose of only the Proposed Action inventory as shown in Figures 2-14 through 2-16 (which are the same as Figures I-2, I-4, and I-6).

3.2 (629)
Comment - EIS000159 / 0002
The premise of this draft EIS is flawed. While the concept of building a nuclear waste dump that is destined to leak is preposterous; this draft EIS is premature since it does not analyze the actual design. The only two other options examined in this draft EIS are unrealistic and thus do not provide for reasonable comparisons.

Response
The Department acknowledges that it cannot build a containment system that can provide perfect containment forever. This EIS provides the DOE's best estimate of the impacts that could occur when the containment system inevitably degraded. The EIS confirms that the Proposed Action would be expected to result in release of radioactive contamination to the environment beginning sometime after 10,000 years after repository closure. However, the EIS also shows that these releases under the Proposed Action would not exceed environmental protection standards (40 CFR Part 197) within 10,000 years of repository closure, standards specifically enacted to ensure the safety of future generations.

DOE noted in the Draft EIS (see Section 2.1.1.5, for example) that the analyzed designs were preliminary, and that it was investigating various design options and features to effect a predicted improvement in repository performance and to reduce associated uncertainties. The Department published the Supplement to the Draft EIS in May 2001, which focused on a more recent design that includes various heat management scenarios. DOE believes that the EIS adequately analyzes each element (for example, waste handling facilities, heat management scenarios, transportation alternatives and scenarios) of the Proposed Action.

As discussed in Section 2.2 of the Final EIS, if the Yucca Mountain site was not approved, the future course that Congress, DOE, and the commercial nuclear power utilities would take is uncertain. A number of possibilities could be pursued, including centralized interim storage or the study of another location for a geologic repository. However, it is speculative whether the Nation would pursue such a course. In light of these uncertainties, DOE decided to illustrate one set of possibilities by focusing its analysis of the No-Action Alternative on the potential impacts of two scenarios. DOE recognizes that neither of these scenarios would be likely to occur in the event of a decision not to develop a repository at Yucca Mountain. However, the Department chose the two scenarios for analysis because they provide a baseline for comparison to the impacts from the Proposed Action and they reflect a range of impacts that could occur.

3.2 (630)
Comment - EIS000159 / 0003
The draft EIS downplays or ignores important and relevant scientific data. In its rush to win approval of the Yucca Mountain dump, DOE downplays or ignores important data about rainwater and groundwater flow and contaminant transport. For example, DOE claims that the data on Chlorine 36 are "incomplete" yet a study on this issue was published in September, 1997.

Response
As discussed in Section 2.5 of the EIS, DOE has received input from many organizations, universities, other Federal agencies, the State of Nevada, counties, municipalities and local governments, and Native American tribes and groups. Their input included research or information that in some cases disagrees with the views that DOE presented in the EIS. DOE reviewed these documents, evaluated their findings, and identified and addressed them in the EIS. If the information represented a credible view, the Department incorporated that view in the EIS analysis and identified its source.

The 1997 U.S. Geological Survey study referred to in this comment noted the occurrence of chlorine-36 in tunnels at the Yucca Mountain site at higher-than-natural concentrations, suggesting that the chlorine-36 source might have been from above-ground tests of nuclear weapons on the Nevada Test Site during the 1950s and 1960s. The chlorine-36 present in the unsaturated zone at Yucca Mountain arises mostly from ocean testing in the Pacific during the 1940s, 1950s, and 1960s, not from surface testing at the Nevada Test Site during the same time period. The chlorine signature occurs throughout the world, and is still widely found in low infiltration areas (deserts). Data gathered on the presence and distribution of these isotopes led to improved models of vadose zone hydrology for Yucca Mountain that recognize the possibility of more rapid movement of infiltrating water. These improved vadose zone hydrology models were used in the Draft EIS. The Final EIS includes results based on further improvements to these models.

3.2 (637)
Comment - EIS000141 / 0001
The final EIS must, therefore, address not only the more traditional effects of a large and complex project -- impacts to the environment, to public health and safety, to area populations, and to state and local economies -- but the final

EIS must also address those impacts of the program which derive from the highly controversial nature of the activity and the fact that the program involves the handling, movement, and storage of nuclear waste materials. This project will impact not only the host state and host community, but also thousands of communities and millions of citizens located along highways and rail lines that would be used to ship deadly nuclear materials from the facilities where they were generated to the Yucca Mountain repository.

Response
DOE acknowledges the Proposed Yucca Mountain Project is controversial among certain members of the public. The EIS evaluates the affected environments and estimates potential environmental impacts in regions of influence for a variety of subjects and addresses a number of issues such as perceived risk and stigma (see Appendix N of the EIS), uncertainties, the repository design, and associated transportation activities. DOE has selected the regions of influence and subjects for analysis consistent with Council on Environmental Quality regulations (40 CFR 1502.15), which require that data used and analyses undertaken should be commensurate with the likely importance of the potential impacts. Therefore, DOE has addressed environmental impacts in proportion to their potential significance. Insignificant or minor impacts are addressed in less detail. Sections 3.1 and 3.2 contain more information on the regions of influence for repository- and transportation-related subjects, respectively.

3.2 (906)
Comment - EIS000116 / 0005
We suggest to you that the models that you've used to calculate safety or, to put it another way, the models that you've had to calculate risk, radiologic exposure, transportation risks and risks to the groundwater in many instances have been based on insufficient data, and those models in some cases have been criticized by national peer review groups as being insufficient and based on inadequate data.

Response
DOE believes that the EIS is consistent with National Environmental Policy Act requirements. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions if information was incomplete or unavailable and if there were uncertainties, provide a meaningful assessment of environmental impacts consistent with the regulations.

The EIS, which DOE prepared using the best available data, analyzes a variety of implementing alternatives and scenarios. These alternatives and scenarios reflect potential repository design and operating modes, waste packaging approaches, and transportation options for shipping spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site.

For the Proposed Action, the EIS evaluates the affected environment and estimates potential environmental impacts in regions of influence for each of a variety of resource areas. DOE used information from a broad range of studies to obtain or evaluate the information needed for the assessment of Yucca Mountain as a monitored geologic repository. These include, for example, reports and studies sponsored by DOE, other Federal agencies, the State of Nevada, and affected units of local government. In addition, DOE identified the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches.

DOE acknowledges that the results of analyses often have associated uncertainties, and has described such uncertainties throughout the EIS.

3.2 (940)
Comment - EIS000260 / 0003
The EIS, which is now under review, should recognize the human, economic and environmental conditions in our area [Southeast Inyo County; Death Valley National Park area] and address the concerns raised before you today.

Response
The EIS describes potential environmental impacts to the regions of influence, including Inyo County, in Chapters 4 through 8 and Chapter 10 of the EIS.

3.2 (979)
Comment - EIS000230 / 0008
The DEIS is a seriously flawed document in regards to geology and hydrology and is already out of date given the recent seismic activity and the data gathered from it. All work should stop until it is known thoroughly that the Yucca site is safe or not. Currently it does not appear safe nor can it be made safe.

Response
The EIS devotes a substantial amount of description and analysis to geology and hydrology. Without specific reasons for the commenter's concern that the EIS does not address these issues adequately, DOE cannot offer a more specific response.

DOE recognizes that the results and conclusions of some of the analyses in the EIS have associated uncertainty. To provide better understanding, the EIS contains descriptions of uncertainties associated with its results and conclusions.

3.2 (983)
Comment - EIS000242 / 0004
Nye County maintains that this proposal for a repository at Yucca Mountain, should it go forward, must be done in a manner that is safe, with no added risk to the residents of Nye County.

Response
Section 1.3 of the EIS discusses the site approval process established by the NWPA, which requires the Secretary of Energy to gather data about the Yucca Mountain site and to determine whether to recommend the site for approval for a License Application to the Nuclear Regulatory Commission for repository development. The Secretary's specific duties are to physically characterize the site; hold public hearings in the vicinity of the site; prepare a description of the site, including waste forms and packaging and site safety; and determine whether to make a recommendation to the President on whether to approve the site for development as a repository. If the President considered the site qualified for application to the Nuclear Regulatory Commission for a construction authorization, he would submit a recommendation to Congress. The Governor or Legislature of Nevada can object to the site; however, this objection could be overridden if Congress passed a joint resolution of repository siting approval and the President signed it into law. Performance confirmation activities, which would consist of tests, experiments, and analyses to evaluate the adequacy of information in any License Application, would continue until the beginning of repository closure operations (see Section 2.1.2.4 of the EIS).

3.2 (995)
Comment - EIS000235 / 0001
The Lincoln County/City of Caliente repository oversight program has adopted the following goals: to understand and minimize risk; to understand and minimize impacts; and to understand and maximize benefits of DOE radioactive waste management activities in Nevada. I believe these goals should also be driving the federal government's radioactive waste management activities. I agree with these goals and am concerned that the DEIS does not provide adequate information to enable the County and City or DOE and the Nuclear Regulatory Commission to accomplish such goals. The Final EIS should provide adequate information to enable accomplishment of each of these three goals.

Response
The EIS contains considerable information on the short- and long-term impacts and risks of the repository on the State of Nevada, including Lincoln County. DOE believes that the information in the EIS can assist Lincoln County in meeting the goals stated in the comment.

3.2 (1031)
Comment - EIS001886 / 0002
The EIS is fundamentally deficient

Both of DOE's "no action" scenarios are straw men designed to orient the decision to "yes" for Yucca [Mountain]. 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 ... 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 [National Environmental Policy Act]. 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 [Institute for Energy and Environmental Research] 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 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.

*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.

Response

While Section 114(a) of the NWPA directs DOE to prepare an EIS to accompany any Site Recommendation to the President, it specifies that the EIS need not consider the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. Although the NWPA does not require the EIS to evaluate alternatives to the repository, DOE chose to evaluate a No-Action Alternative to provide a basis for comparison with the Proposed Action.

Under the No-Action Alternative, and consistent with the NWPA, DOE would terminate activities at Yucca Mountain and undertake site reclamation activities to mitigate any significant adverse environmental impacts. In

addition, DOE would prepare a report to Congress, with the Department's recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority. Under any future course that would include storage at the generator sites, commercial utilities and DOE would have to continue managing spent nuclear fuel and high-level radioactive waste in a manner that protected public health and safety and the environment. However, the future course that Congress, DOE, and the commercial utilities would take if Yucca Mountain was not approved is uncertain.

DOE recognizes that a number of possibilities could be pursued if Yucca Mountain is not recommended, including continued storage of spent nuclear fuel and high-level radioactive waste at existing sites and/or one or more centralized locations, study and selection of another location for a deep geologic repository, the development of new technologies, or reconsideration of alternatives for geologic disposal. The environmental considerations of these possibilities have been analyzed in other documents.

In light of these uncertainties, DOE decided to illustrate the possibilities by focusing the analysis of the No-Action Alternative on the potential impacts of two scenarios – long-term storage of spent nuclear fuel and high-level radioactive waste at the current sites with effective institutional control for at least 10,000 years, and long-term storage with no effective institutional control after about 100 years. Although the Department agrees that neither of these scenarios is likely, it selected them for analysis because they provide a basis for comparison to the impacts of the Proposed Action and because they reflect a range of impacts that could occur.

With regard to the reasonableness of the No-Action Alternative, DOE considered guidance in the Council on Environmental Quality's "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (46 *FR* 18206, March 23, 1981). This guidance defines the No-Action Alternative as "...no change from current management direction or level of management authority..." For this reason, DOE believes that continuing to store spent nuclear fuel and high-level radioactive waste at 77 commercial and DOE sites is an appropriate description of the No-Action Alternative.

Concerning human intrusions, the Nuclear Regulatory Commission and the Environmental Protection Agency have specified the way to analyze human intrusion in their regulations for Yucca Mountain. The regulations describe a stylized calculation that attempts to minimize speculation as to why humans would intrude into the repository. Human intrusion into the repository is an issue because the future behaviors of humans cannot be predicted. For the Final EIS, DOE used a conservative assumption that human intrusion could occur at about 100 years postclosure. This assumption would tend to overestimate the consequences because the waste materials would become less toxic with time. The EIS also contains results from an intrusion occurring at 30,000 years to simulate an intrusion at a time when the intruder might not detect the waste packages because of their weakened state. Section 5.9.1 of the Final EIS discusses the human intrusion scenario analyses and results.

3.2 (1121)
Comment - EIS000270 / 0002
The omissions and uncertainties that appear throughout this document, with respect to information essential to the evaluation of the environmental impacts of this proposed federal action, render it arbitrary and capricious in the judgments of the Department as to what can be ignored or dismissed, and therefore unacceptable.

Response
DOE used information from a broad range of studies to obtain or evaluate information needed for the assessment of Yucca Mountain as a monitored geologic repository. As discussed in Section 2.5 of the EIS, DOE identified the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches. In such instances, the EIS describes the basis for the analyses, including assumptions, the use of preliminary information, or conclusions from draft or incomplete studies.

The EIS acknowledges that the results of some analyses have associated uncertainties. Uncertainties could be the result of the complexity and variability of the process, the use of incomplete information, or the unavailability of information. The Department describes such uncertainties throughout the EIS.

3.2 (1134)
Comment - EIS000270 / 0019
Factors that give rise to public concerns about and opposition to approval of the Yucca Mountain site include:

Failure to include in cost-benefit analyses all costs to the affected populations and to the environment of potential failures of control.

Response
DOE assumes that this comment, when referring to "failure of control," means a loss of institutional control. Chapter 5 of the EIS addresses potential human-health impacts from radioactive and nonradioactive materials that the proposed repository at Yucca Mountain could release to the environment during the first 10,000 years after closure. As indicated in Section 2.4, DOE does not expect long-term impacts to the public and the environment after repository closure and decommissioning (50 to 300 years after waste emplacement) to be significant.

Sections 2.1.5 and 2.2.3 of the EIS discuss cost estimates for the Proposed Action and the No-Action Alternative, respectively. However, DOE has not performed a specific cost-benefit analysis because it is not necessary to support decisionmaking. The Department believes that the EIS provides sufficient information about potential impacts to the public health, safety, and the environment to support decisionmaking.

3.2 (1137)
Comment - EIS000270 / 0023
Factors that give rise to public concerns about and opposition to approval of the Yucca Mountain site include:

Ignoring or outright dismissing critical comments and recommendations of the State of Nevada, local government officials, and members of the public, as well as those of independent scientists, throughout the history of the program and the development of this DEIS.

Response
DOE identified opposing views from organizations or individuals, as described in Section 2.5.3 of the EIS. Sources of information that contained such views included reports from universities, other Federal agencies, the State of Nevada, counties, municipalities, other local governments, and Native American tribes. DOE reviewed the information to determine if it addressed issues analyzed in the EIS; differed from DOE positions; was based on scientific, regulatory, or other information supported by credible data or methods that related to the impacts analyzed in the EIS; and had significant basic differences from the data or methods used in the analyses or to the impacts described in the EIS. The EIS discusses opposing views that met these criteria.

3.2 (1148)
Comment - EIS000087 / 0005
I don't see the preliminary evaluations being conducted in a manner where it could be called it was done right or correct.

Response
In the EIS, DOE used information from a broad range of studies conducted over many years to obtain or evaluate the information needed for an assessment of Yucca Mountain as a monitored geologic repository. DOE also used information provided by the State of Nevada, units of local government, and other organizations. As discussed in Section 2.5 of the EIS, some of the studies are ongoing, some of the information is incomplete, and there are uncertainties. However, the EIS describes the basis for the analyses, including assumptions, the use of preliminary information, or conclusions from draft or incomplete studies. Without more specific reasons for the commenter's belief that the evaluations are incorrect, DOE cannot offer additional response to address the concern.

3.2 (1152)
Comment - EIS000261 / 0001
Federal agencies must integrate the NEPA [National Environmental Policy Act] process with other environmental laws and list in the DEIS all federal permits, licenses and other entitlements needed by the proposed action. To the fullest extent possible agencies are encouraged to integrate the NEPA processes with the review process established

by these other laws (40 CFR 1502.25(a)). These include Section 4(f) of the Transportation Act of 1966 (49 U.S.C. 303), the Comprehensive Environmental Response and Liability Act of 1980 (43 U.S.C. 9601), and the Resource Conservation and Recovery Act of 1976 (42 U.S.C. 692).

Context and significance of the proposed action including unique characteristics, degree of controversy, cumulative and related effects are not adequately addressed in the DEIS (40 CFR 1508.27).

Response
The introduction to Chapter 11 of the EIS lists the permits, licenses, and approvals that would be necessary for the repository. Moreover, Chapter 11 describes the Federal and state laws and regulations, Executive Orders, DOE Orders, and Nuclear Regulatory Commission regulations that are applicable to the repository.

Council on Environmental Quality regulations (40 CFR 1500 to 1508) require an agency to assess the environmental impacts of each alternative under consideration in terms of their context and intensity. Context means that the significance of an action is analyzed in terms of societal impacts as a whole, or in terms of the affected region or locality. Significance varies with the setting of the action (for example, site-specific or the Nation or region as a whole).

Consistent with these regulations, the EIS evaluated the affected environments and estimated potential environmental impacts in regions of influence for a variety of subjects. To identify the regions of influence, DOE considered whether potential impacts would be of a local, regional, or national character. Sections 3.1 and 3.2 contain more information on the regions of influence for repository- and transportation-related subjects, respectively.

The intensity of an impact refers to its severity. Judgments of severity must consider, in part, whether the action or impact would be beneficial or adverse; would affect public health or safety; would affect unique geographic characteristics; would be highly controversial or uncertain or involve unique or unknown risks; could establish a precedent for future actions with significant effects; could result in significant cumulative impacts; and would have the potential for adversely affecting cultural resources or endangered or threatened species and their habitats, and for violating relevant Federal, state, or local laws or requirements. In the EIS discussions of short- and long-term impacts (Chapters 4 through 8 and 10), DOE based its identification of the intensity of potential impacts on these factors.

3.2 (1240)
Comment - EIS000226 / 0003
Page 29 of the County/City EIS Scoping Report points out the need for the DEIS to consider distributional equity. Nowhere in the DEIS could we find any consideration of the inequitable distribution of risk and related impacts which will accrue to south-central Nevada.

Response
As discussed in Section 1.5.1 of the EIS, DOE received input from the public and a number of organizations during the scoping process. DOE considered that input, and modified the analytical approach to the EIS as appropriate. In addition, DOE identified comments and information, such as those on distributional equity, that it believes are unrelated to the scope or content of the EIS, or comments for which analyses would be uncertain and speculative. (Section 1.5.1 has been modified accordingly.)

3.2 (1242)
Comment - EIS000226 / 0005
If the DOE renders any decisions based upon the content within the DEIS, such decisions will be made without sufficient knowledge of the consequences of such actions upon the residents, visitors, institutions and environment of Lincoln County and the City of Caliente. The DOE's failure to consider issues of concern to Lincoln County and the City of Caliente will preclude effective minimization of risk, minimization of impacts and maximization of benefits. DOE is encouraged to prepare a Final EIS, which addresses concerns raised in scoping by Lincoln County and the City of Caliente and which presents viable proposals for mitigation and compensation of impacts.

Response
The EIS examines socioeconomic impacts to Lincoln County in Sections 4.1.6 (for the repository) and 6.3 (for waste transport in Nevada). With regard to mitigation of impacts, any decision to provide assistance under Section 116 of the NWPA would be based on an evaluation of a report submitted by an affected unit of local government or the State of Nevada that documented probable economic, social, public health and safety, and environmental impacts, as described in Chapter 9.

3.2 (1268)
Comment - EIS000144 / 0003
You don't have any fundamental understanding of the climate, hazards (both in terms of terribly fickle and unpredictable weather for seven months of each year, and equally unpredictable wildlife), and that you have willful pride and drive that enable you blindly to put the square peg of nuclear waste, both high and low level, into the round hole of Yucca Mountain, in spite of much evidence that it is a very poor storage site, due to potential volcanism and leakage into the groundwater from the fault zones, to say nothing of leakage due to the inability of mankind to make a container that is guaranteed to last 10,000-plus years.

Why haven't you addressed problems of climate, lack of training of personnel to handle such emergencies locally, lack of proper highways to carry such hazardous waste, lack of attention to what will happen to the local economy in terms of stigma after a nuclear spill? (I'll bet tourists don't flock to Chernobyl.) What will happen to the environment at the Great Basin National Park if there is a nearby plutonium leak? How many people in what radius from the accident will die because of air and water-borne contamination in the event of such a leak?

You don't address these, because it is easier to sell the project from a stance of wishful thinking and denial. I hope that's your reason. I'd hate to think that once again, officials of the atomic bureaucracies see people on the transport routes, passing through Nevada, and natives as being expendable--expendable for at least twenty-seven years, while you haul waste over America.

Response
DOE has conducted a broad range of studies to obtain or evaluate information for the assessment of Yucca Mountain as a monitored geologic repository. In addition, the Department used input from a number of organizations including universities, other Federal agencies, the State of Nevada, counties, municipalities, other local governments, and Native American tribes and groups, as appropriate.

Appendix I of the EIS discusses the climate changes DOE considered in the repository performance analysis. With respect to emergency planning, Sections M.6 and M.7 describe the implementation of Section 180(c) of the NWPA. Consistent with Section 180(c), DOE would provide technical assistance and funds to states for training public safety officials of units of local government and Native American tribes through whose jurisdictions spent nuclear fuel and high-level radioactive would travel. DOE would institute this training before beginning shipments to the proposed repository. Based on comments received on the Draft EIS, DOE reexamined the issue of perceived risk and stigma and concluded that while stigmatization can be envisioned in some scenarios, it is not inevitable or measurable (see Section 2.5.4 and Appendix N of the EIS). Any stigmatization that could occur would likely be an aftereffect of unpredictable events such as a serious accident. As a consequence, DOE did not attempt to quantify any potential impacts from risk perception or stigma in this EIS, and did not incorporate risk perceptions or stigma as factors in reaching the results and conclusions set forth in this Final EIS.

DOE also recognizes that some information remains unavailable and might be incomplete and that uncertainties exist (see Section 2.5 of the EIS). Where information is unavailable or uncertainties exist, analysts identified a range of conservative assumptions. In such instances, the assumptions (and analytical methods) conservatively represent (that is, tend to overestimate) the reasonably foreseeable impacts that could occur from the Proposed Action and the No-Action Alternative.

3.2 (1299)
Comment - EIS000236 / 0007
Lincoln County and the City of Caliente recognize however, that many compelling reasons exist to move waste to a central repository, not the least of which may be to achieve long-term health and safety benefits. The fact remains that if waste is brought to Nevada, risks will be minimized or eliminated at existing storage sites and concentrated in

south-central Nevada. Table 2-7 of the DEIS indicates that during the emplacement phase of the repository, risks will be highest along the transportation corridors used to move waste to Yucca Mountain. Lincoln County and the City of Caliente see this shifting of risks from current storage sites to Nevada as a question of equity, one that is not addressed at all within the DEIS. At a minimum, the Final EIS should provide an estimate of the cost and risk benefits which will accrue to the Nation by moving waste to Nevada.

Response
DOE believes that the EIS presents the requested information. The EIS compares the environmental consequences of the Proposed Action to construct, operate and monitor, and eventually close a repository to those of the No-Action Alternative, in which the materials would remain at the current storage sites. For example, Sections 2.1.5 and 2.2.3 provide cost estimates for the Proposed Action and the No-Action Alternative, respectively.

3.2 (1373)
Comment - EIS000432 / 0001
The biggest problem I have with the proposed draft is that with many of the situations involving any impact on the environment or people it uses words such as "unlikely." This seems to tell me that you are not really sure what will happen. If this is the case then I think you must wait and do more studies and tests. Granted, nothing is going to be a hundred percent positive for results but there is too much "maybe" or "small amounts" and "unlikely."

It doesn't seem to me like there is enough information on the different issues to begin. The possibilities talked about in the draft seemed toned down or even sugar coated. I think the potential for disaster is much greater then estimated in the draft. Radioactive waste and spent nuclear fuel can cause significant irreversible damage to the environment. I think there should be more time spent on something that has to last for thousands of years.

Response
DOE recognizes that the results and conclusions of some of the analyses have associated uncertainties, and describes these throughout the EIS.

3.2 (1390)
Comment - EIS000417 / 0002
In addition, many nuclear weapons were tested in this vicinity (both underground and atmospheric). Would this have a negative impact on the stability of geologic structures in which the YMP [Yucca Mountain Project] would be constructed.

Have these issues been adequately addressed in the draft EIS.

Response
The only impact that past or potential future weapons testing on the Nevada Test Site could pose to the repository would be ground motion associated with energy released from the detonation of a weapon (DIRS 103273-Walck 1996). The ground motion would be similar to the motion caused by an earthquake. Direct effects on the rock at Yucca Mountain in the form of fractures have not occurred from past weapons testing. The repository would be designed to withstand earthquakes that could generate ground motions of far greater magnitude than ground motions produced by weapons testing.

3.2 (1393)
Comment - EIS000418 / 0003
Another question raised in the effect of nearby nuclear weapons testing (as late as the previous decade) on the stability of geologic structures in this region. I did not notice any reference to this issue in the DEIS, and was wondering if it had been considered at all.

Response
The only impact that past or potential future weapons testing on the Nevada Test Site could pose to the repository would be ground motion associated with energy released from the detonation of a weapon (DIRS 103273-Walck 1996). The ground motion would be similar to the motion caused by an earthquake. Direct effects on the rock at Yucca Mountain in the form of fractures have not occurred from past weapons testing. The repository would be

designed to withstand earthquakes that could generate ground motions of far greater magnitude than ground motions produced by weapons testing.

3.2 (1394)
Comment - EIS000294 / 0001
The scope of this EIS is obviously not accurate, compared to the impacts that this project apparently will have. I've heard my colleagues who generate nuclear waste clearly state that if the repository program does not go forward, their reactors will close. And if that is the case, then the continued operation of nuclear reactors has to be included in this environmental impact statement, and all the attendant risks and health impacts that go along with nuclear power generation. So clearly, if reactor closure is tied to Yucca Mountain, we have to put that squarely on the table and include that in this analysis.

Response
The continued viability of nuclear power, as identified in this comment, is beyond the scope of this EIS. The approval and development of the Yucca Mountain site as a repository would affect commercial nuclear powerplants only to the extent that spent nuclear fuel would be packaged and removed from storage for transport to the repository. The continued generation of electricity by these powerplants would be determined by other factors, including their ability to maintain a Nuclear Regulatory Commission license to operate, rate structures as set by state public service commissions, ability to maintain sufficient profitability, supply and demand, and others. The Commission has addressed the impacts of the operation of commercial nuclear powerplants in its environmental reviews of the applications submitted by the utilities to construct and operate the plants.

3.2 (1516)
Comment - EIS000442 / 0002
DOE [assumption] that the NWPA provides a road map for the EIS has resulted in essentially a myopic viewpoint of the locally prevalent and important issues associated with implementing the NWPA.

Nye County believes that the Draft [Environmental] Impact Statement should adequately assess most of the NWPA, not just the repository specific action, construction, operation, transportation, closure. The EIS must also evaluate the NWPA implementation activities as might be associated with the mitigation, quality and compensation.

By failing to address these aspects of the NWPA implementation, the EIS does not accurately portray the president, secretary and the public in the range of potential impacts of nature and the human environment. Some of the specific inadequacy of the Draft EIS includes alternatives evaluated. The DOE's selection of the alternatives fails to meet the intent of the NEPA, even as qualified by the NWPA.

Response
The NWPA does not require DOE to evaluate alternatives to the repository. However, DOE chose to evaluate a No-Action Alternative to provide a basis for comparison with the Proposed Action. DOE believes that the inclusion of a No-Action Alternative in the EIS provides a better understanding of the expected impacts from the repository. With regard to mitigation, and technical and financial assistance, DOE would evaluate requests for assistance pursuant to Section 116 and 180 of the NWPA.

3.2 (1639)
Comment - EIS000520 / 0004
I am firmly convinced that this is a recipe for disaster for the following reason:

There is absolutely no guarantee that the proposed area will still be geologically stable over 10,000 years. I refuse to believe any so-called science that makes that claim. Therefore, the government is playing roulette with people's futures, whether in the immediate (through transport accidents -- or terrorism), the "near" future (100 years when the casks degrade) or long-term (over 10,000 years of geologic uncertainty). It is not right that we put this problem on the shoulders of our descendants.

Response
DOE recognizes that the results of the EIS analyses often have some associated uncertainty. For example, differing views on the likelihood of volcanism near Yucca Mountain result from uncertainty in the volcanic hazard

assessment. To address these uncertainties, DOE has performed analyses, conducted extensive volcanic hazard assessments, considered alternative interpretations of the geologic data, and consulted with recognized experts. In 1995 and 1996, DOE convened a panel of recognized experts from other Federal agencies (for example, the U.S. Geological Survey and national laboratories) and universities (for example, the University of Nevada and Stanford University) to assess uncertainties associated with the data and models used to evaluate the potential for disruption of the proposed repository by volcanic activity. To enable understanding of the status of the findings, the EIS describes such uncertainties. For example, Chapter 5 describes the analysis of repository long-term performance. Section 5.2.4 describes the uncertainties associated with predicting impacts over thousands of years, including such things as societal and climatic changes, and uncertainties because of currently unavailable data and the models and model parameters used to predict long-term performance.

3.2 (1742)
Comment - EIS000469 / 0004
Many critics have cited your lack of data and yet, as I understand the CEQ [Council on Environmental Quality] guidelines, they suggest a good environmental impact statement ought to be about as a benchmark, 150 pages. You have provided 1500 almost. So it is hard to imagine that there is much missing.

A strategy does seem to be emerging from opponents within Nevada, such as Senator Bryan, who spoke earlier today and issued a press release you should all know, so it will be in the morning headlines in the Las Vegas papers, about a lack of specificity in transportation, and I think some of this is inclined to instill fear among the 44 other states about the unknowns or, as Mr. Halstead [said], the things DOE won't tell you.

Well, I think you have provided an adequate analysis in terms of the generic information from which each of those departments of transportation -- in my state, the Commonwealth of Virginia, I'm sure the DOT people are looking at that document, and they could very easily take the worst-case approach and assume all 70,000 tons are traveling through our infrastructure and analyze it accordingly.

Response
Thank you for your comment.

3.2 (1810)
Comment - EIS000332 / 0009
Additionally, the DEIS fails to consider alternatives that are currently being pursued (e.g., interim storage and Goshute Reservation in Utah), but evaluates alternatives that are illegal and do not meet DOE's mandate to accept wastes. For example, DOE includes as part of the action proposal, analysis of the full DOE-responsible radiologic inventory through 2046 as part of the cumulative impact evaluation. The EIS must acknowledge that this scenario, which has not been proposed, would require additional legislation, at a minimum, and is an abandonment of the original 1982 compromise of the geographic equity envisioned as part of our Nation's nuclear waste policy.

Response
The NWPA states that this EIS does not have to consider (1) the need for a geologic repository, (2) the time at which a repository could become available, and (3) alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository (see Section 1.5 of the EIS). DOE does not propose to develop an interim storage site and, thus, did not evaluate interim storage in the EIS. (As noted in Chapter 7, the EIS analyzed continuing storage at existing sites and/or one or more centralized locations in other contexts.)

Since the publication of the Draft EIS, the Nuclear Regulatory Commission has published the *Draft Environmental Impact Statement for the Construction and Operation of an Independent Spent Nuclear Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah* (DIRS 152001-NRC 2000). That EIS evaluates the potential construction of an interim storage facility that the Commission would license for storage of commercial spent nuclear fuel. DOE recognizes that interim storage at the Goshute Reservation facility is a reasonably foreseeable future action and has included this action as part of the cumulative impacts analysis in Chapter 8.

Chapter 8 of the EIS acknowledges that the disposal of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste would require legislative action by Congress unless a second repository was in operation.

3.2 (1844)
Comment - EIS000365 / 0005
I would ask you to broaden the diversity of the people working on the EIS within the Department of Energy. I think that your shortsightedness results partly from a lack of understanding of the lifeways of people that you're proposing to affect. And thank you very much for the opportunity to comment.

Response
DOE recognizes the importance of cultural diversity in the preparation and review of documents such as EISs. In relation to this EIS, the Department understands that an appreciation of environmental conditions, lifestyles, and other factors in areas near the proposed repository and transportation regions is important to the derivation of estimates of potential environmental impacts from the Proposed Action and No-Action Alternative. The Department used information and analyses (such as population and demographics) prepared by "local sources" such as the State of Nevada, counties, and Native Americans. (DOE also has relied on local input in soliciting public comments during the scoping process and during hearings on the Draft EIS and the Supplement to the Draft EIS. For this reason, DOE believes that the EIS reflects information and attributes important to the potentially affected populations.

3.2 (1924)
Comment - EIS000477 / 0004
Although I am only mentioning a few issues concerning the use of the Yucca Mountain site, it is my intent that there needs to be a more thoughtful process before any actual shipments or storage of radioactive materials is made. A more extensive study of the geological, ecological, human genetic, and mechanical effects and consequences of this facility (especially since it will be around 10-to-the-35th [power] years) need to be addressed and explained to the local population. In a democratic republic the ultimate decision rests with the majority, but who wants it in their backyard? Those individuals affected need to be heard.

Response
Section 1.3 of the EIS discusses the site approval process established by the NWPA, which requires the Secretary of Energy to gather data about the Yucca Mountain site and to determine whether to recommend the site for approval for a License Application to the Nuclear Regulatory Commission for repository development. The Secretary's specific duties are to physically characterize the site; hold public hearings in the vicinity of the site; prepare a description of the site, including waste forms and packaging and site safety; and make a recommendation to the President on whether to approve the site for development as a repository. If the President considered the site qualified for application to the Nuclear Regulatory Commission for a construction authorization, he would submit a recommendation to Congress. The Governor or Legislature of Nevada can object to the site; however, this objection could be overridden if Congress passed a joint resolution of repository siting approval and the President signed it into law. Performance confirmation activities, which would consist of tests, experiments, and analyses to evaluate the adequacy of information in any License Application, would continue until the beginning of repository closure operations (see Section 2.1.2.3 of the EIS).

3.2 (1985)
Comment - EIS000515 / 0002
The EIS seems to pay little attention to the prevention of human error.

Response
DOE recognizes that it is difficult to eliminate the potential for human error on any project. The Department developed the designs evaluated in the EIS to reduce that potential. Sections 4.1.8.1 and 4.1.8.2 of the EIS evaluate credible radiological and nonradiological accidents, respectively, that could occur at a repository. Section 6.2.4 describes transportation accidents. If there was a decision to construct and operate a repository at Yucca Mountain, employees would be required to conduct their work in accordance with applicable Nuclear Regulatory Commission and DOE safety requirements.

3.2 (2081)
Comment - EIS000883 / 0006
Incomplete health impact assessment.

Response
DOE believes that the analysis of health impacts associated with the construction and operation of a repository at Yucca Mountain as presented in the EIS is sufficient.

3.2 (2224)
Comment - EIS000622 / 0006
I think we need to really look at the National Environmental Policy Act which specifies clearly that it's to be used to look at whether something will protect or enhance the environment and not to justify a decision that's already in process or being made. There has been no other site looked at or no other method to isolate the waste that we're talking about. And it seems to be a political decision. I think this is illegal, and I think it needs to be addressed a lot more clearly.

Response
The purpose of the National Environmental Policy Act (NEPA) is to promote an understanding of the environmental consequences of Federal actions prior to their implementation. The Act provides Federal agency decisionmakers with a process to consider potential environmental consequences (beneficial and adverse) of proposed actions. In general, the regulations of the Council on Environmental Quality implementing the procedural provisions of NEPA require that an agency examine the reasonable alternatives to the Proposed Action. However, in 1987, Congress amended the Nuclear Waste Policy Act of 1982 and specified that it is not necessary for this EIS to consider the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. Section 1.5 of the EIS describes the environmental impact analysis process and its application to the proposed repository at Yucca Mountain.

3.2 (2236)
Comment - EIS000566 / 0003
The draft document is bogus and shameful, particularly because it doesn't study anything that's actually going to happen or that might happen. They do not talk about what the design of the repository will be, and they do not talk about what the transportation routes will be. Those are two very important parts of this project, wouldn't you say? And yet, they won't specifically speak in the EIS to those two parts of it.

Response
The Supplement to the Draft EIS, which DOE distributed to the public for comment, provides updated information to the public, with further information provided in Chapter 2 of the Final EIS. Chapter 6 and Appendix J discuss the design of the transportation system at Yucca Mountain, in Nevada, and across the country in terms of alternative transportation modes (rail, heavy-haul truck, legal-weight truck). DOE believes that the level of information in the EIS on the design of the repository and the design of the transportation system is sufficient to estimate environmental impacts.

3.2 (2284)
Comment - EIS000586 / 0002
So what problems may arise for Nevada and Clark County residents because of a deficient and incomplete EIS? Picture such an EIS supporting the decisions that need to be made by federal officials. This is the federally mandated document in which these officials expect to see a complete picture, one that addresses all the impacts of concern to us, like the conflict of designation of transport routes with local government plans and development plans.

For example, the City of Las Vegas is designing and planning a very large town center which would be cut in half by one of the proposed routes.

The City of North Las Vegas is negotiating to obtain 7500 acres of land for urban development near the proposed beltway that has also been mentioned as a potential route.

Response
DOE believes that the EIS adequately analyzes the issues associated with the construction, operation and monitoring, and closure of a repository at Yucca Mountain, including the potential for a heavy-haul truck route through parts of the Las Vegas Valley. In Chapter 8 of the EIS, the Department considered potential cumulative impacts which were based, in part, on reviews of available plans and studies for projects within the region. The Department, however, cannot estimate the potential impacts of activities that are speculative or in the idea stage because to do so could misrepresent the cumulative impacts of the Proposed Action.

3.2 (2337)
Comment - EIS000638 / 0004
The other thing that really concerns me, especially after hearing the presentations, is how many times I heard the word assume. Is that so many parts of the details of this project, the devil is in the details. We assume this, we assume that, we don't know yet. It's a concept. We assume. I think we all know the joke about assuming. And I think it's very true in this case.

Response
The EIS acknowledges in Section 2.5 that the results and conclusions of analyses often have associated uncertainties. Uncertainties could be the result of the complexity and variability of the process, the use of incomplete information, or the unavailability of information. DOE describes such uncertainties throughout the EIS.

If information is incomplete or unavailable or if there are uncertainties, assumptions often enable analyses to proceed. In such instances the assumptions and analytical methods conservatively represent (that is, they tend to overestimate) the reasonably foreseeable impacts that could occur from implementing the Proposed Action.

3.2 (2379)
Comment - EIS001833 / 0001
An environmental impact statement is an inadequate document to fully assess the impacts of a project of this magnitude. Therefore, I request that a full environmental impact report [EIR] be done and submitted for review. This request is fully justified by existing law under NEPA [the National Environmental Policy Act] and the California law known as CEQA [the California Environmental Quality Act]. The new document should address the cumulative impacts of transporting high and low-level nuclear waste at the same time by railroad and truck, if indeed it needs to be transported at all. In addition, the document should address the pros/cons of leaving the waste on site (high level) versus transporting all over the country. Why is one site for all waste better than keeping it onsite or taking it just short distances to be stored?

It seems to me the risks from accidents in transports would be substantially reduced by shorter distances. If this is not true, then it should be proven in an EIR.

Additionally, the [EIR] should identify ALL locations that waste will be coming from, power plants, foreign as well as domestic, hospitals, research laboratories, universities, military sites, both foreign and domestic, and any other sites not identified but that the DOE would consider qualified for disposal in this project.

Response
DOE believes that this EIS is consistent with Council on Environmental Quality and DOE regulations on the implementation of the National Environmental Policy Act, and adequately analyzes the environmental impacts of the Proposed Action and the No-Action Alternative. The California Environmental Quality Act applies to actions that the State of California must approve.

DOE would not transport high- and low-level waste in the same shipments.

Chapter 8 of the EIS describes cumulative impacts from the transportation of radioactive materials. Chapter 6 and Appendix J describe transportation accident analyses. Chapter 1 and Appendix A identify the sources of spent nuclear fuel, high-level radioactive waste, Greater-Than-Class-C waste, and Special-Performance-Assessment-Required waste.

3.2 (2394)
Comment - EIS000763 / 0002
The Draft EIS provides a reasonable assessment of the risks associated with the implementation of disposal at the Yucca Mountain Site. It recognizes that there are risks and impacts and quantifies them. I believe, in many cases, due to the efforts to be conservative or error on the high side, it significantly over estimates the risks.

I suggest several items for the redraft of the EIS:

The major radiation risk to the off-site population, in the next thousands of years, is from the release of natural radon-222 from the repository formation.

The dose estimates should focus on realistic scenarios for both operations and accidents. The focus should be on best-estimate doses, with reduced emphasis on upper range doses and extremely low probability accidents.

Response
Section 4.1.2 of the EIS states that radiological air quality impacts could occur from releases of radionuclides, primarily naturally occurring radon-222 and its radioactive decay products, from the rock into the subsurface facility and then into the ventilation air during all phases of the proposed repository project. Section 4.1.7 describes radiological impacts to the public from these releases. These releases of radon would last only while the repository was open, which could last more than 300 years under the flexible design operating modes. When the repository was closed, radon releases would cease. Estimates of routine releases used the best current estimates of future repository characteristics and operating parameters. The EIS analyzed a spectrum of accidents, from high-probability/low-consequence accidents to low-probability/higher consequence accidents.

3.2 (2451)
Comment - EIS000717 / 0002
The Draft Environmental Impact Statement does not describe the proposed project in a way that allows for a reasonable analysis of its impacts. The document contains a number of design alternatives and options from which DOE will presumably choose. All of the design alternatives admittedly and inevitably result in releases of radionuclides from the repository into Nevada's groundwater. The end result will be contamination of both drinking water and water used for agriculture. The Draft EIS simply does not inform the public what the future risks of the repository are to people and the environment.

Response
DOE acknowledges that the Draft EIS is complex, involving various implementing alternatives and scenarios. In recognition of this complexity, DOE analyzed a variety of alternatives and scenarios that would implement a Proposed Action to construct, operate (including transportation) and monitor, and eventually close a repository at Yucca Mountain. These alternatives and scenarios reflect potential repository design and operating modes (for example, thermal load scenarios, approaches to heat management) and waste packaging approaches (for example, canisters, disposal containers). Since the publication of the Draft EIS key aspects of the design (such as disposal container components and use of drip shields) have changed in ways that would be important to repository performance and reduction in uncertainties. To provide the updated information to the public, DOE published a Supplement to the Draft EIS that focused on the most recent design enhancements (called the flexible design), including several heat-management scenarios. DOE believes that the EIS adequately analyzes each element of the Proposed Action (such as waste handling facilities, heat management scenarios and transportation implementing alternatives and scenarios).

DOE has organized the EIS to present information, methods of analysis, and results of analyses in a clear and concise manner. For example, Chapter 5 discusses the consequences of long-term repository performance to humans and the environment, and Appendix I provides supporting information. Together, Chapter 5 and Appendix I discuss the locations of the reasonably maximally exposed individual and the population of concern for which impacts were estimated, and the waterborne and airborne radiological consequences for the various thermal load scenarios (among other aspects). The results of these analyses indicate that releases would be below applicable standards.

3.2 (2504)
Comment - EIS000764 / 0001
I believe that the DOE DEIS provides a comprehensive evaluation of the environmental impacts associated with the construction and operation of the proposed Yucca Mountain repository. Specifically, it is clear that the proposed facility can be constructed and operated to adequately provide for the protection of the public health and safety. Additionally, it serves to underscore the need for such a facility and that there are clear and convincing benefits to the construction of a central repository as opposed to the distributed long-term storage of commercial spent nuclear fuel among sites.

Response
Thank you for your comment.

3.2 (2505)
Comment - EIS000694 / 0004
You know the NRC [Nuclear Regulatory Commission], EPA [Environmental Protection Agency], and DOE, they're all federal agencies, so they got to prove their credibility. There's been an awful lot of study going on on Yucca Mountain.

A lot smarter people than I am have read it, reviewed it and agreed with it. The National Sciences Academy of professors. They say this is the route to go.

You know, this is the first repository DOE has done. This is the first repository NRC has licensed. This is the first standards EPA has had to set for a repository.

We got to give them folks some credit. They've done a lot of work trying to put this thing together and make it acceptable.

Response
Thank you for your comment.

3.2 (2538)
Comment - EIS001060 / 0008
We want a moratorium on any further plans or hearings until the entire State of Nevada has been archeologically and environmentally [studied] to prove Nevada is a suitable nuclear dumpsite and waste land!

Response
Congress, through enactment of the NWPA, assigned DOE the responsibility for evaluating the suitability of the Yucca Mountain site as a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste.

3.2 (2959)
Comment - EIS000727 / 0007
The DEIS finds that all the calculated risks are statistically insignificant, and thus do not require mitigation or compensation. This raises questions about the scientific validity of the YM [Yucca Mountain] Project. How can there be no major impacts to people or to the environment when a project of this scope and magnitude has never been attempted before?

Response
Section 2.4.1 of the EIS states that, although generally small, environmental impacts would occur under the Proposed Action. DOE would reduce or eliminate many such impacts with mitigation measures or implementation of standard Best Management Practices. The Department recognizes that it cannot ignore potential risks and that mitigation actions are a possibility.

DOE agrees that there is often a difference between calculated and perceived risk. However, the Department has focused its analyses on impacts that it can estimate. It is now up to the decisionmakers and regulators who represent the public to make informed decisions about the future of the project. The EIS presents probabilistic results showing the statistical risks for all of the impacts analyzed (see Table 5-4). In addition, the EIS includes an extensive

discussion of uncertainties in the results (see Section 5.2.4). In general, the estimated impacts would be small, especially when measured against environmental and health standards. This does not mean that DOE takes the impacts lightly. A repository at Yucca Mountain would be a major, first-of-its-kind project and DOE recognizes the need for comprehensive analyses.

3.2 (3000)
Comment - EIS001067 / 0001
The last statement under Section S.8 is unacceptable. The DOE MUST be committed to research and development of additional measures to improve the long-term performance of the repository. Anything less is unacceptable. At least TRY to find better ways to mitigate the adverse effects of this thing for future generations.

Response
This comment is correct in that DOE has evaluated ways to improve the long-term performance of the repository, and would continue to perform such evaluations if the Yucca Mountain site was approved. DOE has modified the text in the Final EIS to clarify this fact.

3.2 (3083)
Comment - EIS000735 / 0011
The EIS indicates DOE's preferred alternative is to proceed with [the] proposed action to construct, operate, monitor, and eventually close a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain. How can DOE possibly arrive at a preferred alternative when there are no transportation routes designated.

Response
To indicate distinctions among available transportation modes in Nevada, and to define the range of potential impacts associated with each transportation mode, the EIS analyzes three transportation options for waste shipments to Yucca Mountain in Nevada—rail, legal-weight truck, and heavy-haul truck. The heavy-haul truck option would require an intermodal transfer facility to transfer the waste from railcars to the heavy-haul trucks.

DOE's preferred waste-transport mode in Nevada is rail. The selection of a specific rail alignment in a corridor would require additional field surveys, State and local government consultations, environmental and engineering analyses, and National Environmental Policy Act reviews.

3.2 (3085)
Comment - EIS000735 / 0013
The analysis in the EIS appears to find many more potential impacts related to the no-action alternative than those connected with the preferred alternative.

Response
Section 2.4 of the EIS contains a comparison of the impacts between the Proposed Action and the No-Action Alternative. Based on this comparison, readers and decisionmakers can draw their own conclusions.

3.2 (3270)
Comment - EIS000602 / 0002
I didn't read the study. It's big. It's got lots of paper. But in my opinion, I feel like it is kind of like a quick fix. We're going to say we need to fix this, and not really look into what's going to happen.

I just find a lot of lawsuits in the future for this because it does feel like it's unfinished, it is an unfinished report. Unfinished in that I like the points where it didn't have the flaws. What are the flaws? What about if it doesn't work?

Response
The Federal Government would be responsible for the proposed repository in perpetuity. If, at some time in the future after the repository had been closed, there was a determination that the repository was not performing adequately, the Federal Government would take appropriate actions to protect public health and safety and the environment.

3.2 (3330)
Comment - EIS001123 / 0001
Our Coalition had a speaker to our last [monthly] meeting and was informed of many discrepancies that are in the large volume of information that was written. It seems to me that the Energy Department has not done all the studies that should be done to make sure that everyone across the whole United States would be safe from any leakage of the nuclear waste.

Please give us some consideration and do more studies before making a final decision on Yucca Mountain.

Response
With regard to the adequacy of studies at Yucca Mountain, DOE believes that the EIS adequately analyzes the environmental impacts that could result from the Proposed Action.

3.2 (3587)
Comment - EIS000550 / 0001
I guess my big comment is that being familiar with much of the science that's going on at Yucca Mountain, I feel secure in the knowledge that it's good science, it's solid science, and it is revealing a lot to us.

Response
Thank you for your comment.

3.2 (3764)
Comment - EIS001029 / 0007
We need many more years of study to understand the geology of Yucca Mountain so that the citizens of Nevada can be protected from the radioactivity that is already there.

Response
Past underground testing of nuclear weapons has contaminated parts of the Nevada Test Site with radioactive materials. Extensive geologic and hydrologic studies at Yucca Mountain and on the Test Site have demonstrated that these materials have not migrated very far from the original points where the weapons were detonated.

3.2 (3898)
Comment - EIS000654 / 0001
I feel that the proposed action does not represent a solution to the problem of nuclear waste in America. In order to find a solution to that problem, real alternatives need to be addressed. This may not be entirely the fault of the DOE, but of the political process, but in order for a solution to be found, it is necessary to look at all of the alternatives, including reprocessing, transmutation, so forth. Also, I feel it is the fault of this process that basic uncertainties remain as to the nature of the problem, the quantity of waste to be disposed of, for example. Also the question of whether or not a second repository would eventually be needed as originally proposed.

What we don't know about it, the Environmental Impact Statement, one large area of inadequacy in the document that I feel is the number of areas where conclusions have not been reached where the document simply states that additional studies would need to be done. In fact, the Environmental Impact Statement does not even adequately describe the Yucca Mountain proposal or how the site would be managed over the closure.

Response
The NWPA does not require DOE to evaluate alternatives to a geologic repository at Yucca Mountain. However, DOE chose to evaluate a No-Action Alternative to provide a basis for comparing the magnitude of potential environmental impacts of the Proposed Action.

The Proposed Action of this EIS is to construct, operate and monitor, and eventually close a geologic repository for the disposal of 70,000 metric tons of heavy metal (MTHM) of spent nuclear fuel and high-level radioactive waste at Yucca Mountain. During the scoping period, DOE received comments that noted the potential existence of more than 70,000 MTHM of these materials and encouraged DOE to evaluate the total projected inventory. In addition, some commenters requested that the EIS evaluate the disposal of radioactive waste types that might require permanent isolation, such as Greater-Than-Class-C low-level waste and Special-Performance-Assessment-Required

waste. For these reasons, DOE included a range of waste volumes and waste types in Chapter 8 of the EIS. The NWPA, however, requires the Nuclear Regulatory Commission to include in any construction authorization a prohibition against the emplacement of more than 70,000 MTHM in the first repository until a second repository is in operation.

DOE believes that the EIS adequately analyzes the environmental impacts that could result from either the Proposed Action or the No-Action Alternative. This belief is based on the level of information and analysis, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions where information is incomplete or unavailable, or where uncertainties exit. DOE acknowledges that the results of analyses often have associated uncertainties, and has described such uncertainties throughout the EIS.

3.2 (3961)
Comment - EIS001106 / 0022
The issue of significant effects is problematic for the YMP [Yucca Mountain Project] because of the complexities involved. Among these are the context and intensity of an action and the threshold of disturbance to result in an environmental impact. Additional considerations include the degree of controversy involved, unknown risks associated with human health, and impacts being reasonably foreseeable.

Considerations such as thresholds, context, intensity, and long periods of time for effects to occur have not been articulated in the YMP DEIS. Consideration of the spectrum of hazards and risks of impacts and the feasibility of mitigation measures over long frames of time also is absent from the YMP DEIS.

Response
DOE disagrees with this comment. Consistent with Council on Environmental Quality regulations (40 CFR 1508.27), the Department considered thresholds, context, intensity, and duration in reaching conclusions on the significance of short- and long-term impacts to the natural and human environment from the implementation of the Proposed Action or the No-Action Alternative. These impact-related conclusions occur throughout Chapters 4 through 8 and Chapter 10 of the EIS, and Chapter 9 describes management actions that DOE would consider to reduce or mitigate adverse impacts.

3.2 (3992)
Comment - EIS000724 / 0006
For fifty years, this country has shied away from confronting the problems that the nuclear age has caused, and it is vital that we insist upon looking these problems in the face, finding sound solutions, and honestly characterizing the results of our decisions. If the DOE would draw an honest picture of the decision it has already made with regard to Yucca Mountain, this country would see that it is the wrong decision. If the DOE really believes that Yucca Mountain is safe, then it should do a full and honest analysis, which would require a complete rewrite of the DEIS.

Response
DOE could not pursue the use of Yucca Mountain as a repository until the Secretary recommended approval of the site to the President and the President and Congress, if necessary, approved the site. The Secretary will consider information from the site characterization program, the results of the environmental analyses in this EIS, and public input before making a determination whether to recommend the site to the President.

3.2 (4091)
Comment - EIS001374 / 0002
The DEIS fails to address the fact that as time passes, and as more is learned about the nature of the proposed Yucca Mountain site as well as the nature of the material it proposes to store, the worse it looks. With more knowledge, the probability that the facility will fail increases. The probability increases that failure will occur sooner rather than later, and that failure will be more rather than less destructive to biological systems, including humans. This general conclusion is based on increasing knowledge of the following physical characteristics:

- Tectonic activity and the Ghost Dance Fault;
- Relatively recent volcanic activity;

- The presence in the tunnel of crystalline rocks that could only have been formed in the presence of upwelling groundwater driven by magma;
- The potential for small pockets of air found in crystalline structures to be relatively young;
- High humidity in the tunnel;
- Porous rock and volcanic tuff that allows for the rapid migration of surface water through the site;
- Inability of the site to adequately diffuse heat generated by irradiated fuel;
- The new-found ability of plutonium and perhaps other long-lived fractions to chemically transition into forms that are soluble in air and water, and that can rapidly move into the biosphere (see Science Magazine, Vol. 287 5451, Jan. 14, 2000).

We make no claim that this list is exhaustive, but it serves to document the point that as people learn more about the "show-stopper" problems with Yucca Mountain, rather than stopping the show and rethinking the "repository philosophy," standards are relaxed. Now, instead of being a permanent repository to contain radionuclides for the required period of time, Yucca Mountain is a "planned release" facility that at best will result in the long-term low-level exposure of untold numbers of people. And DOE is ignoring the evidence about the biological consequences of long-term low-level exposure, including the work of Dr. Abram Petkau. None of this is acceptable, and a repository under these conditions will not be allowed to operate.

Response
DOE has found no evidence to suggest that, as it gathers more information, the likelihood increases that the repository would fail. Rather, the physical, chemical, and biological information gathered by DOE and its contractors over the past few decades suggests that Yucca Mountain could be a suitable site for a repository.

The EIS addresses opposing views or views that differ from those of DOE if those views were based on scientific, regulatory, or other information supported by credible data and analytical methods. For example, Section 3.1.4.2.2 discusses opposing views on the nature of the groundwater system at Yucca Mountain. Opposing views on other subjects are discussed elsewhere in the EIS.

3.2 (4106)
Comment - EIS001476 / 0002
And as a scientific background, this document bothers me greatly because there are so many instances of imprecise language. That's not really good to be using in scientific studies. Things like "unlikely" and "probably" and "maybe" and "computer models," and not a lot of facts are presented here. There's a lot of supposition, and this is what we're going to base this on. That bothers me a great deal.

Response
Section 2.5 of the EIS acknowledges that the results and conclusions of analyses often have associated uncertainties. Uncertainties could be the result of analyzing complex variables, using incomplete information, or the inability to obtain unavailable information. In these instances, DOE describes the uncertainties associated with the results and conclusions throughout the EIS.

When information is incomplete or unavailable or uncertainties exist, assumptions are often used to enable analyses to proceed. In such instances the assumptions and analytical methods conservatively represent (that is, tend to overestimate) the reasonably foreseeable future impacts that could occur from the Proposed Action and the No-Action Alternative.

3.2 (4224)
Comment - EIS001160 / 0040
The National Environmental Policy Act (NEPA) requires federal agencies to consider "connected actions." Construction and operation of a repository at Yucca Mountain will result in spent nuclear fuel and high-level radioactive waste being transported through Nevada (and in all likelihood by legal-weight truck in the short-term). The prospect of transportation of spent nuclear fuel and high-level radioactive waste through the Las Vegas Valley will likely trigger a decision by the Governor of Nevada to designate alternative routes. Therefore, the FEIS must consider the impacts of State of Nevada identified alternative routes as a connected action pursuant to NEPA.

Response
The EIS broadly defines the Proposed Action to encompass activities at commercial and DOE sites to prepare for spent nuclear fuel and high-level radioactive waste transport; the transport of these materials; and activities that would be necessary for the construction, operation and monitoring, and eventual closure of the repository. In addition, DOE identified other specific actions, such as the manufacture of shipping casks and disposal containers, that could not occur unless it developed the repository. DOE believes it has analyzed the scope of the Proposed Action in accordance with Council on Environmental Quality regulations.

The National Environmental Policy Act requires Federal agencies to analyze impacts that are reasonably foreseeable, not speculative. Consistent with the Act, the EIS analyses used current regulations governing highway shipments and historic rail industry practices to select existing highway and rail routes to estimate potential environmental impacts from waste transportation. Although Nevada has designated a state routing agency to the U.S. Department of Transportation, the State has not designated alternative preferred routes for Highway Route-Controlled Quantities of Radioactive Waste.

3.2 (4238)
Comment - EIS001160 / 0053
The DEIS conveys preconceived notions regarding the safety and efficacy of transportation of high-level nuclear waste and [its] subsequent storage at the Yucca Mountain site. Recognizing that transportation of hazardous materials and especially radioactive products has an excellent track record in the United States, and moreover that many great minds have established proven protocols to handling these products, White Pine County recommends that the results of this DEIS be reviewed by an independent technical group to ensure that analyses are appropriate and that all measures to effectively manage risk have been considered. While admittedly a costly measure, because of the nature of the material involved and longevity of the impact, a second study, ordered by the Congress of the United States, by another agency or group, might well be undertaken in an effort to confirm or dispute the findings in this report. At the very least, a group of experts in the various fields associated with this report, not associated with the Department of Energy or even the NRC [Nuclear Regulatory Commission] should be assembled and charged with the task to carefully review this document with the understanding that their comments would be accepted, utilized and indeed exercised even after the February 9, 2000 comment period expired.

Response
Title V of the NWPA established the Nuclear Waste Technical Review Board as an independent organization in the Executive Branch. The Board is responsible for evaluating the technical and scientific validity of activities undertaken by the Secretary of Energy, including activities related to the packaging or transportation of spent nuclear fuel and high-level radioactive waste. Members of the Board are appointed by the President after being nominated by the National Academy of Sciences.

The Draft EIS and the Supplement to the Draft EIS were available for review by any person or group that requested a copy. DOE has considered all comments on the Draft EIS and the Supplement and, where appropriate, modified the EIS.

3.2 (4271)
Comment - EIS001160 / 0079
Page 1-24, Section 1.5.2 indicates that calculations were verified independently. The FEIS should indicate the nature of the independent verification (who was involved).

Response
The cited statement is a general observation on the process to verify and validate calculations used in the EIS. Chapter 13 lists the preparers, contributors, and reviewers in the EIS process.

3.2 (4650)
Comment - EIS001462 / 0001
I am a working nuclear chemical engineer, and I've read the statements and the summaries.

This EIS has addressed existing concerns and projected concerns for permanently siting a disposal facility at Yucca Mountain. The process has taken an extraordinary amount of time and effort. In fact, DOE has failed to meet opening date of objectives.

Response
DOE cannot comment on the issue of when or where it would take title to spent nuclear fuel currently in storage at reactor sites around the Nation because these issues are the subject of ongoing litigation. However, DOE is completing its program of investigations and evaluations of the Yucca Mountain site to enable the Secretary of Energy to determine whether to recommend the site to the President for development as a geologic repository for spent nuclear fuel and high-level radioactive waste.

3.2 (4709)
Comment - EIS001230 / 0004
Full Analysis

According to the "Purpose and Need for Action," in the Draft EIS, this EIS is being prepared to support DOE decision-making related to the Federal Government's responsibility for permanent disposal of all SNF [spent nuclear fuel] and HLW [high-level radioactive waste]. Therefore, the INEEL CAB [Idaho National Engineering and Environmental Laboratory Citizen's Advisory Board] recommends that each alternative include a full description of what would be done to manage the entire inventory of SNF and HLW, including any portions that would not be disposed at the geologic repository for any reason. In addition, the description of impacts under each alternative should include those impacts that would result from ongoing management of those wastes (any not disposed at the geologic repository) at their present locations.

Response
The EIS evaluates a Proposed Action to emplace 70,000 metric tons of heavy metal in the proposed geologic repository in accordance with the requirements of the NWPA. The future course that Congress, DOE, and the commercial utilities would take if Yucca Mountain did not receive a recommendation as a repository site is uncertain. Chapter 8 of the EIS evaluates potential environmental consequences of disposing of spent nuclear fuel and high-level radioactive waste generated through 2046, for which DOE retains ultimate responsibility, at Yucca Mountain. However, disposal of more than 70,000 metric tons of heavy metal would require legislative action by Congress unless a second repository was in operation. Chapter 7 analyzes continued storage of spent nuclear fuel and high-level radioactive waste at the 77 commercial and DOE sites where it is currently located.

3.2 (4799)
Comment - EIS001535 / 0002
Your risk assessment fails to adequately account for human error.

Response
DOE incorporated human error into the analyses for each resource area as appropriate. For example, the transportation analyses in Chapter 6 relied on accident rate information that reflects human error and other factors such as mechanical failure. As another example, the EIS analyzed potential accident scenarios at the repository that are based on human-initiated events (see Section H.2.1). For other areas, such as biological and cultural resources, impact estimates were determined primarily by loss or change of habitat and loss of individuals that is not attributable to human error, although indirect impacts from human activities (for example, accidental damage to cultural resources) were considered.

3.2 (4812)
Comment - EIS000938 / 0007
Page I-14, Section I.3.2.1, Identification of Waterborne Chemically Toxic Materials, Last Paragraph, Last Sentence: "...while there are radiological limits set for plutonium, no chemical toxicity benchmarks have been developed. Therefore, because of this lack of data to analyze chemical toxicity, plutonium was not analyzed for the chemical screening." Question? Can the Secretary of DOE sign off on this DEIS without knowing the result of the analysis? These questions must be answered.

Response
Although DOE was unable to analyze for chemical toxicity of plutonium because there are no established chemical benchmarks, it factored plutonium's radioactive nature into the potential long-term human health impacts of the proposed repository. Section 2.5 of the EIS acknowledges that some information is incomplete or not available, and it identifies where DOE has used incomplete information to identify uncertainties in the data or analytical approaches. In addition, the EIS describes the relevance and importance of the incomplete or unavailable information and the assumptions and preliminary information used in the analysis. DOE has done this to help the reader understand the results or conclusions and their context. If the Secretary of Energy, the President, or Congress believed that these uncertainties were substantial enough to delay the program, a decision to put the project on hold could occur at any time during the approval process.

3.2 (4851)
Comment - EIS001215 / 0002
The draft EIS is another part of a piecemeal and confusing decision making process. Other EIS's conducted by the U.S. Department of Energy (DOE) indicate Hanford's high-level waste will go to a national repository. The Yucca Mountain EIS does not support that conclusion. DOE must reconcile these divergent decision-making documents and should involve the states and tribes in this effort.

Response
This comment is correct in that the Record of Decision for the Tank Waste Remediation System, Hanford Site EIS (62 *FR* 8693, February 26, 1997) indicates that DOE would dispose of high-level radioactive waste in a national repository. That Record of Decision, however, did not make a determination on disposal and did not specify the Yucca Mountain site as the national repository. The analyses in this EIS include the high-level radioactive waste from the Hanford Site.

3.2 (4922)
Comment - EIS001510 / 0007
The DEIS is problematic in its entirety because the project is based upon the assumption that environmental conditions will remain relatively unchanged in the next 300 years, yet this is a factor over which we, as humans, have no control. The report seems to neglect several features of the surrounding area which may render it even more dangerous when radioactive waste is placed into the mountain, such as its previous volcanic activity and the likelihood of earthquakes. When dealing with a substance as potentially lethal as radioactive waste, assumptions that there will be no significant, unpredictable changes in the future environment pose a very serious threat to public health.

Response
This comment is correct in that the short-term impact analyses assumed, for the most part, that environmental conditions would remain unchanged for the foreseeable future. For some resources (for example, biological, soils, cultural), conditions would be unlikely to change in such a way that impacts could be predicted. Impacts to these resources would depend primarily on the amount of habitat disturbed from the construction, operation, and closure of the repository. For other conditions, such as socioeconomics, estimated changes in population can reflect future trends. DOE has modified Section 3.1.7 of the EIS to reflect changes in population through 2035. For still other conditions, impact analyses can be based on future predictions. For example, the EIS analyzes the potential impacts from a variety of accidents, such as a seismic event, which has a probability of occurring of greater than or equal to 1 in 10 million during the operating life of the repository (see Section 4.1.8, for example). DOE assessed the potential for volcanic activity and found that the probability of an event intersecting the repository would be below the frequency of a credible event. In addition, DOE considered the impacts of a regional event (ash fall), and concluded that such events would not affect repository structures. Section H.2.1.3 contains more information.

3.2 (5175)
Comment - EIS001443 / 0004
Our evaluation of the project and DOE's mandate under the NWPA reveal that DOE has failed to effectively and objectively exercise [its] authority and obligation under the National Environmental Policy Act (NEPA) to develop and analyze realistic project alternatives on a level equal to that provided for the proposed repository. Treatment of cumulative impacts and indirect effects under NEPA are also seriously compromised.

Response
The EIS evaluated the Proposed Action to construct, operate and monitor, and eventually close a repository. Under the NWPA the EIS is not required to consider alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository. However, to provide a basis for comparison with the Proposed Action, the EIS analyzes a No-Action Alternative, under which spent nuclear fuel and high-level radioactive waste would remain at 72 commercial and 5 DOE sites across the country.

The EIS analyses (especially Chapters 4, 6, and 7) considered direct and indirect effects of the Proposed Action, consistent with Council of Environmental Quality (CEQ) regulations (40 CFR 1508.8). Chapter 4 considers the direct impacts caused by implementing the action. Chapter 6 discusses the impacts of transportation. Chapter 5 considers the impacts of long-term repository performance, indirect impacts that would occur later but are still reasonably foreseeable. Because of the need to evaluate impacts that would occur far in the future (10,000 years), some EIS analyses had to use incomplete information. The EIS identifies the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches.

The analysis of cumulative impacts in Chapter 8 of the EIS evaluated the impacts of repository activities coupled with the impacts of other Federal, non-Federal, and private actions consistent with Council of Environmental Quality requirements (40 CFR 1508.7). The analysis considered past and present actions (such as activities at the Nevada Test Site and the Beatty Waste Disposal Area) and reasonably foreseeable future actions such as activities at the Nellis Air Force Range and the continued operation and expansion of a gold mine and processing facility. Table 8-1 lists the activities DOE considered in analyses of cumulative impacts.

3.2 (5185)
Comment - EIS001443 / 0010
CEQ [Council on Environmental Quality] regulations concerning treatment of direct and indirect project effects require that indirect effects, which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable be analyzed by the EIS (40 CFR 1508.8). The DEIS fails to address a number of impacts which DOE may view as indirect effects of the project. These impacts are discussed in detail in later sections of this commentary. By way of example, the most obvious effect of the project -- which DOE apparently considers indirect and unworthy of analysis at this time -- is the extensive transportation campaign necessary to move nuclear waste to Yucca Mountain. Operation of the proposed repository unquestionably includes the creation of new risks accruing to transportation of spent nuclear fuel and high-level radioactive waste to the repository site from locations all across the United States. The transportation campaign required to move waste into Yucca Mountain is later in time, generally further removed in distance and unquestionably foreseeable, yet the DEIS does not attempt to quantify the impact of the transportation campaign or develop the range of transportation alternatives necessary to compare risks to human populations and infrastructure. Even if the Department of Energy considers the transportation impacts associated with development and operation of the repository indirect effects of the project, the DEIS must include meaningful analysis of indirect effects of the project if the DEIS is to be considered a credible attempt to comply with NEPA [the National Environmental Policy Act]. The NEPA exemptions provided DOE by the NWPA do not include exemption from addressing such effects.

Response
DOE considered the potential environmental impacts associated with all elements of the Proposed Action in the EIS, including transportation activities. Chapter 6 of the EIS addresses the potential impacts of transporting spent nuclear fuel and high-level radioactive waste to a repository at Yucca Mountain. Appendix J contains more information on transportation impacts.

The Secretary of Energy will consider the potential impacts associated with the transportation of spent nuclear fuel and high-level radioactive waste when determining whether to recommend Yucca Mountain to the President as the site of this Nation's first monitored geologic repository. Although no transportation decisions would be made unless and until the site was designated, DOE believes that the EIS provides the information necessary to make decisions on the basic approaches (for example, mostly rail or mostly truck shipments), as well as the choice among alternative rail corridors in Nevada. DOE would prepare additional National Environmental Policy Act studies and documentation for the specific alignment of a rail route in an identified corridor.

3.2 (5238)
Comment - EIS001887 / 0004
The comments contained in the following Parts of this document present, in both general and specific terms, compelling evidence that DOE's Draft EIS is both legally and substantively deficient in numerous ways. In addition, the State of Nevada contends that the procedures used by DOE to notify those people potentially affected by the Proposed Action and to solicit public input as required by NEPA [National Environmental Policy Act] are likewise deficient and in violation of NEPA statutory provisions and implementing regulations.

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

After an extensive review of the Draft EIS and associated reference materials, the State of Nevada finds the document so inadequate and deficient as to require its withdrawal and the immediate announcement by DOE of the intent to prepare a new programmatic EIS sufficient to evaluate program-wide impacts and support program-level decisions that are reasonable and defensible. PEIS development process should begin with a new scoping process designed to actively and meaningfully obtain public input on the content and nature of the data and analyses necessary to define alternatives at the program level and to identify and assess potential impacts to the physical and human environment.

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

The existing Draft EIS fails to undertake this type and level of analysis. DOE must reconsider its entire approach to NEPA compliance and commit itself to a producing a comprehensive and adequate programmatic environmental impact statement. Schedule pressures and perceived political imperatives should not be permitted to obstruct the implementation of a truly adequate NEPA process and decision documents that must provide justification and guidance for a ten thousand year program.

Response
DOE agrees that the scope of the Yucca Mountain Program (and the EIS) is highly complex and has many unique features. In recognition of this complexity and of the EIS-related provisions of the NWPA, DOE analyzed a variety of alternatives and scenarios that would implement a Proposed Action to construct, operate and monitor, and eventually close a repository at Yucca Mountain. These alternatives and scenarios reflect design considerations, waste packaging approaches, and modes, routes, and corridors for transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain from 77 commercial and DOE sites. DOE also analyzed a No-Action Alternative with two scenarios that provide a basis for comparison with the Proposed Action and reflect the range of impacts that could occur.

The Proposed Action and No-Action Alternative, involving various implementing alternatives and scenarios, are complex (and relatively costly to analyze). In recognition of this complexity, DOE organized the EIS to present information, methods of analysis, and results of analyses as clearly and concisely as possible. For example, Chapter 5, which presents the environmental consequences of long-term repository performance, consists of sections that address the important elements of the evaluations—the inventory for performance analysis calculations, an overview of the repository system, locations for which DOE estimated impacts, waterborne radiological consequences, atmospheric radiological consequences, consequences from chemically toxic materials, consequences from disruptive events, nuclear criticality, consequences to biological resources and soils, and a summary. Appendix I contains more detailed information.

For each alternative, the EIS evaluates the affected environments and estimates potential impacts in regions of influence for a variety of subjects. DOE selected these regions and subjects for analysis consistent with Council on Environmental Quality regulations that indicate that the data and analyses should be commensurate with the likely importance of the potential impact (40 CFR 1502.15). Thus, the Department addressed the various environmental impacts in proportion to their potential significance. The EIS uses less detail to address clearly insignificant or minor impacts.

In the EIS, DOE used information from a broad range of studies to obtain or evaluate the information needed for the assessment of Yucca Mountain as a repository. These include, for example, reports and studies sponsored by DOE, other Federal agencies, the State of Nevada, and affected units of local government (see Chapter 3 for additional information).

Further, as discussed in Section 2.5 of the EIS, DOE identified the use of incomplete information or the unavailability of information to ensure reader understanding, in accordance with Council on Environmental Quality regulations (40 CFR 1502.22). In addition, the EIS acknowledges that the results and conclusions of analyses often have associated uncertainties (see Section 2.5) and describes such uncertainties and associated results as appropriate.

To resolve some of the uncertainties and provide information about the repository design that became available after publication of the Draft EIS, DOE published a Supplement to the Draft EIS. The Supplement focused on the most recent design enhancements, including various operating modes to manage the heat generated by emplaced spent nuclear fuel and high-level radioactive waste. DOE believes that the EIS adequately analyzes each element of the Proposed Action (such as waste handling facilities, heat management scenarios, and transportation implementing alternatives and scenarios).

The National Environmental Policy Act. The purpose of the National Environmental Policy Act is to promote an understanding of the environmental consequences of major Federal actions before agencies take action. The Act does not prohibit activities that harm the environment; rather, it requires Federal agencies to disclose the extent of such environmental harm, and the environmental benefits if any, to the public and agency decisionmakers. DOE believes that this EIS appropriately describes the type and magnitude of environmental impacts that could occur if it was to construct, operate and monitor, and close a repository at Yucca Mountain.

Public Involvement. As discussed in Section 1.5.1 of the EIS, DOE conducted public scoping in 1995, eventually holding 15 public meetings around the country. The Department used this process to determine the scope of the EIS and to identify the major issues it would analyze in depth. The Draft EIS was the outcome of this process. After issuing the Draft EIS, DOE held 21 public hearings in communities around the State of Nevada and across the country that transportation activities could affect. Consistent with Council on Environmental Quality and DOE regulations on the National Environmental Policy Act, the *Federal Register* published a notice of these meetings. In addition, DOE advertised the meetings in local newspapers. The Department recognizes that it was not always successful in providing several days notice in the newspapers. In addition, the public comment period for the Draft EIS lasted more than 6 months, giving commenters sufficient time to review the document and to submit comments. In May 2001, DOE issued the Supplement to the Draft EIS, which it distributed to more than 4,000 stakeholders in Nevada and nationwide. These stakeholders were encouraged to submit comments during a 45-day comment period, which was later extended to 57 days. In June, during a review of its mailing records, the Department discovered that had inadvertently not sent the Supplement to the Draft EIS to about 700 stakeholders who had requested and received a copy of the Draft EIS. DOE announced this oversight and sent the Supplement to the Draft EIS to these stakeholders, and provided them an opportunity to submit comments during a separate 45-day comment

period. Despite the respective deadlines, DOE has considered to the extent practicable all comments received in the development of the Final EIS.

Need for a Programmatic EIS. The NWPA requires DOE to prepare an EIS to examine the impacts that could occur as a result of constructing and operating a geologic repository for high-level radioactive waste and spent nuclear fuel at Yucca Mountain. DOE believes that this EIS adequately analyzes the impacts that could result from either the Proposed Action or the No-Action Alternative. DOE might need to prepare subsequent, project-specific National Environmental Policy Act documents before it could site, build, and operate a branch rail line or intermodal transfer station. In that regard, this EIS is an assessment of the impacts of the repository program, to which DOE would tier (link) other documents.

An earlier EIS (DIRS 104832-DOE 1980) analyzed environmental impacts that could occur if DOE developed and implemented various technologies for the management and disposal of spent nuclear fuel and high-level radioactive waste. It examined several alternatives, including mined geologic disposal, very deep hole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, space disposal, and no action. The 1981 Record of Decision for that EIS (46 *FR* 26677; May 14, 1981) announced the DOE decision to pursue the mined geologic disposal alternative for the disposition of spent nuclear fuel and high level radioactive waste.

Risk perception and stigma. The EIS addresses potential risks to human health and the environment as a result of the proposed siting, construction, operation, and closure of a repository at Yucca Mountain. While stigmatization can be envisioned in some scenarios it is not inevitable or measurable. Any stigmatization that could occur would likely be an aftereffect of unpredictable events such as a serious accident. However, because of the comments received on this subject, DOE reexamined the relevant literature and assessed the state of research into the perception-based impacts and stigma effect (see Section 2.5.4 and Appendix N of the Final EIS).

3.2 (5260)
Comment - EIS001887 / 0018
For the low thermal load repository, the Draft EIS would include Area 5, in order to provide sufficient underground emplacement area. Area 5 has not been the object of site characterization and, therefore, should not be included in the Draft EIS or repository planning until it has been characterized. The Secretary's site recommendation is to be made at the completion of site characterization according to the NWPA. In the case of the low thermal load alternative design, site characterization has not been completed in a portion of the area included in the Proposed Action. If the low thermal load alternative is to be considered a reasonable alternative, which it must if it is included in the Draft EIS, this Draft EIS should be deferred until after characterization of Area 5 is satisfactorily completed.

Response
This comment is correct in that there was less site characterization information available for Area 5 than for the Upper and Lower Blocks (see Figure 2-16 of the Draft EIS). This information was most relevant to analyses for long-term performance. The Draft EIS assumed that information available for areas adjacent to Area 5 was sufficient for purposes of analysis. Section I.4.2.3 of the Draft EIS discussed this assumption. Council on Environmental Quality regulations (40 CFR 1502.22) require a Federal agency to identify the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches. DOE complied with this requirement, as demonstrated by the information in Section I.4.2.3 of the Draft EIS.

Based on the evolving nature of the repository design, as discussed in the Supplement to the Draft EIS, DOE has revised the EIS to discuss the most recent design scenarios (higher- and lower-temperature repository operating modes). The analyses of these scenarios included assumptions similar to those made about Area 5 for the low thermal load scenario in the Draft EIS. As with the Area 5 analysis, DOE believes that the information available for adjacent areas is sufficient to help in the determination of impacts. This Final EIS does not address the high, intermediate, and low thermal load scenarios in detail because the repository design has evolved beyond them.

3.2 (5331)
Comment - EIS001887 / 0059
Page 1-21; Section 1.5.1 - Notice of Intent and Scoping Meetings. The State of Nevada reiterates its objection to the manner in which the scoping process for the Draft EIS was handled, both in Nevada and elsewhere. In comments on

the proposed scope of the Yucca Mountain EIS in 1995, the State found that the notices of the scoping meetings did not adequately describe the Proposed Action and its implications for people along transportation routes. DOE failed to indicate the true national scope of the high-level waste program and deliberately chose not to make people aware of the potential transportation routes through their communities - and the consequent risks from spent nuclear fuel (SNF) and HLW [high-level radioactive waste] shipments - as part of the notices for scoping meetings. Failure to adequately inform potentially affected citizens of possible consequences of the Proposed Action for their communities created a situation where public participation in the EIS scoping process was suppressed, as evidenced by the poor turnout at most of the EIS scoping meetings. In effect, DOE disenfranchised people throughout the country who stand to be substantially affected by the proposed repository program and who were not afforded adequate opportunity to participate in the initiation of the NEPA [National Environmental Policy Act] process.

In addition to DOE's failure to adequately notice the scoping Draft EIS hearings, the information contained in the original Notice of Intent (NOI) and DOE's informational presentations at the beginning of each scoping meeting misrepresented and, in certain instances, distorted the Yucca Mountain program and its possible impacts. For example, no information was provided on the possible unfavorable conditions present at the Yucca Mountain site. The implementation alternatives contained in the NOI failed to include any discussion of the relationship between thermal load, the space required for waste emplacement, and the capacity constraints at the Yucca Mountain site. Inadequate information was provided on the relationship between regional (i.e., Nevada-specific) and national transportation impacts and analyses, and misleading information was provided regarding transportation regulations, waste volumes required to be transported, and the possible modes and routes for SNF and HLW transportation.

The inadequate meeting announcements and the incomplete information presented led to a recommendation by the State that DOE extend the scoping period and initiate new scoping meetings. DOE rejected the State's recommendation and proceeded with development of the Draft EIS.

The fact that the repository project description "evolved" significantly from the time of the scoping meetings in 1995 to the issuance of the Draft EIS in August 1999 created a situation wherein the "project" that was presented in scoping materials and hearings is now unrecognizable in the Draft EIS. The conceptual design for the repository in 1995 relied primarily on the geologic environment for waste isolation, while the "evolved" design of this Draft EIS places primary waste containment emphasis on engineered barriers, with little or no credit taken for the isolation capabilities of the Yucca Mountain geology. In addition, the three thermal load scenarios specified in the 1995 scoping materials and carried forward into the Draft EIS no longer reflect the thermal conditions postulated for the current preferred repository design.

For all these reasons, the original scoping process and scoping meetings should be considered inadequate as well as irrelevant to the current state of the proposed repository program. DOE should be required to re-scope the project and reissue the Draft EIS using the information obtained from the new public scoping process, as required under NEPA.

Response

The Council on Environmental Quality guidance for the scoping process identifies the following objectives: (1) identify the concerns of the affected public and the agency; (2) facilitate an efficient EIS preparation process; (3) define the issues and alternatives that the EIS will examine in detail, and simultaneously devote less attention and time to issues that cause no concern; and (4) save time in the overall process by helping to ensure that draft EISs adequately address relevant issues, reducing the possibility that new comments will cause the agency to rewrite or supplement a statement. DOE believes that its scoping process was consistent with these objectives.

DOE believes that its approach to the public involvement process during the development of the EIS is consistent with the National Environmental Policy Act, Council on Environmental Quality and DOE regulations, and DOE guidance on public participation during the preparation of EISs. As discussed in Section 1.5.1 of the EIS, DOE conducted the public scoping process from August 7 through December 5, 1995. To encourage broad participation, before beginning the scoping period DOE notified stakeholders, the media, Congressional representatives, the Office of the Governor of Nevada, affected units of local government, Native American tribes, and Federal agencies of its plan to prepare the EIS and its approach to the scoping process. The Department held meetings to discuss the Proposed Action and alternatives, the schedule of scoping meetings, and the means by which DOE intended to

solicit public comments. A series of information releases notified stakeholders of the opportunity to comment. Press releases and public service announcements were submitted to newspapers and radio and television stations. DOE representatives met with local television, radio, and newspaper reporters before each meeting to provide information about the repository program, the EIS, and the scoping process. Information about the repository program was inserted in utility bills, and informational flyers and fact sheets were distributed at each scoping location and by request.

At the beginning of each scoping meeting DOE described the repository program, the EIS, and the scoping process. The public was encouraged to ask questions and to discuss particularly important aspects of the program with DOE and with members of the technical staff. The formal public comment portion of the meeting began after the question-and-answer period. At each meeting DOE set up a separate information room containing exhibits and handouts about the repository program and the EIS, and technical representatives were present to answer questions and discuss issues.

The repository design has evolved to reflect ongoing evaluations and other influences such as public comments and design and performance-related reviews by external organizations, such as the Nuclear Waste Technical Review Board. In May 2001, DOE issued the Supplement to the Draft EIS, which it distributed to more than 4,000 stakeholders. The Supplement focused primarily on matters involving repository design, and the Department held three public hearings in Nevada during the comment period.

On this basis, DOE considered all comments and information received during scoping, issued a summary of scoping comments (DIRS 104630-YMP 1997), and modified the analytical approach to the EIS accordingly. DOE also identified the comments and information that it believed to be unrelated to the scope or the content of the Proposed Action (see Section 1.5.1). In the Final EIS, Section 1.5.1 explains that some scoping comments were not addressed in the EIS because they would result in analyses that would be uncertain or speculative and, thus, would not be meaningful.

3.2 (5333)
Comment - EIS001887 / 0061
Page 1-24; Section 1.5.3 - Relationship to Other Environmental Documents

This section includes the 1996 Final EIS for the Nevada Test Site (NTS) but does not mention the important DOE-NTS Resources Management Plan that should have been used as the model for the Yucca Mountain environmental assessment. This issue, essentially involving the use of ecosystem management, is further discussed in Attachments F, G, H, I, J, K, and L.

Response
DOE believes that the assessment method used in the preparation of the EIS is appropriate and sufficient for evaluating potential environmental impacts of the Proposed Action and the No-Action Alternative. Contrary to the suggestion in this comment, DOE incorporated principles of ecosystem management, such as those discussed by the Council on Environmental Quality, in the analysis methods.

For example, DOE evaluated impacts on long-term ecosystem functions, integrity, and biodiversity at appropriate scales and levels of organization. The evaluation of potential impacts of repository construction on biological resources concentrated primarily on the species level of ecological organization because the impacts would be localized and most likely to occur at that level. Section 4.1.4 of the EIS concludes that the removal of vegetation from the relatively small area required for the implementation of the Proposed Action and the impacts to some species would not affect regional biodiversity or ecosystem function.

3.2 (5340)
Comment - EIS001887 / 0066
Page 2-6; Section 2.1.1 - Overview of Implementing Alternatives and Scenarios

Since titanium drip shields are required for all repository design scenarios discussed in the Draft EIS, DOE must also address resource impacts and costs associated with the acquisition and manufacture of the drip shields.

Response
The design evaluated in the Draft EIS did not include drip shields. Since DOE issued the Draft EIS, key aspects of the design (such as disposal container components and the use of drip shields) have changed in ways that would be important to repository performance and reduction in uncertainties. DOE published the May 2001 Supplement to the Draft EIS, which focuses on the most recent design enhancements. Section 3.1.15 of the Supplement and Section 4.1.15 of the Final EIS discuss the offsite manufacture of titanium drip shields. The use of drip shields is incorporated into the costs shown in Section 2.1.5.

3.2 (5342)
Comment - EIS001887 / 0065
Page 2-6; Section 2.1.1 - Overview of Implementing Alternatives and Scenarios

It appears that DOE has chosen to segment the Proposed Action into various transportation and repository development activities. Such activities are further subdivided into a national and a Nevada-specific transportation program. The transportation program includes the off-site manufacture of shipping casks and disposal containers, construction of a potential rail line to Yucca Mountain, and development of heavy-haul truck capabilities using one or more intermodal (rail to truck) waste transfer facilities. For repository development, DOE has divided activities into surface and sub-surface repository construction. Such segmentation is incompatible with the requirements of a comprehensive assessment of impacts and, in the absence of a Programmatic EIS and tiered EISs for related program components, may be in violation of NEPA [the National Environmental Policy Act].

Because of the multitude of uncertainties associated with these activities, along with the evolving nature of the program, the Draft EIS depends on an analytical environmental impact process that "bounds" impacts likely to result from the Proposed Action. This bounding analysis supposedly incorporates assumptions so conservative that they overstate the risks and thereby fully address the multitude of program impacts and uncertainties. While this approach is typically used for Programmatic EIS documents, this Draft EIS is not a Programmatic EIS.

There are also outstanding and potentially significant non-programmatic issues that are part of the Proposed Action that must be specifically evaluated in the Draft EIS. These issues should not be misrepresented as programmatic alternatives evaluated through a "bounding analysis." For example, Navy spent fuel in storage at the Idaho National [Engineering and Environmental] Laboratory will be shipped by rail to a geologic repository. Consequently, either rail access to Yucca Mountain will be developed or an intermodal waste transfer facility and heavy-haul trucks will be required to move Navy spent fuel to a Yucca Mountain repository. Since the Draft EIS is not a programmatic document and fails to evaluate the impacts of moving Navy fuel to Yucca Mountain, supplemental NEPA documents must be prepared to assess such impacts. To do otherwise misrepresents the NEPA process.

Response
The NWPA establishes a Federal policy for the disposal of spent nuclear fuel and high-level radioactive waste.

Council on Environmental Quality regulations indicate that an agency is to determine the scope of an EIS by considering three types of actions—connected actions, cumulative actions, and similar actions. Connected actions are defined, in part, as those that cannot or will not proceed unless other actions occur previously or simultaneously, or are interdependent parts of a larger action and depend on the larger action for their justification. Consistent with these definitions, DOE broadly defined the Proposed Action to encompass (1) the transport of spent nuclear fuel and high-level radioactive waste from generator and storage sites to the proposed repository and (2) activities necessary for the construction, operation and monitoring, and eventual closure of a repository.

DOE identified other actions, such as fabrication of shipping casks and disposal containers, that could not proceed unless DOE developed the repository. The EIS analyses identified fundamental differences between the elements of the Proposed Action (for example, transportation versus subsurface emplacement), and reflected their temporal and geographic differences (for example, long-term repository performance impacts versus short-term operational health and safety impacts). For these reasons, DOE believes that it has developed and analyzed the scope of the Proposed Action without segmentation and consistent with Council on Environmental Quality regulations.

DOE also believes that the information and analyses of the EIS are appropriate given:

- The level of detail and analysis devoted to the repository design, transportation, and other aspects of the Proposed Action and No-Action Alternative.
- The analytical methods and approaches used to represent conservatively the potential impacts.
- The use of conservative assumptions if information is incomplete or unavailable and if uncertainties exist.

As discussed in Section 2.5 of the EIS, uncertainties could be the result of the complexity and variability of the process being analyzed, the use of incomplete information, or the unavailability of information. DOE describes such uncertainties throughout the EIS. Thus, in some instances, such as if information is incomplete or unavailable or uncertainties exist, the Department identified assumptions to enable analyses to proceed. In such instances DOE chose the assumptions and analytical methods to represent conservatively, rather than bound, the reasonably foreseeable impacts that could occur from the Proposed Action and the No-Action Alternative.

DOE cannot predict with certainty the mode of transportation (rail or truck) from commercial and DOE sites for each shipment of spent nuclear fuel and high-level radioactive waste. If the repository was developed, the Department would use legal-weight truck and rail transportation and would determine the number of shipments by either mode as part of future transportation planning efforts (see Section 2.1.1.3 of the EIS). For this reason, the EIS evaluates two national transportation scenarios (mostly truck and mostly rail) that encompass the potential range of impacts to human health and the environment. Both scenarios include rail shipments of naval spent nuclear fuel.

Based on the above, DOE believes that the EIS adequately analyzes environmental impacts from the Proposed Action. DOE also believes that the EIS provides the necessary information on which to base decisions about basic approaches (for example, mostly rail or mostly truck shipments), as well as the choice among candidate rail corridors or intermodal transfer stations and associated heavy-haul truck routes in Nevada. The Department of the Navy evaluated rail shipments of naval spent nuclear fuel in *Department of the Navy Final Environmental Impact Statement for a Container System for the Management of Naval Spent Nuclear Fuel* (DIRS 101941-USN 1996).

DOE recognizes that future National Environmental Policy Act reviews could be necessary. As more information about proposed transportation activities becomes available, follow-up implementing decisions would require additional field surveys, State and local government consultations, environmental and engineering analyses, and National Environmental Policy Act reviews. Follow-up implementing decisions could include the selection of a specific rail alignment in a corridor. As described in Section 2.1.3.2.1 of the EIS, part of the mostly legal-weight truck scenario includes the shipment of naval spent nuclear fuel that would be shipped to Nevada by rail. These shipments incorporate approximately 300 shipments over a 24-year operational period. The EIS assumed that these shipments would use the services of a commercial intermodal operator. The EIS also assumed that DOE would not build an intermodal transfer station to handle naval spent nuclear fuel shipments. Naval spent nuclear fuel shipments, equating to approximately 16 casks per year, would then be shipped from the intermodal transfer point to Yucca Mountain by heavy-haul truck, as described in Section 6.3.3.1. It is the Department's opinion that sufficient information on the mostly legal-weight truck transportation shipping scenario is provided in the EIS to support current decisionmaking.

3.2 (5437)
Comment - EIS001887 / 0133
Page 2-74; Section 2.4.1 - Proposed Action and No-Action Alternative

This section of the Draft EIS concludes that "analyses showed that the environmental impacts associated with the Proposed Action would be small..." This statement is not supported by the data and assessments in the Draft EIS. As discussed in comments relative to Sections 4, 5, and 6 of the Draft EIS (below), data that DOE ignored and/or analyses they failed to undertake clearly indicate that the impacts associated with the Proposed Action could be substantial. These impacts would affect people and the environment in Nevada and in cities and communities across the country and would be costly in monetary terms and in terms of human health, safety, and well-being.

Response
DOE believes, based on the analyses in the Draft EIS, the Supplement to the Draft EIS, and this Final EIS, that the environmental impacts from the implementation of the Proposed Action would generally be small. This belief is based on the following:

- The available information and scope of the analyses undertaken
- The level of detail and analysis devoted to the repository design, transportation, and other aspects of the Proposed Action
- The analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur
- The use of conservative assumptions if information is incomplete or unavailable and if uncertainties exist

3.2 (5466)
Comment - EIS001887 / 0148
Page 3-1; Section 3.1 - Affected Environment at the Yucca Mountain Repository Site at the Conclusion of Site Characterization Activities

Section 3.1 defines the affected environment as it was at the end of site characterization. The documentation is in several environmental baseline files. This approach ignores and circumvents the issue that an environmental baseline did not exist prior to site characterization and, therefore, no impacts of that phase could be evaluated. Thus, for the Draft EIS, the affected environment was as it stood after being impacted by site characterization, with the absence of a true, undisturbed baseline as intended by NEPA [National Environmental Policy Act] regulations. The importance of pre-disturbed baseline information in the Environmental Impact Assessment and NEPA processes is discussed in Attachments A, B, D, E, F, and G.

Response
The NWPA distinguishes between site characterization as a preliminary decisionmaking activity not subject to an EIS. As such, the baseline environment from which DOE estimated impacts under the Proposed Action is the environment that will exist at the conclusion of site characterization. An annual Site Environmental Report describes the environmental impacts of site characterization. DOE has prepared these publicly available reports since 1991.

3.2 (5481)
Comment - EIS001557 / 0001
The presentations from the DOE this morning demonstrated that there has been a tremendous amount of work and effort that has gone into this, but there still remains numerous technical and legal and political questions that call into question whether or not these shipments will ever take place.

Response
DOE agrees that the process to develop a repository established by the NWPA is ongoing (see Section 1.4), and that preconstruction testing and performance confirmation activities will continue into the future (see Section 2.1.2 of the EIS). In addition, the satisfaction of applicable regulations related to construction authorization and a license to possess nuclear materials would be a future activity if the site was approved.

3.2 (5583)
Comment - EIS001887 / 0207
Page 4-1; Section 4.1 - Short-Term Environmental Impacts of Performance Confirmation, Construction, Operation and Monitoring, and Closure of a Repository

The Draft EIS fails to adequately reflect the unique and highly controversial nature of the Yucca Mountain program and the impacts that are likely to derive from the Proposed Action. In the time line presented in Figure 4-1, there are a number of decision points that will generate considerable public and intergovernmental conflict. A decision to recommend Yucca Mountain for development as a repository in 2001, for example, will inject considerable conflict

into the relationship between the State of Nevada and the federal government. This conflict will have implications that will be manifest in a number of ways, including possible considerable legal costs to the State and the federal government. As part of the analysis in Section 3, the Draft EIS should have examined impacts related to the conflict-inducing nature of the project.

As written, Section 3 treats the proposed Yucca Mountain repository as just another federal program, with no attention paid to the one-of-a-kind, controversial, extremely long duration, and extraordinarily complex program that is characterized by irreducible uncertainties in almost every aspect of its design and implementation. The overly general, off-the-shelf impact assessment contained in Section 3 is entirely inadequate and inappropriate for a program of the type and complexity presented by the Proposed Action. Nevada continues to believe, as stated in the State's Scoping Comments on DOE's 1995 Notice of Intent, that DOE should have prepared a programmatic EIS for the repository project and then tiered separate EISs to it for the Yucca Mountain repository facilities, the rail spur corridor selection, the selection of Nevada and national highway and rail routes, and the intermodal transfer facility. Such an approach would more accurately reflect the complex and interconnected nature of the various elements of the program and allow DOE to better assess and address environmental impacts program wide. It would also have enabled DOE to deal more directly and effectively with the wide range of uncertainty presented by each aspect of the program.

Response
DOE recognizes that construction and operation of a repository at Yucca Mountain could result in conflict between the State of Nevada and the Federal Government. However, the nature and form of such conflict in relation to environmental concerns are highly uncertain and the Department cannot estimate them with any degree of reliability. Thus, DOE did not consider conflict in the EIS.

Regarding the need for a Programmatic EIS, the NWPA established a Federal policy for the disposal of spent nuclear fuel and high-level radioactive waste. DOE prepared this EIS to examine impacts that could occur as a result of constructing, operating (including transportation) and monitoring, and eventually closing a geologic repository for spent nuclear fuel and high-level radioactive waste at the Yucca Mountain site. DOE believes that the information in the EIS on impacts of the Proposed Action is consistent with NWPA requirements. DOE also believes that the EIS provides the information necessary to make decisions on basic transportation modes (for example, mostly rail or mostly truck shipments), as well as the choice among candidate rail corridors or intermodal transfer stations and associated heavy-haul truck routes in Nevada. This determination is based on: (1) the level of detail and analysis of the repository design, and transportation and other aspects of the Proposed Action, (2) the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and (3) the use of conservative assumptions if information was incomplete or unavailable and if there were uncertainties.

Furthermore, DOE acknowledges (see the Foreword to the EIS) that it could need to undertake additional National Environmental Policy Act reviews before selecting a particular rail alignment.

3.2 (5637)
Comment - EIS001887 / 0259
Page 4-102; Section 4.2.1.2.3 - Impacts to Hydrological Resources from Retrieval

Under the scenario described in the Draft EIS, the impacts to surface water and groundwater from retrieval will be confined to short-term effects such as runoff rate changes, drainage, infiltration rate changes due to the existence of the above ground storage facility, and demand for water. Because the Draft EIS, as written, does not postulate any alternative but to leave the waste at Midway Valley indefinitely, the document should assess the impacts associated with contamination of surface and subsurface water as storage canisters and systems fail over long periods of time. Such an analysis should assess the radiological risks and health effects to populations using water from aquifers contaminated over long periods of time.

Response
As discussed in Section 4.2.1 of the EIS, retrieval and storage of the materials would be consistent with the NWPA and all applicable regulations. For this reason, DOE would maintain storage canisters and systems such that they would not fail in the manner suggested by this comment. Although the development of specific alternatives for the

ultimate disposition of these retrieved materials is speculative, DOE would develop alternatives based on Congressional and Presidential direction.

3.2 (5647)
Comment - EIS001887 / 0265
Page 5-2; Section 5 - Environmental Consequences of Long-Term Repository Performance

It is incorrect to assert that the evaluation of the No-Action Alternative can be used to inform the Secretary of Energy's decision on whether to recommend the Yucca Mountain site to the President for development of a repository. The No-Action Alternative scenarios are not reasonable scenarios, and the Draft EIS acknowledges this situation in Section 1.4.3.4. Therefore, the NEPA [National Environmental Policy Act] analysis is insufficient, and the Secretary's use of the analysis in making any decision would be improper.

Response
DOE analyzed the No-Action Alternative to serve as a basis for comparison to the magnitude of potential environmental impacts of the Proposed Action, because the future course that Congress, DOE, and the commercial utilities would take if Yucca Mountain was not approved is uncertain. DOE chose the two No-Action scenarios for analysis because they represent a range of impacts that could occur. DOE did not want to influence the results of the No-Action analysis to favor the Proposed Action and, therefore, used assumptions for the No-Action scenarios that minimized predicted impacts. Section K.4 of the EIS discusses examples of these assumptions and their effect on the outcome of the impact analysis.

3.2 (5793)
Comment - EIS001622 / 0002
Inadequate Scoping Process and Failure to Provide a Complete and Accurate Project Description

The DEIS is too narrow in scope and does not provide a complete description and analysis of the proposed project including shipment routes and modes, number and characteristics of shipments, and a route-specific analysis of potentially impacted populations and environment from these shipments.

Before an agency prepares an EIS, NEPA regulations require "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." (40 CFR 1502.7) As part of this process, DOE must "invite the participation of affected Federal, State, and local agencies, any affected Indian tribe,...and other interested persons (including those who might not be in accord with the action on environmental grounds..."(Id.)). DOE did not conduct an adequate scoping process. Although DOE held 15 public scoping meetings across the country including one in Sacramento, the DEIS does not reflect the scope of issues raised at these meetings.

For example, Daniel Nix, representing California and the Western Interstate Energy Board High-Level Waste Committee, testified at the scoping hearing in California that it is "crucial...that DOE conduct route and mode-specific analyses of transportation impacts as part of the Yucca [Mountain] EIS." He further recommended that DOE should 1) perform an integrated modal analysis that incorporates realistic potential routes, 2) allow for state involvement in the designation of routes, 3) identify and describe DOE's modal choice, 4) state DOE's intentions regarding full scale cask testing, 5) develop highway and rail routing policies, 6) develop policies regarding Section 180 (c) assistance, and 7) recognize the proximity of Death Valley National Park to the Yucca Mountain site and give special consideration to the need for regional groundwater impact evaluations. However, the scope of impacts evaluated in the DEIS [is] limited and [does] not reflect the explicit requests by California for analyses related to potential groundwater and route-specific transportation impacts in California. If proper scoping had occurred, states' concerns expressed early to DOE presumably would have determined the rage of actions, alternatives, and impacts to be considered in the EIS.

Response
As discussed in Section 1.5.1 of the EIS, DOE conducted the scoping process from August 7 through December 5, 1995. To encourage broad participation, before initiating the scoping period DOE notified stakeholders, the media, Congressional representatives (in several states including California), affected units of local government, Native American tribes, and Federal agencies. Comments and information were received from the public and a number of

organizations. In determining the scope of the EIS, DOE considered the relevant Council on Environmental Quality regulations (40 CFR 1501.7), which indicate that a Federal agency is to identify and eliminate from detailed study issues that are not significant or that have been covered by earlier reviews. The regulations also state that the agency should narrow the discussion of why these issues would not have a significant effect on the human environment or provide reference to their coverage elsewhere.

DOE considered all comments and information received during scoping, issued a summary of scoping comments (DIRS 104630-YMP 1997), and modified the analytical approach to the EIS accordingly. In addition, DOE identified comments and information it believed to be unrelated to the scope or content of the EIS. DOE has modified Section 1.5.1.1 of the EIS to explain that it did not address some scoping comments because they would result in analyses that would be uncertain or speculative, such as those related to risk perception or stigmatization.

DOE has not selected a transportation mode or route and has not determined the process or timetable for selecting a transportation mode or route. Section 2.1 of the Final EIS identifies rail as the preferred mode of transportation, both nationally and within the State of Nevada. If Yucca Mountain was selected as the site for a geologic repository, then DOE would begin the process of making transportation decisions, including the selection of a rail corridor.

Transportation activities conducted by DOE would use casks certified by the Nuclear Regulatory Commission. The regulations, which must be met prior to certification, are the radiological performance standards that assure public health and safety. Although DOE would use casks designed by others, the designs and applicable quality assurance activities would be certified by the Nuclear Regulatory Commission.

With respect to emergency planning, Sections M.6 and M.7 of the EIS describe the implementation of Section 180(c) of the NWPA. Under these requirements, DOE would provide technical assistance and funds to states for training public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions DOE would transport spent nuclear fuel and high-level radioactive waste.

3.2 (6017)
Comment - EIS001879 / 0042
The Cumulative Effects analysis introduces a speculative new action alternative, based on public scoping comments, that is not currently under consideration by any branch of government. Nye County applauds the Department's responsiveness, but would like to know: If DOE considers scoping comments to be a reasonable basis for developing and evaluating an alternative, then why were Nye County, Affected Units of Local Government, and other local scoping comments dismissed from further consideration and evaluation?

Response
The cumulative impacts analysis (Chapter 8 of the EIS) included past, present, and reasonably foreseeable future actions; it did not introduce another action alternative. Consistent with Council on Environmental Quality regulations, the analysis identified impacts on the environment from the incremental impacts of the Proposed Action when added to past, present and reasonably foreseeable future actions. Section 1.5.1, which addresses the scoping process, indicates that DOE did not include certain views and concerns in the EIS if they were not related to the scope or content of the Proposed Action.

3.2 (6034)
Comment - EIS001898 / 0004
The DEIS discusses five components relating to: 1) construction of the repository and waste handling facilities; 2) preparation of SNF [spent nuclear fuel] and HLW [high-level radioactive waste] 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 [Nuclear Regulatory Commission] 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.

Response

In the Draft EIS and the Supplement to the Draft EIS, DOE analyzed a variety of scenarios that offer a range of options for implementing the Proposed Action to construct, operate (including transportation) and monitor, and eventually close a repository at Yucca Mountain. These scenarios, which reflect potential design considerations, waste packaging approaches, and modes for transporting spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site, considered the range of the environmental impacts likely to result from the Proposed Action.

In the Final EIS, DOE has identified and analyzed a range of operating modes from higher- to lower-temperature. The lower-temperature analytical scenario considered six cases. Chapter 2 of the EIS and other related sections of the Final EIS have been revised to reflect this refinement in design selection, which basically is an establishment of design fundamentals such as drift layout, drift spacing, depth and location of emplacement areas, and location of ventilation raises. The Final EIS describes a design for the repository with variations on the operating mode. The key parameters defining the flexible operating modes are package spacing, drift temperatures, length of active ventilation, and age of the fuel being emplaced. The range of variances in these parameters basically determine the extent of the repository design that will be utilized for emplacement of 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste; the higher-temperature operating mode would require only the main central segment of the repository; the lower-temperature operating mode could use that segment and the western extension, and could possibly require use of the entire available emplacement area. DOE has focused its analysis on a more clearly defined proposal, and demonstrated that the environmental impacts of the construction and operation of the proposed repository would not be likely to exceed the upper range of the estimated impacts.

DOE believes that the information in the EIS on the potential direct, indirect, and cumulative impacts that could result from the Proposed Action is sufficient. This belief is based on the level of information and analysis, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of "bounding assumptions" if information is incomplete or unavailable and if uncertainties exist.

For the same reasons, DOE believes that the EIS provides the information necessary to make decisions on the basic approaches to transporting spent nuclear fuel and high-level radioactive waste (such as mostly rail or mostly truck shipments), as well as the choice between alternative rail corridors in Nevada. However, follow-up implementing decisions, such as the selection of a specific alignment in a corridor, the specific location of an intermodal transfer station, or the need to upgrade heavy-haul truck routes, would require field surveys, State and local government consultations, environmental and engineering analyses, and National Environmental Policy Act reviews.

3.2 (6073)
Comment - EIS001898 / 0019
No Action Alternative: 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.

Response
DOE recognizes that neither No-Action scenario is likely to occur (see Section 2.2 and the introduction to Chapter 7 of the EIS). However, they were identified to provide a basis for comparison to the Proposed Action and because they reflect a range of potential impacts that could occur from the continued storage of material at these sites. For example, the impacts associated with the first 100 years of effective institutional control (either Scenario 1 or Scenario 2 of the No-Action Alternative) enable a direct comparison to the impacts of the Proposed Action during the first 100 years after closure of the repository. For purposes of analysis and to be consistent with the Proposed Action, Scenario 2 does not assume credit for institutional control after approximately 100 years. Under this scenario storage facilities and spent nuclear fuel and high-level radioactive waste would degrade, and radioactive material would eventually enter the accessible environment. This assumption is based upon a review of generally applicable Environmental Protection Agency regulations for the disposal of spent nuclear fuel and high-level radioactive waste (40 CFR Part 191) and the National Academy of Sciences review of standards for the proposed Yucca Mountain Repository (DIRS 100018-National Research Council 1995). Each of these references generally discounts the consideration of institutional control for longer periods of performance assessments for geologic repositories.

Section K.4.1.1 of the EIS discusses the uncertainties associated with changes in societal values that could lead to the loss of institutional controls. Although these conditions might be difficult to imagine happening in the United States, they are not unlike what has occurred recently in the former Soviet Union and Germany prior to the end of World War II. The evaluation of Scenario 2 was not included in the EIS as a scare tactic. In fact, DOE took extreme care to avoid overestimating any impact from the No-Action Alternative. By intentionally using a realistic best estimate modeling approach (see Section K.1) and by not including all potential human exposure pathways

(see Section K.3.1), DOE concludes that the impacts of such a scenario might have been underestimated by several orders of magnitude (Section K.4).

3.2 (6119)
Comment - EIS001654 / 0012
Page S-9. Proposed Action Scope Needs Clarification

The statement "The Proposed Action would include the transportation of spent fuel...to the site" seems to be at variance with the opening sentence in the section on "Decisions Related, etc." on page S-2. We suggest this be clarified in the FEIS and that the multi-stage approach to NEPA [National Environmental Policy Act] reviews for transportation described in our earlier comment (NARUC [National Association of Regulatory Commissioners] ES-1) be followed.

Response
As stated in the EIS, DOE proposes to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain to dispose of spent nuclear fuel and high-level radioactive waste. The Department does not see any variance in meaning between the descriptions of the Proposed Action in Section S.3.1 of the Summary, and has not modified the text.

As discussed in the Foreword and Section 1.1, DOE believes that the EIS provides the necessary information to make transportation-related decisions on basic approaches (for example, mostly rail), as well as a choice among candidate transportation corridors. Follow-on implementing decisions such as the selection of a specific rail alignment would require additional National Environmental Policy Act reviews.

3.2 (6333)
Comment - EIS001613 / 0003
My request is that an alternative plan is developed which accurately and adequately takes into account the safety of U.S. communities and the members of the communities surrounding Yucca Mountain.

Response
DOE believes that its Proposed Action features elements that would protect public health and safety and the environment in accord with applicable regulations of the Nuclear Regulatory Commission and the Environmental Protection Agency. The Department recognized that, since the publication of the Draft EIS, key aspects of the repository design (such as disposal container components, use of drip shields) changed in ways that would be important to repository performance and reduction in uncertainties. To provide updated information to the public, DOE published a Supplement to the Draft EIS that focused on the most recent design (called the flexible design), including various heat management scenarios. The results of the analyses, discussed in Chapter 5 of the EIS, demonstrate that releases from the repository would be within applicable standards.

3.2 (6406)
Comment - EIS001632 / 0003
EPA devoted considerable attention to the no-action alternatives and noted the public controversy about how realistic these are.

Section 2.2, page 2-59: This section describes the no-action alternative (no further site characterization at Yucca Mountain) and lays out two scenarios for this alternative: (1) wastes are stored at current locations and monitored/maintained for 10,000 years; or, (2) wastes are maintained for only 100 years, after which they are assumed to be abandoned. The Draft EIS acknowledges (page 2-60) that should there be a decision not to proceed with the repository, neither of these scenarios is likely; rather, the scenarios were chosen to provide a basis of comparison with the proposed action.

EPA agrees that while aspects of the no-action alternatives are speculative, they do provide a basis for comparison with the preferred alternative for the purposes of NEPA. We caution DOE, however, that should the U.S. decide not to proceed with constructing and operating the repository at Yucca Mountain, DOE would need to do a full examination of alternative solutions and their environmental impacts, within the confines of any national legislation.

Response
DOE agrees with the Environmental Protection Agency's assertions regarding future actions should the United States decide to not proceed with construction and operation of a repository at Yucca Mountain. As stated in Section 2.2 of the EIS, if Yucca Mountain was determined to be unsuitable or was not approved by the President or Congress, DOE would prepare a report to Congress. This report, required by the NWPA, would contain DOE recommendations for further action to ensure the safe, permanent disposal of spent-nuclear fuel and high-level radioactive waste, including the need for new legislative authority. Other than this action, the future course that Congress, DOE, and the commercial nuclear utilities would take is uncertain. Several possibilities could be pursued, including centralized interim storage or the study of another location for a deep geologic repository. However, it would be too speculative to say that any of these actions would be pursued.

3.2 (6514)
Comment - EIS001774 / 0014
Why hasn't the DOE considered the economic, environmental and public safety impacts of the Yucca [Mountain] site?

Response
Chapters 4 through 8 and 10 of the EIS discuss the economic, environmental, and public safety impacts of the Proposed Action.

3.2 (6617)
Comment - EIS001878 / 0020
Related Environmental Documents. The list of related environmental documents in the table in Section 1.5.3 is extremely narrow with respect to the transportation aspects of the proposed action. The DOE has failed to utilize a vast body of available environmental documentation on land use, mining, wildlife, wild horses, public lands, agriculture, and other topics of particular concern to Eureka County. Nor does table include an important recent NEPA [National Environmental Policy Act] document, the FEIS, Proposed Fallon Range Training Complex Requirements, Naval Air Station Fallon, Nevada (Department of the Navy and Bureau of Land Management, January 2000). Through consultation with the Navy and the BLM [Bureau of Land Management], the DOE should have been aware of this FEIS. Finally, the Cortez Pipeline Gold Deposit project is located in east central Nevada, not western Nevada.

Response
The table in Section 1.5.3 of the EIS lists environmental documents that formed a basis for decisions associated with a geologic disposal program and investigation of Yucca Mountain as a potential repository site. DOE has changed the title of the table to clarify its purpose. The Fallon Naval Air Station EIS mentioned in this comment does not fit the purpose of that table.

DOE has revised Table 1-1 to indicate that the Cortez Pipeline Project is in north-central Nevada.

3.2 (6728)
Comment - EIS001377 / 0002
As an architect, I'm frequently involved in the review or creation of an EIS, and have come to believe that the process itself is vulnerable to manipulation because it allows the lead agency, in this case the DOE, to write the EIS, conduct the public meetings, to create, summarize and shape the "scientific data" and spin public input to reach predetermined outcomes, such as your DOE "Proposed Action." This is like allowing the fox to guard the chicken coop.

As a taxpayer, I protest the use of our collective public money being used to fund this EIS which leaves primary stakeholders, such as the local indigenous peoples, with no representation on the EIS staff, or direct involvement in the scoping of the study or creation of possible alternatives to the DOE proposal to store nuclear waste on their traditional homelands.

Because DOE shapes the study, we the public won't see information included in the EIS that would not support the DOE Proposed Action. For example, why don't the figures such as S-21 realistically illustrate both the predicted spills during handling and transport, as well as the likely contamination of the groundwater, the downstream

distribution and effects through animal, plant and human uptake? The figures and the text are sanitized to present a picture of optimal project management which even your statistical models cannot support.

Response
The funds used to study the Yucca Mountain site and to prepare this EIS came primarily from the Nuclear Waste Fund, which is funded by ratepayers of nuclear utilities, not by U.S. taxpayers, although Federal tax dollars would fund the portion of the cost attributed to the management and disposal of materials that DOE produced and owns. Further, DOE involved its stakeholders, including Native American tribes and other affected individuals and governments, in the scoping of the EIS. Chapter 1, Section 1.5.1 describes the DOE scoping process.

Congress directed in the NWPA that an EIS accompany any recommendation of the Yucca Mountain site to the President. The NWPA states that the EIS does not have to consider the need for a geologic repository, the time at which a repository could become available, alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository, and any site other than Yucca Mountain for development of a repository. Under the Act, the EIS is one of many documents the Secretary of Energy would consider in determining whether to recommend Yucca Mountain to the President for development of a repository.

Sections 4.1.8, 6.2.4, and 8.2.8 of the EIS discuss potential environmental impacts associated with nonroutine events (accidents during preconstruction testing and performance confirmation, construction, operation and monitoring, and closure activities; transportation accidents; and cumulative impacts associated with accidents, respectively).

3.2 (6732)
Comment - EIS001377 / 0005
The DOE Draft EIS fails to protect our Mother Earth by excluding information which describes the place occupied on the chain of continuing production and use of nuclear materials which this proposed facility will only stimulate.

Response
Through the passage of the NWPA, Congress determined that DOE should evaluate the Yucca Mountain site as a potential location for a monitored geologic repository. The extent to which the construction and operation of a repository for spent nuclear fuel and high-level radioactive waste could encourage the development of nuclear energy or increase the production of nuclear weapons is speculative and, therefore, DOE did not consider it in the EIS.

3.2 (6733)
Comment - EIS001377 / 0006
Action Required-EIS Process Design and Scoping

1. Public meetings must be held nationwide prior to issuance of a 2nd Draft EIS created through national scoping.

2. DOE funding for an "Alternative Options and Recommendations" study must be included in the next round of the Draft EIS. Stakeholders from the local indigenous tribes, environmentalists, and anti-nuclear activists, as well as representatives from the communities along the proposed transport routes must be included in creating the Alternative Options and Recommendations study.

3. The revised Draft EIS needs to determine to what extent the creation of a national repository will directly stimulate the continued mining of uranium, production, handling and transport of lethally toxic and unstable materials, the research, development, testing and use of nuclear energy for weapons of mass destruction, and for the production of domestic energy. How many more metric tons of replacement nuclear material will this national repository inspire to be created?

4. The revised DOE Draft EIS must compare costs for the DOE Proposed Action which includes the continued mining, production, use and storage it will stimulate vs. the complete termination of production and use of nuclear materials and their replacement in the production of domestic energy by alternative methods such as solar and wind generated power.

Response
DOE published for public review a Supplement to the Draft EIS that focused on the most recent repository design, including various heat-management scenarios. The Supplement provided an assessment, related to the thermal loads analyzed in the Draft EIS, of how impacts would probably change in the short and long terms.

In developing the scope of the Supplement, DOE evaluated new information to determine if there were substantial changes or important new circumstances or information affecting the Proposed Action that would be relevant to environmental concerns or to the Proposed Action or its impacts. Because of the relatively limited scope of the Supplement and in accordance with Council on Environmental Quality and DOE regulations, DOE did not hold scoping meetings.

In general, the National Environmental Policy Act (NEPA) and the Council on Environmental Quality regulations implementing NEPA require an agency to examine all reasonable alternatives to a proposed action. Case law interpreting these provisions and guidance issued by the Council on Environmental Quality and DOE state that an alternative can be reasonable even if it is outside the jurisdiction of the agency or would need Congressional action for implementation. However, in 1987, Congress amended the Nuclear Waste Policy Act and specifically altered the requirements for complying with NEPA for a proposed repository at the Yucca Mountain site. In particular, the 1987 amendments state that the EIS is not required to consider the following (see Section 1.5 of the EIS):

- The need for a geologic repository
- The time at which a repository could become available
- Alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository

Because the extent to which the development of a repository would affect the mining of uranium, use of "toxic and unstable materials," weapons development, and domestic energy production cannot be known with certainty, any such analysis would be speculative. The Council on Environmental Quality regulations do not require speculative analysis.

3.2 (6752)
Comment - EIS001377 / 0011
The revised Draft EIS must further explore the No Action Scenarios that offer alternative options to a centralized repository, and which also insure Corporate participation in clean-up for commercial sites. Corporate profits-not consumer rate hikes, must pay for clean-up and long-term storage at commercial sites.

Response
The NWPA makes it the policy of the Federal Government to determine if geologic disposal at Yucca Mountain would be safe. The NWPA does not direct DOE to examine any other methods of storage or disposal, or continuing storage at existing sites, because neither is the policy of the United States. Further, the NWPA specifies that it is not necessary for the EIS to consider the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain.

Although the NWPA does not require DOE to evaluate alternatives to the repository, DOE chose to evaluate a No-Action Alternative to provide a basis for comparison with the Proposed Action. Consideration of the source of funds for the continued storage of spent nuclear fuel or for the cleanup of commercial utility sites is not necessary for an examination of potential impacts from the No-Action Alternative.

3.2 (6756)
Comment - EIS001377 / 0015
A current editorial from our local paper which is critical of the DOE role in the cleanup of our local nuclear reservation at Hanford, Washington along the once beautiful Columbia River. The editorial assumes that the DOE Proposed Action in Yucca Mountain is a done deal. Where did they get that impression?

Response
The NWPA established a process for determining if the Yucca Mountain site should be approved for development as a repository. Pursuant to the NWPA, DOE could not pursue the use of Yucca Mountain as a repository until the Secretary of Energy recommended approval of the site to the President and the President and Congress, if necessary,

approved the site. The Secretary will consider information from the site characterization program, the results of the environmental analyses, and public input in determining whether to recommend the development of the Yucca Mountain site as a geologic repository to the President.

3.2 (6889)
Comment - EIS001522 / 0016
There are a number of ethical shortcomings in the DEIS. Some of the most important of these shortcomings are that the DEIS violates considerations of environmental justice, ignores duties to future generations, and relies on the DOE to secure the safety of the proposed facility.

Response
The purpose of the National Environmental Policy Act is to promote an understanding of the environmental consequences of Federal actions before an agency takes action. The statute does not prohibit activities that could harm the environment; rather, it requires Federal agencies to disclose to the public and to agency decisionmakers the extent of such environmental harm and any environmental benefits.

DOE believes that the EIS accurately describes the type of environmental impacts that could occur if DOE constructed, operated, and eventually closed a nuclear waste repository at the Yucca Mountain site. Further, the EIS addresses disproportionately high and adverse impacts to minority populations and low-income populations, consistent with Executive Order 12898 (see Section 4.1.13, for example). The document also addresses human health impacts that could occur far into the future, recognizing that decisions made by this generation could affect future generations (see Chapter 5).

DOE is a signatory to an international agreement titled *The Environmental and Ethical Basis of Geological Disposal of Long-Lived Radioactive Wastes, a Collective Opinion of the Radioactive Waste Management Committee of the OECD Nuclear Energy Agency* (DIRS 150579-NEA 1995), which considers the onsite disposal of certain nuclear waste to be morally unethical. This agreement includes a strategy for the isolation of radioactive wastes from humans and the environment, and seeks to ensure that any future releases of radioactive substances to the environment be at a level that would not be unacceptable today. (The agreement qualifies acceptable level to be "concentrations insignificant when compared, for example, with the natural background of radioactivity.") In addition, the agreement states that, in pursuing the reduction of risk from a geologic disposal strategy for radioactive wastes, current generations should keep in perspective resources deployment in other areas where there is potential for greater reduction of risk to humans or the environment, and consider whether resources might be used more effectively elsewhere. DOE views this as a clear warning to not pursue risk reduction in radioactive waste management to an extreme degree, given the greater risks society faces from other activities affecting the environment.

The NWPA places direct responsibility for the different aspects of a repository, including safety, with DOE. The Act also provides that the Nuclear Regulatory Commission, and independent agency, will exercise continuing regulatory oversight of DOE's activities.

3.2 (7010)
Comment - EIS000439 / 0005
Not only is the project inadequately described for purposes of assessing the impacts required as required by the National Environmental Policy Act, but what it proposes also violates the intent of the NWPA that disposal of spent fuel and high-level waste be accomplished through geologic disposal.

Response
As discussed in Section 1.3.2 of the EIS, Congress made the decision to focus on the Yucca Mountain site as a geologic repository. The 1987 amendments to the Nuclear Waste Policy Act directed the Secretary of Energy to perform site characterization activities only at Yucca Mountain, and if the site was suitable, to make a recommendation to the President on whether to approve the site for development as a repository. A Final EIS must accompany any approval recommendation.

DOE believes that the EIS presents information sufficient to estimate potential impacts from the Proposed Action to construct, operate and monitor, and eventually close a repository at Yucca Mountain. The Department analyzed a

variety of alternatives and scenarios to implement the Proposed Action. These alternatives and scenarios reflect potential repository design and operating modes (for example, thermal load scenarios, approaches to heat management), waste packaging approaches (for example, canisters, disposal containers), and transportation options for shipping spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site. The selected analytical methods and approaches conservatively represent the reasonably foreseeable impacts that could occur. DOE used conservative assumptions if information was incomplete or unavailable and if there were uncertainties.

3.2 (7013)
Comment - EIS000439 / 0006
The State of Nevada believes that the Draft EIS systematically underestimates radiological, social and economic impacts of spent fuel and high-level waste.

Response
DOE believes that the EIS presents information sufficient to estimate potential impacts from the Proposed Action to construct, operate and monitor, and eventually close a repository at Yucca Mountain. The Department analyzed a variety of alternatives and scenarios to implement the Proposed Action. These alternatives and scenarios reflect potential repository design and operating modes (for example, thermal load scenarios, approaches to heat management), waste packaging approaches (for example, canisters, disposal containers), and transportation options for shipping spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site. The selected analytical methods and approaches represent conservatively the reasonably foreseeable impacts that could occur. DOE used conservative assumptions if information was incomplete or unavailable and if there were uncertainties.

3.2 (7030)
Comment - EIS001337 / 0001
The Board of Lincoln County Commissioners and the Caliente City Council expect DOE to give full consideration of all comments to the DEIS presented within this document. The County and City anticipate that these and other comments offered in response to the DEIS will warrant important changes to the draft document. In the event that substantive changes to the draft are necessary, the County and the City request that DOE consider reissuing the DEIS for further review and comment. Lincoln County and the City of Caliente will not hesitate to pursue all avenues afforded by federal and state law to ensure that repository impact issues important locally are fully addressed within the final environmental impact statement and subsequent Record of Decision. The County and City will be particularly interested to see that negative aspects of the repository system are indeed identified and that the FEIS and Record of Decision include substantive commitments to mitigation. Given that the repository and attendant transportation systems are not desired by any state in the Nation, but are being imposed on Nevada and its locales, Lincoln County and the City of Caliente believe that the FEIS and Record of Decision must include commitments by DOE to seek to compensate Nevada for the unwanted burden of hosting the Yucca Mountain project.

Response
DOE has reviewed each of the more than 11,000 comments identified in more than 2,300 letters, facsimiles, emails, and oral presentations it received on the Draft EIS as well as the approximately 1,900 comments received on the Supplement to the Draft EIS. Many comments resulted in changes to the EIS that expanded on or clarified the descriptions of the existing environment, impact analyses, and management actions to mitigate environmental impacts. In addition, DOE performed new analyses and, as appropriate, described them in this Final EIS.

DOE recognized that since it published the Draft EIS, key aspects of the design had changed in ways that would be important to repository performance and reduction of uncertainties. To provide updated information to the public, DOE published the Supplement to the Draft EIS, which focused on the most recent design. This Final EIS incorporates the results of public comments on the Supplement.

With regard to a Record of Decision, Section 114(a)(1) of the NWPA authorizes the Secretary of Energy to determine whether to recommend approval of the Yucca Mountain site to the President for development as a repository for the disposal of spent nuclear fuel and high-level radioactive waste. A comprehensive statement of the basis for the recommendation, including a Final EIS, would have to accompany such a recommendation. However, the decision to approve the site rests not with the Secretary, but with the President and Congress, if necessary.

Because the President and Congress would make this decision, DOE does not anticipate issuing a Record of Decision if the Secretary recommended the site to the President.

DOE regulations (10 CFR 1021.331) require preparation of a Mitigation Action Plan if mitigation measures are identified in a Record of Decision. Because DOE does not anticipate issuing a Record of Decision regarding any approval recommendation, it might not prepare a Mitigation Action Plan. However, the Yucca Mountain site, if approved in accordance with provisions of the NWPA, would be subject to licensing by the Nuclear Regulatory Commission. DOE, in submitting its application to build and operate the repository, would identify relevant commitments, including those identified in the Final EIS, to the Commission for its consideration, and could reasonably expect a comprehensive set of mitigation measures or conditions of approval to be part of the licensing process.

DOE anticipates that the project plan and design will continue to evolve, creating additional opportunities for mitigation and potentially eliminating the need for some mitigation measures currently under consideration. Chapter 9 of the EIS, which provides DOE's list of commitments available at this time, describes management actions that DOE would consider to reduce or mitigate adverse impacts to the environment that could occur if it implemented the Proposed Action. Chapter 9 states that Section 116 of the NWPA requires the Secretary to provide financial and technical assistance to mitigate impacts of the development of a repository and the characterization of the site. The Section 116 mitigation assistance review process and the EIS process are distinct from one another and the implementation of one does not depend on the implementation of the other.

DOE would base its final determinations on mitigation measures on the submittal of its License Application to the Nuclear Regulatory Commission and on the Commission's response to the application. Other measures, such as those requested by this comment (for example, compensation for hosting the repository), would be the subject of a separate process described by the NWPA (see Section 11.1 of the EIS).

3.2 (7046)
Comment - EIS001337 / 0009
[Lincoln] County and [the] City [of Caliente] recommended that the comparative evaluation of alternatives for accomplishing deep geologic disposal should also capture the range of uncertainty attendant to such options. In this way, the DEIS could facilitate decision-making under conditions of uncertainty. While uncertainty is addressed to varying degrees throughout the DEIS, a summary assessment of the uncertainty associated with the various alternatives is not included within the DEIS. The FEIS should include such a summary assessment.

Response
Section 2.5 of the EIS acknowledges that the results of analyses often have associated uncertainties and has described such uncertainties throughout the EIS. Uncertainties could be the result of the assumptions being used, the complexity and variability of the process being analyzed, the use of incomplete information, or the unavailability of information. DOE believes that a summary assessment of uncertainties associated with the various alternatives and scenarios, as suggested by this comment, is not necessary for estimating their impacts.

3.2 (7101)
Comment - EIS001106 / 0036
Section 3.1 defines the affected environment as it was at the end of site characterization. The documentation is in several Environmental Baseline Files. This approach ignores and circumvents the issue that a true, pre-disturbance baseline did not exist for site characterization to evaluate the impacts of that phase. Thus, for the repository DEIS the affected environment was just that; as it stood after having been impacted by site characterization with an absence of a true, undisturbed baseline, as intended by the NEPA [National Environmental Policy Act] regulations.

Response
The NWPA treats site characterization as a preliminary decisionmaking activity not subject to an EIS. As such, the baseline environment from which DOE estimated impacts under the Proposed Action is the environment that will exist at the conclusion of site characterization. An annual Site Environmental Report describes the environmental impacts of site characterization. DOE has prepared these publicly available reports since 1991.

3.2 (7130)
Comment - EIS001887 / 0417
Valid EIA [environmental impact assessment] requires reliable scientific and technical methods and information not always present at the time. Identifying such shortcomings is a responsibility that is part of good environmental documentation. This enables subsequent study when and where needed to resolve important uncertainties within a reasonable time frame and circumstantial situations and to mediate unforeseen consequences. Identifying where more information is needed is particularly relevant in cases of uncertainty arising from expert opinion where sufficient hard data and sound information are lacking for impact prediction. Agencies need to be clear about such issues and about the techniques used for predicting and assessing impacts in the face of uncertainty, especially regarding future cumulative impacts. This is a benefit from having scientists and other technical experts involved in EIA for NEPA [National Environmental Policy Act] that have been trained to fully comply with NEPA and not just to provide scientific information. In the numerous cases where sound information is missing from the YMP [Yucca Mountain Project] DEIS, the shortcomings should be recognized and a framework set forth for resolving the difficulties and uncertainties created. Included in the framework should be the concept of monitoring and mitigating unforeseen consequences. At times, uncertainty in EIA can be lessened if the methods and techniques followed for environmental documentation are clearly set forth. This is lacking in the YMP DEIS and should be resolved. Also needed is information regarding standard practices used for impact assessment and prediction. Lack of such insights is an indication in the DEIS that sound interdisciplinary expertise in EIA was not assembled for the YMP. Experts trained not just in their respective disciplines are needed, but sound training and experience in EIA also is essential.

Response
DOE obtained and evaluated the best information available to prepare this EIS. However, the Department acknowledges in the EIS that some information is from ongoing studies and, therefore, is incomplete or unavailable, that the interpretations of results might differ among researchers, or that the use of different analytical methods might produce different results or conclusions. In addition, the complexity and variability of the natural system at Yucca Mountain, the long periods evaluated, and the lack of completeness and unavailability of information have resulted in a degree of uncertainty associated with analysis results.

Consistent with regulations issued by the Council on Environmental Quality (40 CFR 1502.22), Section 2.5.1 of the EIS describes the use of incomplete or unavailable information to identify uncertainties in the data or analytical approaches. This section also describes the basis for the analyses, including assumptions, the use of preliminary information, and conclusions from draft or incomplete studies. DOE continues to study issues that are relevant to an understanding of what could happen in the future at Yucca Mountain, and the potential impacts associated with its use as a repository. As a result of these continuing studies, this Final EIS includes information that was not available for the Draft EIS.

3.2 (7146)
Comment - EIS001337 / 0043
In scoping comments to the EIS, Lincoln County and the City of Caliente observed that the potential for development and operation of repository system components within Lincoln County had already demonstrated the ability to bear upon local politics. The County and City recommended that the DEIS include an evaluation of possible impacts upon local politics. To enable said analysis, the County and City called upon DOE to include a baseline assessment of the local political landscape within the DEIS. The DEIS gives no consideration to the potential for the Yucca Mountain project to be disruptive to or create political divisiveness within local political institutions.

Response
Section 1.5.1 of the EIS discusses the scoping process and indicates how DOE modified the scope of the EIS in response to public scoping comments. DOE does not believe it would be appropriate for the Department to speculate on how the repository could influence the political structure of a given community. Although information on the social fabric of a community could be useful to the Department in its public outreach program, it would be difficult to achieve the "accurate scientific analysis" set forth at 40 CFR 1500.1(b) for elements such as political structure, leadership capabilities, and perceived risks. Also, addressing such variables could be misconstrued as an attempt to influence local leadership, social institutions, and family structures. DOE has taken this position in awareness of the current revision that are underway for the Guidelines and Principles for Social Impact Assessment issued by the Interorganizational Committee on Guidelines and Principles for Social Impact Assessment.

3.2 (7163)
Comment - EIS001337 / 0054
To ensure that the repository EIS focused upon those issues posing the most threat to existing environmental conditions, [Lincoln] County and [the] City [of Caliente] recommended in comments to the scope of the DEIS that DOE seek to categorize prospective impacts as to their probability of occurrence and their degree of consequence. The County and City reasoned that this course of action would help to encourage a draft NEPA [National Environmental Policy Act] compliance document, which was most responsive to issues perceived important by stakeholders. In their comments, the County and City referenced their study of potential repository system impacts, which addressed socioeconomic effects. (18) The DEIS does not include a categorization of impacts as to their probability of occurrence and their degree of consequence. As a result, the DEIS lends no indication as to where efforts to mitigate impacts should be initiated to afford greatest benefit.

(18) Intertech Services Corporation, The Yucca Mountain High-Level Radioactive Waste Repository and Lincoln County: Characterization of Socioeconomic Impacts Framework for Assessment of Effects, prepared for Lincoln County and the City of Caliente, October 1994.

Response
The National Environmental Policy Act and regulations promulgated by the Council of Environmental Quality to implement that Act require Federal agencies to analyze potential beneficial and adverse impacts of their proposed major actions on the human and natural environments. As discussed in Section 1.5.1 of the EIS, DOE initiated the public scoping process for this project in 1995, eventually holding 15 public meetings around the country. The purpose of the process was to determine the scope and identify the significant issues for in-depth analysis in the EIS. This EIS is the outcome of the process.

For each alternative, the EIS analyses evaluated the affected environments and estimated potential impacts in regions of influence for a variety of environmental resource areas. DOE selected these regions and subjects consistent with Council on Environmental Quality regulations (40 CFR 1502.15) that indicate that the data used and analyses undertaken should be commensurate with the likely importance of the potential impact. DOE addressed impacts in proportion to their potential significance, and addressed clearly insignificant or minor impacts in less detail.

Categorizing impacts by their probability of occurrence or their degree of consequence would not provide information beyond that already in the EIS. Further, the relative importance of consequences to particular resource areas is likely to vary among stakeholders.

3.2 (7174)
Comment - EIS001337 / 0065
Page 1-23 1st full paragraph. This section implies that only Nye County responded to DOE's request for documents setting forth perspectives and views on a variety of issues of local and regional concern. In fact, in response to [the] DOE request representatives of Lincoln County and the City of Caliente met with DOE and DOE contractor staff in Las Vegas and spent several hours presenting a variety of documents prepared by and/or for the County and City reflecting issues of local and regional concern. In addition, the County and City provided DOE and DOE contractor staff with diskettes containing economic impact models developed by the University of Nevada for Lincoln County. DOE was encouraged to utilize all of this information in preparing the DEIS. Lincoln County and the City of Caliente provided this briefing and related documents with the specific understanding that they were responding to DOE's request for perspectives and views. The County and City are very concerned that DOE has not used the variety of information provided to it as evidenced by the lack of specific references to only one document provided by the County and City (ETS 1989).

Response
DOE acknowledges that Lincoln County and the City of Caliente provided a variety of documentation, and has utilized these materials as appropriate in this EIS.

3.2 (7222)
Comment - EIS001337 / 0102
Page 4-3 1st full paragraph. The first sentence of this paragraph should end with "and Congress authorizes construction and appropriates funding to build the repository." As written, the sentence misleads the reader to believe that all that is needed is NRC [Nuclear Regulatory Commission] approval.

Response
The purpose of Chapter 4 is to describe short-term environmental consequences that could result from implementing the Proposed Action, which is to construct, operate and monitor, and eventually close a geologic repository at the Yucca Mountain site. Section 1.1 of the EIS explains the use of the term "proposed repository" throughout the EIS and that DOE could not pursue the use of Yucca Mountain as a repository until a Presidential site designation became effective.

Several factors are germane to the construction and operation of a repository. In addition to a license from the Nuclear Regulatory Commission and Congressional authorization and budgetary authority, DOE must comply with its directives, complete a final design and specifications, let contracts for various services, and more. DOE believes that that the addition of the suggested language is unnecessary and adds little meaningful information to the overall understanding of the process.

3.2 (7258)
Comment - EIS001832 / 0005
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 ... 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. Perspective on the impacts is important to assure understanding.

Response
To analyze potential environmental impacts that could result from the implementation of the Proposed Action, DOE compiled information about the environments that action could affect. The Department used this information to establish the baseline against which it measured potential impacts. Chapter 3 of the EIS describes (1) environmental conditions that will exist at and near the Yucca Mountain site after the conclusion of site characterization activities (Section 3.1); (2) environmental conditions along the candidate transportation corridors in Nevada that DOE could use to ship spent nuclear fuel and high-level radioactive waste to the site (Section 3.2); and (3) environmental conditions at 72 commercial and 5 DOE sites that manage spent nuclear fuel and high-level radioactive waste (Section 3.3). Each of the 13 impact categories mentioned in this comment is described in Chapter 3. DOE believes these descriptions provide the perspective the commenter correctly believes is required for understanding the full range of potential consequences.

With regard to the qualitative descriptions applied to some impact categories (low, small, within regulatory limits, slight, not disproportionately high), DOE has attempted to normalize these descriptions in this Final EIS. In the cases cited, the terms are for the most part synonymous. In performing qualitative assessments, DOE based its conclusions on professional judgments related to the magnitude and context of potential changes in elements of the affected environment. The yardstick can vary based on the nature of the discipline under consideration. To use land use as an example, if the Proposed Action could result in departures from existing uses and mitigation could not remedy the conflict, the effects could be significant. On the other hand, the impacts could be small if land use changes could be avoided through judicious alignment of a branch rail line, for example, or through mitigation.

3.2 (7263)
Comment - EIS001832 / 0011
The Draft Environmental Impact Statement does not address the tremendous environmental benefits of the proposed action.

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 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 recognize that it is well beyond the scope of this EIS to attempt to evaluate the [effects] 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.

Response
DOE acknowledges that the construction and operation of a repository could affect issues such as those listed in this comment. However, the extent of the effects cannot be determined with relative certainty and, thus, any such analysis or discussion would not be meaningful in the context of this EIS.

3.2 (7268)
Comment - EIS001832 / 0016
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 [National Environmental Policy Act] 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 [Nuclear Regulatory Commission] licensing process that will follow if Yucca Mountain is selected. The NEPA [National Environmental Policy Act] 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.

Response
Section S.1 of the EIS discusses the National Environmental Policy Act process and Section S.2.2.2 discusses the Site Recommendation and the Nuclear Regulatory Commission licensing process. Chapter 1 elaborates on these processes.

3.2 (7293)
Comment - EIS001957 / 0004
We firmly believe that a supplementary environmental impact analysis effort must be conducted. This additional analysis must address hazards to National Park System units, and equally important, the potential economic impacts of decreased tourism in this part of California and Nevada should mishaps occur.

Response
In May 2001, DOE issued the *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* to present the latest repository design information and the corresponding environmental impact analyses. The Final EIS addresses the potential impact from transporting spent nuclear fuel and high-level radioactive waste to the proposed repository including an analysis of the effects on access to recreational areas in Section 6 of the Final EIS. The discussion of the specific impacts of rail corridor implementing alternatives in Section 6.3.2.2 of the Final EIS addresses recreation management areas and wilderness areas that could be crossed depending on the selected rail corridor. DOE did not attempt to quantify any potential for impacts from risk perceptions or stigma (such as the effect on tourism) since any such stigmatization would likely be an aftereffect of unpredictable future events, such as serious accidents, which may not occur. DOE concluded that while in some instances risk perceptions could result in adverse impacts on portions of a local economy, there are no reliable methods whereby such impacts could be predicted with any degree of certainty.

3.2 (7359)
Comment - EIS001106 / 0027
Adaptive management: Often uncertainty can be reduced through environmental monitoring and adaptive management based on the resulting information. Such a tack should be followed during development and the useful lifetime of the YMP [Yucca Mountain Project] as well as far into the future. This is because initial assumptions about an action change due to new knowledge, social values and human needs change over time, and significant changes can occur in the environment. Intentions and plans for such changes, based on a framework of integrated EIA [environmental impact assessment], should be included in the DEIS but are not. This is unacceptable given the certainty of long-term environmental and health consequences associated with the program.

Response
If DOE were to construct and operate a repository at Yucca Mountain, it would develop an environmental monitoring program consistent with applicable laws, regulations, and DOE directives. In addition, it would monitor repository performance and would continue geotechnical testing. If the results of this monitoring indicated the need for changes in repository and site management, DOE would implement such changes.

3.2 (7366)
Comment - EIS001106 / 0031
Study design and analysis: The ecological study design and the methodology adopted for EIA [environmental impact assessment] analysis for the YMP [Yucca Mountain Project] were flawed due to the inability to conduct credible replication of the ecosystem. Standard statistical techniques based on reliable replicates and controls do not apply in such cases.

Response
DOE did not attempt to replicate the ecosystem, as suggested by the comment, because the expense for such an effort would not be commensurate with the level of the likely impacts. This approach is consistent with regulations issued by the Council on Environmental Quality (40 CFR 1502.15), which state that data and analyses in an EIS should be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. By doing this, the EIS concentrates on important issues.

Section 4.1.4 of the EIS describes potential impacts to plants and animals from a repository at Yucca Mountain. The analysis determined that the magnitude of impacts to biological resources would be low to very low (see Section 4.1.4.3).

3.2 (7420)
Comment - EIS001912 / 0020
Furthermore, 40CFR1502.22(a) states, "essential information, if it is obtainable, must be included in the EIS." On page 2-86 clearly states that some information in the DEIS is incomplete and that some may not be available until after the DOE has issued the FEIS. These statements are not consistent with the requirements of 40CFR1502.22(a).

Response
DOE used the best information available to prepare this EIS. However, the Department acknowledges in the EIS that some information is from ongoing studies and is, therefore, incomplete or unavailable and that the interpretations of results might differ among researchers, or the use of different analytical methods might produce different results or conclusions. In addition, the complexity and variability of the natural system at Yucca Mountain, the long periods evaluated, and the lack of completeness and availability of information have resulted in a degree of uncertainty associated with analysis results.

As discussed in Section 2.5 of the EIS, DOE identified the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches. In addition, DOE acknowledged (see Section 2.5) that the results of analyses often have associated uncertainties. Such uncertainties are described throughout the EIS as appropriate. In addition, to resolve some of the uncertainties and provide information to the public about the repository design that became available after the publication of the Draft EIS, in May 2001 DOE published the Supplement to the Draft EIS. The Supplement focused on the most recent base design (called the flexible design), including various heat-management scenarios. DOE believes that the EIS adequately analyzes each element of the Proposed Action (such as waste handling facilities, heat management scenarios, and transportation implementing alternatives and scenarios). The design information presented in the Supplement was carried forward to the Final EIS.

3.2 (7426)
Comment - EIS001912 / 0023
Pg. 2-10 Section 2.1.1.5 2nd Para. states, "This assessment.....found that the changes in the environmental impacts for the design options would be relatively minor in relation to the potential impacts evaluated in the EIS." This simply is not the case. The statement is untrue at best and is misleading. At the time the DEIS was issued, DOE did not have the analytical capabilities to predict such performance. This section needs to be rewritten to indicate the limitations for performance assessment or the DEIS should be reissued once DOE has improved capabilities in place to evaluate design alternatives.

Response
Section 2.1.1.5 of the Draft EIS refers to the analyses in Appendix E. In that section DOE acknowledged the continuing investigation of design options for possible incorporation in the final repository design. Appendix E described the design features and alternatives, and presented a qualitative assessment of factors associated with each

that could cause changes to the environmental impacts discussed in Chapters 4 and 5 (impacts based on the design discussed in Chapter 2).

Since the publication of the Draft EIS, DOE acquired an improved understanding of the interactions of potential repository features with the natural environment and the advantages of a number of design features to enhance waste containment and isolation. In May 2001, DOE published a Supplement to the Draft EIS to provide the updated information to the public. The Supplement assessed the potential short- and long-term environmental impacts from the implementation of the most recent design enhancements, including various operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste. This Final EIS, which incorporates the results of the Draft EIS and the Supplement, demonstrates the range of environmental impacts that would be reasonably likely to occur from the implementation of the base design and its various features and options.

3.2 (7456)
Comment - EIS001912 / 0032
Scenario 2 is unrealistic in that it assumes no institutional control at a point where institutional control would continue at Yucca Mountain.

The No-Action Alternative (Scenario 1 and 2) essentially describes interim above ground storage conditions at the reactor sites. Would this same situation apply to waste held above ground at a centralized DOE facility. If not, why not. It is also likely that DOE will have to take title to the waste if a repository does not open. Would DOE allow for loss of institutional control?

Page 2-60 1st paragraph states, "DOE recognizes that neither of these scenarios is likely to occur in the event there is a decision not to develop a repository at Yucca Mountain." Contrary to the statements further down in the paragraph, these scenarios are not realistic and neither is the No-Action Alternative.

Response
Scenario 2 assumes no effective institutional control after approximately 100 years. The EIS defines short-term impacts as those that would occur until and during the closure of the repository (approximately 100 years following the start of emplacement) and long-term impacts as those that would occur after repository closure (after 100 years) and for as long as 10,000 years as discussed in Section 2.4 of the EIS. Section 2.4 of the EIS contains a general comparison of the Proposed Action and No-Action Alternative (Section 2.4.1), potential short-term impacts (Section 2.4.2), long-term impacts (Section 2.4.3), and transportation impacts (Section 2.4.4), including a table that compares the impacts associated with the Proposed Action and No-Action Alternative for these two time periods. For purposes of analysis, the same situation was assumed to occur at Yucca Mountain. Assuming no effective institutional control after 100 years provides a consistent analytical basis for comparing the No-Action Alternative and the Proposed Action.

DOE based the choice of 100 years on a review of generally applicable Environmental Protection Agency regulations for the disposal of spent nuclear fuel and high-level radioactive waste (40 CFR Part 191), Nuclear Regulatory Commission regulations for the disposal of low-level radioactive material (10 CFR Part 61), and the National Research Council report on standards for the proposed Yucca Mountain Repository (DIRS 100018-National Research Council 1995), which generally discount the consideration of institutional control for longer periods in performance assessments for geologic repositories.

As discussed in the EIS (see Chapter 1 and Sections 2.2 and 2.3), DOE analyzed the No-Action Alternative, or maintenance of the status quo, to serve as a baseline for comparing the magnitude of potential environmental impacts of the Proposed Action. Under the No-Action Alternative, and consistent with the NWPA, DOE would terminate activities at Yucca Mountain and undertake site reclamation to mitigate any significant adverse environmental impacts.

3.2 (7798)
Comment - EIS001653 / 0002
DOE provides no substantive details about the proposed action and no-action alternatives. Instead, the DEIS attempts to use inclusive boundary analysis to substitute for Missing information and design attributes which have not been proven to work. Unfortunately, without a performance assessment capability, DOE cannot establish

boundaries for various design alternatives. Although we recognize the need to maintain some flexibility for the final repository design, the description of the action in the DEIS is done in very generic terms and fails to adequately describe the waste management system associated with Yucca Mountain.

Response
The NWPA establishes a process leading to a decision by the Secretary of Energy on whether to recommend the Yucca Mountain site to the President for development of a geologic repository. As part of this process, DOE must undertake site characterization activities at Yucca Mountain to provide information and data needed to evaluate the site and prepare an EIS. The Department has an ongoing site characterization program of investigations and evaluations to assess the suitability of the Yucca Mountain site as a potential geologic repository and to provide information for the EIS. The program consists of scientific, engineering, and technical studies and activities. DOE used information from the program in preparing the EIS.

3.2 (7842)
Comment - EIS001653 / 0031
Pg. 2-87 1st Par states, "The analysis in the EIS did not identify any potential environmental impacts that would be a basis for not proceeding with the proposed action." This is not the purpose of the DEIS. The proposed action is to construct, operate and eventually close a repository. The analysis of the DEIS needs to focus on the implementation of the proposed action. Can DOE implement the proposed action and not merely proceed with it?

Response
In the context of the cited paragraph, "proceeding" with the Proposed Action and "implementing" the Proposed Action are the same.

3.2 (7858)
Comment - EIS001227 / 0006
Final Waste Management PEIS Applicability?

In several sections of the Draft EIS, reference was made to the Final Waste Management PEIS (DOE 1997b).

The adequacy of portions of a source DOE NEPA [National Environmental Policy Act] report was challenged in federal court and one result is that this Final PEIS now lacks site restoration components.

An employee of a DOE contractor that was reviewing data for the PEIS claimed that quality was lacking. The results of those charges can be seen on the GAP web site.

Generally, this PEIS has had a lengthy and troubled history which leads to question of its adequacy.

Response
Litigation regarding the Final Waste Management Programmatic Environmental Impact Statement (DIRS 101816-DOE 1997) has been resolved. DOE referred to that document in this EIS because it addressed the treatment and storage of high-level radioactive waste.

3.2 (7888)
Comment - EIS001653 / 0046
Section 3.2.2.1. The Baseline Description in the DEIS does not provide for the following:

- Outdoor recreation use
- Appropriate visual analysis including visual characteristics of surrounding lands
- Specific land uses residential, commercial, agricultural
- Mining claims and activity-patented mining claims
- Grazing-allotment, name of permit holder, season of use, total aums [AUMs – animal unit-months]

Land use maps showing types of ownership and uses along the routes should be included in the DEIS. Simply referencing other BLM [Bureau of Land Management] documents is not sufficient. Lander County is not in the Tonopah Resource Area. All of the aforementioned resources and uses need to be shown on maps with discussion

of various resources. Did any DOE staff or contractors actually visit the areas along proposed routes? Please identify the resource expert and the type of site visits made.

Response
DOE has modified the baseline descriptions for land use to reflect additional coordination with the appropriate Bureau of Land Management regional offices (see Section 3.2.2.1.1 of the EIS). The modified material includes the identification of notable recreation areas and usage. Section 3.2.2.1.8 contains information on the visual characteristics of surrounding lands. DOE used Bureau of Land Management visual resource management classifications as a surrogate to assess a corridor's scenic sensitivity. Because the Bureau controls the majority of lands within the 400-meter (0.25-mile)-wide rail corridors, and prepares environmental assessments based on visual resource management classifications, DOE incorporated this approach for consistency and for purposes of comparison. The EIS discusses views from selected locations in each candidate rail corridor.

The EIS does not discuss land uses for specific areas or tracts of land because DOE believes it can make decisions on the relative merits of each corridor using current information. More definitive information is not available at present on specific tracts of land that could be required or specific areas where access to lands could be impaired. DOE would minimize restrictions to or control of land used for recreation or mining and could develop specific mitigation measures to alleviate potential impediments to continued use of lands.

With regard to grazing land and animal unit-months, DOE expects that, after construction of a branch rail line, operational impacts would be less even though the line could divide some grazing lands. Input received from the Bureau of Land Management indicates that dividing grazing lands would result in a small loss of animal unit-months in large allotments but would probably not affect ranch operations. The loss of animal unit-months in small allotments could affect a permittee's operation. The Bureau indicated that a branch rail line dividing an allotment into separate pastures could provide an opportunity to rotate use, enabling new grazing management options. This could benefit livestock and vegetation management.

Incorporating information by reference is consistent with Section 1502.21 of the Council on Environmental Quality regulations. The information in the EIS is, in part, from referenced documents. DOE provided the references to assist readers in obtaining additional information. Chapter 13 lists all the individuals who contributed to the preparation of the EIS.

3.2 (7895)
Comment - EIS001227 / 0007
DOE Control Over Technical Review Process

Appendix Section 13.2, pages 13-7 and 13-8, provided a listing of reviewers. Only organizations and general offices were provided. The Final EIS should provide a listing of the personal names and work addresses of the reviewers. In looking over the list of preparers I noticed virtually all of them would likely have a strong vested interest in seeing that the proposed repository at Yucca Mountain is approved and put into operation. This represents a major conflict of interest in the preparation of the Draft EIS. The preparation and review of the Final EIS should involve a selection of individuals who clearly have no stake in the outcome of the EIS review process.

A panel of independent experts should be established to determine the individuals who should perform future reviews of the EIS. A major selection criteria should be that these individuals should have no vested interest in the outcome of the repository analysis.

Response
Chapter 13 of the EIS contains a list of individuals who filled primary roles in the preparation of this EIS. DOE directed the preparation of the EIS with primary support and assistance from Jason Technologies Corporation. Consistent with Council on Environmental Quality regulations [40 CFR 1506.5(c)], neither Jason Technologies Corporation nor any of its subcontractors has a financial interest or other interest in the outcome of the project.

Title V of the NWPA established the Nuclear Waste Technical Review Board as an independent organization in the Executive Branch. The Board is responsible for evaluating the technical and scientific validity of activities undertaken by the Secretary of Energy, including activities related to the packaging or transportation of spent

nuclear fuel and high-level radioactive waste. Members of the Board are appointed by the President after being nominated by the National Academy of Sciences. Board members have no financial interest or other interest in the outcome of the Yucca Mountain Project.

3.2 (7898)
Comment - EIS001653 / 0050
Throughout Chapter 3 DOE repeatedly references other EISs or other documents for more specific information. In certain circumstances, the referenced information is important to the review of the action. It is questionable whether DOE has met the intent of 40 CFR 1502.21. Reference by incorporation is made when the effect will be to cut down on bulk without impeding agency and public review.

Response
Without greater specificity it is difficult to understand the circumstances referred to in this comment. In any event, DOE believes that the EIS adequately analyzes the environmental impacts that could result from either the Proposed Action or the No-Action Alternative.

3.2 (7995)
Comment - EIS001672 / 0002
Out of the research that I have done about the Yucca Mountain, it seems as though your organization has not researched the history of the land around Yucca Mountain. So before you contaminate our land, do some research on our land, and for once think of someone other than yourselves.

Response
Chapter 3 of the EIS discusses information relevant to land use and naturally occurring resources at and near the Yucca Mountain site. DOE believes it has provided enough information to determine potential environmental impacts from the Proposed Action in a manner that is proportional to their potential significance. The EIS addresses clearly insignificant or minor impacts in less detail (see Chapter 4).

3.2 (8002)
Comment - EIS000817 / 0057
This choice of the thermal load directs everything else as far as spacing, ventilation, etc. Why hasn't this decision been made by now? How can you evaluate an EIS that has made no major decisions?

Response
A primary purpose of an EIS is to be a tool to assist in decisionmaking. The Council on Environmental Quality regulations encourage agencies to integrate the National Environmental Policy Act process with other planning at the earliest possible time to ensure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts. As discussed in the Foreword and Section 1.1 of the EIS, DOE developed the information about potential environmental impacts from the Proposed Action and the No-Action Alternative. Any recommendation by the Secretary, as required by the NWPA, must include a description of the proposed repository, including preliminary engineering specifications for the facility. These preliminary specifications will provide information relevant to the management of heat in the repository.

3.2 (8083)
Comment - EIS000406 / 0007
Observations made by technical oversight groups call into question whether DOE currently has the ability to predict performance and hence the potential environmental impacts of the repository. If this is the case, we question whether the DEIS in its current form could support the decision by the Secretary of Energy to recommend the site to the President and congress. Unfortunately, it appears that the completion of the EIS process is being driven more by schedules than the ability to support decisions with strong technical analysis. For this reason, DOE needs to consider reissuing a draft EIS when the ability to predict performance can support the environmental impact analysis and ultimately a decision to recommend the Yucca Mountain site for geologic disposal. Furthermore, the analysis in the DEIS cannot be based upon conceptual designs, particularly when such concepts (design alternatives) have not been utilized or proven to work.

Response
This comment is correct that oversight groups have concerns about various aspects of the Total System Performance Assessment. For example, the most recent report of the Total System Performance Assessment Peer Review Panel (DIRS 102726-Budnitz et al. 1999) provided many observations and suggestions for improving the assessment tools. The Panel concluded, however, that the overall performance assessment framework and the approach used to develop the Total System Performance Assessment were sound and followed accepted methods.

Since the publication of the Draft EIS, DOE published the Supplement to the Draft EIS, which focused on the most recent design enhancements, including various operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste. The Supplement and this Final EIS report repository performance results based on assessment tools that reflect improvements due to the observations and suggestions of the Peer Review Panel. DOE believes that the level of information provided for each element of the design (such as waste handling facilities, heat management scenarios, and transportation implementing alternatives and scenarios), as well as the improved performance assessment tools, is sufficient to provide a meaningful assessment of environmental impacts.

3.2 (8084)
Comment - EIS001653 / 0063
Pg. 4-1 to 4-60 describes the activities but makes little or no judgment about the significance of impacts. There needs to be more conclusions about the information in the DEIS.

Response
DOE believes that it has appropriately characterized the significance of impacts to resource areas.

3.2 (8090)
Comment - EIS001653 / 0066
To be consistent with the no-action alternative (scenario 2), the DEIS must describe impacts from the loss of institutional control. The analysis of the contingency must also describe the costs to manage waste in this form indefinitely and who would be responsible for the cost. Maintaining waste on-site at Yucca Mountain would be similar to the no-action alternative-deep geologic storage would be the preferred option.

Response
The analyses performed to determine the environmental consequences of long-term repository performance (see Chapter 5 of the EIS) are comparable to those performed for Scenario 2 of the No-Action Alternative in that DOE took no "credit" for effective institutional control after 100 years following closure of the repository. This was to ensure there was no undue reliance on institutional control in making long-term safety estimates because of uncertainty about future societies and to not burden future generations unduly. In these analyses, DOE would dispose of the wastes and close the repository, which would then be subject to natural and human-induced features, processes, and events that could affect the release of radionuclides and toxic chemicals. Sections 2.1.5 and 2.2.3 of the EIS contain cost estimates of the Proposed Action and the No-Action Alternative, respectively. However, DOE did not perform a cost-benefit analysis because it is not necessary to support current decisionmaking. DOE believes that the EIS adequately analyzes potential impacts to public health, safety, and the environment.

3.2 (8110)
Comment - EIS001653 / 0069
DOE has recently dropped the high thermal load alternative as a possible final design option for Yucca Mountain. If this is true why did the DEIS consider it to be a viable thermal load alternative? Is the analysis in the DEIS with respect to the high thermal load alternative still accurate? What can DOE say about the accuracy of other design scenarios and the boundary analysis?

Response
As discussed in Section 2.1.1.5, the designs analyzed in the Draft EIS were preliminary and likely to evolve in various ways. DOE believed that ongoing site characterization and design-related evaluations would demonstrate a continued improvement in waste isolation (repository performance) and a reduction in associated uncertainties. However, DOE recognized that, since the publication of the Draft EIS, key aspects of the design (such as disposal container components, use of drip shields) have changed in ways that would be important to repository performance

and reduction in uncertainties. To provide updated information to the public, DOE published a Supplement to the Draft EIS, which focused on the most recent design (called the flexible design), including various heat-management scenarios. This design is consistent with that in the *Science and Engineering Report: Technical Information Supporting Site Recommendation Consideration* (DIRS 153849-DOE 2001). DOE believes that the EIS adequately analyzes each element of the Proposed Action (such as waste handling facilities, heat management scenarios, and transportation implementing alternatives and scenarios). This information was carried forward to the Final EIS.

3.2 (8134)
Comment - EIS000817 / 0079
P. 2-69 -- The fact that this EIS analyzes disposal of all of the projected waste that could go to Yucca Mountain shows that this is in fact a consideration. This flies in the face of all the promises made to limit the site to 70,000 MTHM [metric tons of heavy metal]. You are acting in bad faith with the general public and the State of Nevada by putting this analysis in here, and it breeds distrust of any further DOE promises in the future.

Response
Under the Proposed Action, DOE would place 70,000 metric tons of heavy metal (MTHM), comprised of 63,000 MTHM of commercial spent nuclear fuel and 7,000 MTHM of DOE spent nuclear fuel and high-level radioactive waste, in a geologic repository at the Yucca Mountain site. This overall inventory includes approximately 50 metric tons (55 tons) of surplus weapons-usable plutonium as spent mixed-oxide fuel and immobilized plutonium. During the scoping period, DOE received many comments that noted the existence of more than 70,000 MTHM of these materials and encouraged DOE to evaluate the impacts of placing the total projected inventory at Yucca Mountain. For example, presently operating commercial nuclear powerplants, DOE, and the Navy could generate approximately 107,500 MTHM of spent nuclear fuel eligible for disposal by 2046 if the Nuclear Regulatory Commission extended all commercial nuclear powerplant licenses. In addition, some commenters requested that the EIS evaluate the disposal of radioactive waste types that might require permanent isolation, such as Greater-Than-Class-C low-level waste and Special-Performance-Assessment-Required waste. For these reasons, Chapter 8 of the EIS evaluates the cumulative environmental impacts that could occur from the disposal of this material at the Yucca Mountain site.

3.2 (8442)
Comment - EIS001397 / 0010
There are several plans put forth in the DEIS for the design of this facility. The summary only shows a single block of storage drifts in multiple diagrams. However, in the document itself, plans are suggested for up to eight blocks within the mountain. This is very misleading. If the DOE is not sure of the final design yet, then this discussion is premature. We cannot be expected to analyze a proposal that is incomplete at this time.

The same is true of proposed transportation routes and railways that have yet to be built. It is premature to expect public evaluation when the DOE has yet to make up its own mind. The final EIS must contain clear and complete plans for all aspects of this project. Any additional developments that are not explicitly addressed in this EIS, such as all transportation routes and rail route construction, must go through the entire DEIS review process at whatever point in the future they are fully developed and presented.

The important issue at stake, and the focus of the National Environmental [Policy] Act, is the survival of life on this planet and its life forms, not expedience for nuclear utilities and governmental departments.

Response
With regard to repository blocks, this comment apparently refers to figures that describe the underground layout of the three thermal loads in Section 2.1.2.2 of the Draft EIS and to figures in Appendix I (Figures I-2 through I-7). These latter figures show layouts for the Proposed Action (Figures I-2, I-4, and I-6) and for Inventory Modules 1 and 2 (Figures I-3, I-5, and I-7). The layouts for the Proposed Action are the same as those shown in Section 2.1.2.2, and Chapter 8 contains the analysis of the inventory modules. Based on provisions of the Nuclear Waste Policy Act of 1982, which prohibits the Nuclear Regulatory Commission from authorizing the disposal of more than 70,000 metric tons of heavy metal, DOE could dispose of only the Proposed Action inventory as shown in Figures 2-14 through 2-16 (which are the same as Figures I-2, I-4, and I-6).

The Draft EIS discussed (see Section 2.1.1.5 for example) ongoing site characterization activities and design evaluations, and the potential for resulting changes to the design. Since the publication of that document, DOE acquired an improved understanding of the interactions of potential repository features with the natural environment, and the advantages of a number of design features (such as titanium drip shields) to enhance waste containment and isolation. DOE published the Supplement to the Draft EIS to provide the updated information to the public. While aspects of the design evolved from those in the Draft EIS, the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain (such as transportation of spent nuclear fuel and high-level radioactive waste) remained unchanged. For this reason, the Supplement focused on the most recent design enhancements, including a range of operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste. It is important to recognize that these design enhancements could continue to evolve. If the Yucca Mountain site was approved, a more refined and improved design would only be determined at the time of license application to the Nuclear Regulatory Commission. This refined design would be likely to continue to improve because of the license application process. Consistent with Council on Environmental Quality and DOE regulations, design modifications would be subject to future National Environmental Policy Act review.

As discussed in the Foreword to the EIS, DOE believes that the EIS provides the information necessary to make transportation-related decisions regarding the basic approaches (for example, mostly rail or mostly truck shipments), as well as the choice among alternative transportation corridors. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions if information was incomplete or unavailable and if there were uncertainties, provide a meaningful assessment of environmental impacts consistent with the regulations. However, follow-on implementing decisions, such as selection of a specific rail alignment within a corridor, would require additional field surveys, state and local government consultations, environmental and engineering analyses, and National Environmental Policy Act reviews.

3.2 (8548)
Comment - EIS002256 / 0003
There are two studies outstanding that we believe are important for really examining the viability of Yucca Mountain that haven't been completed yet. One is a fluid inclusion study which should be completed sometime -- I think by the end of this year or the beginning of next year. And also there's another study which involves satellite information on seismic stretching around the Yucca Mountain area, which would, I believe, also be completed sometime next year.

The fluid inclusion study is one which indicates the possibility of thermal water up-welling into the repository. This could be a very significant impact to the immediate area around Yucca Mountain as well as further away from Yucca Mountain.

It is indicated in the DEIS, but the time as to when the last potential thermal up-welling occurred has not been clearly defined, at least by science.

Like I said, it mentions -- and that's what this study is for -- it clearly defines whether it was thermal water that up-welled into the repository cavity. And so we want these studies completed before recommendations go to the president and for final public comment, as well as the satellite studies indicate movement around the project. In fact, as of November of 1988, the information at that time indicated that the crust was moving at 20 times the rate previously thought.

So we thought this study also should be completed before the final recommendation is made and for full public comment on that as well. So we believe that certainly with those two studies, along with other information that I commented on earlier that the DEIS is definitely deficient in that regard.

Response
Section 3.1.4.2.2 of this EIS discusses the DOE perspective on the likelihood of significant changes in the water table and the potential for groundwater intrusions to the level of the proposed repository. Independent experts contracted by DOE to review the available information and reports concluded that a warm-water upwelling to the repository level had not occurred. DOE agrees, however, that more research is needed.

In any event, DOE recognizes that information remains incomplete and unavailable (see Section 2.5.1 of the EIS). Consistent with Council on Environmental Quality regulations (40 CFR 1502.22), the Department concluded that sufficient information was available to assess the range of impacts that could result from either the Proposed Action or the No-Action Alternative. The Secretary of Energy has not yet determined whether to recommend the Yucca Mountain site to the President for development as a repository.

3.2 (8582)
Comment - EIS000817 / 0185
P. H-7. There is no detailed design of the Waste Treatment Building? Then how can you do this draft EIS?

Response
As discussed in Appendix H of the EIS, DOE considered the analyses and supporting information used in the Waste Management Programmatic EIS (DIRS 101816-DOE 1997) to aid in identifying potential accident scenarios and in evaluating radionuclide source terms. The Department based the information in this EIS on high- and low-level waste handling and treatment experience at various DOE sites. Those sites have stored, packaged, treated, and transported these wastes for several decades and have compiled an extensive database of information relevant to accident assessments (such as safety analysis reports and unusual occurrences). Thus, although a detailed design for the Waste Treatment Building is not yet available, DOE is confident that the accident analyses discussed and analyzed in this EIS reflect actual waste handling and treatment experience and, therefore, are sufficient for identifying potential environmental impacts. DOE has modified Appendix H to provide the basis for the use of accident-related information from the Waste Management Programmatic EIS.

3.2 (8625)
Comment - EIS001256 / 0016
The EIS fails to provide for the protection of all components of the biosphere (that is, the protection of the environment for its own sake).

Response
The purpose of the National Environmental Policy Act is to promote an understanding of the environmental consequences of Federal actions before an agency takes action. The statute does not prohibit activities that could harm the environment; rather, it requires Federal agencies to disclose the extent of such environmental harm, and any environmental benefits, to the public and to agency decisionmakers. The EIS describes the type and magnitude of environmental impacts that could occur if there was a decision to construct, operate and monitor, and eventually close a geologic repository at the Yucca Mountain site.

3.2 (8660)
Comment - EIS001579 / 0001
In that very lengthy and detailed technical analysis of Yucca Mountain, I find that's one of the major limitations of it, that we are not looking at the moral responsibility to future generations adequately.

I also feel that my students are ready to consider alternatives to the nuclear power industry and also to nuclear arms, and I would like us to consider more alternatives than just the action and no action. I learn that we get trapped into some old modes of thinking. Students are very good at pointing that out to me. So if we get ourselves trapped into action and no action, I think we are heading for trouble.

I was also reminded of that trap and also the need for change, and certainly change in their lifetimes is going to be accelerating much less over the next thousand years. As I was reading two reports that came out in the last couple weeks, in the January 14th issue of Science there was a report about a plutonium oxide, not just plutonium dioxide being formed, but plutonium oxide, that the ratio of oxygen to plutonium might be greater than two, or something less than three, and in the words of the researcher, the author of that report, they talked about the idea that plutonium dioxide is only -- an outcome of plutonium oxidation was a sacred cow.

Though other researchers have seen hints of the higher oxide, they couldn't reconcile their data until now. Slow reaction times make the newly discovered oxide easy to miss. The researcher came out of Los Alamos. Such reaction times become relevant if buried nuclear waste is to remain stable until the next millennium.

If water is present, the hydrogen gas could build up in sealed containers. Moreover, these oxides dissolve easily in water, explaining why plutonium migrates through the ground more quickly than had been expected. This is very important input for people who modeled these migration processes. I would ask that this EIS statement go back and look at that.

Also an article in the January 25th New York Times, which summarized the work which has come out of Russia and has also been presented in conferences in Oxford and is now being repeated again by people at Los Alamos.

For decades the Mandarins of American science assumed that the phase, the delta phase of plutonium, to be a kind of Rock of Gibraltar on which the American nuclear arsenal could be erected, and expected to weather centuries of storms and service. Now, they note this plutonium instability could sharply cut the lifetime of weapon cores, in theory reducing them from perhaps 70 years to as little as 20 years.

Again, a lot of change [is] coming along very quickly that we have to be ready to adapt to. And that's the part of this EIS statement in its great length, its great detail and great analysis, I think is not prepared to help us handle. I would ask that we begin to include that in the statement.

Response
Recognizing that decisions made by this generation could affect future generations, the EIS addresses potential human health impacts that could occur far into the future. In addition, the EIS notes that, under the No-Action Alternative, the obligation to store spent nuclear fuel and high-level radioactive waste continuously in a safe configuration would become the responsibility of future generations.

The extent to which this Nation should consider options other than nuclear energy is beyond the scope of this EIS. Even if there was a decision to shut down all nuclear powerplants in the country immediately (representing 20 percent of current power production), DOE would still be responsible for the permanent disposal of the spent nuclear fuel and high-level radioactive waste that has been generated to date.

DOE prepared an EIS (DIRS 104832-DOE 1980) that analyzed the environmental impacts that could occur if it developed and implemented various technologies for the management and disposal of spent nuclear fuel and high-level radioactive waste. That EIS examined numerous alternatives, including mined geologic disposal, very deep hole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, space disposal, and no action. The 1981 Record of Decision for that EIS (46 *FR* 26677; May 14, 1981) announced the DOE decision to pursue the mined geologic disposal alternative for the disposition of spent nuclear fuel and high-level radioactive waste. In addition, the NWPA directs DOE to study only the Yucca Mountain site as a potential geologic repository. This EIS follows that directive.

With regard to hydrogen buildup, based on the requirements for shipping casks and waste packages, no water would be permitted inside canisters. Thus, generation and buildup of hydrogen from radiolytic decomposition of water would not occur. In addition, the greatly reduced radiation fields from fuel, which must be cooled 5 years prior to shipment, would limit the generation of hydrogen even if water were present. The radiolytic gases produced from decay of the waste would be a small fraction of the total pressure of the system.

3.2 (8899)
Comment - EIS001198 / 0001
I understand that the NWPA required a technically adequate and final EIS to accompany a site recommendation and license application which can be adopted, to the extent practicable, by the Nuclear Regulatory Commission (NRC). What is the definition of "technically adequate?"

Response
This EIS is consistent with Council on Environmental Quality regulations on the preparation of environmental impact statements (40 CFR Parts 1500 to1508), as well as DOE regulations that implement the National Environmental Policy Act. DOE believes that the procedural and technical aspects of the EIS are adequate.

3.2 (8909)
Comment - EIS000869 / 0035
Paragraph 2 [of Section S.11.2], the unavailability of information and differing interpretations of data, as stated in paragraph two, is a glaring omission throughout this report. Until this information is available and with a consensus of opinion regarding the interpretation of this information, I believe that the Yucca Mountain site should be put on hold.

Response
DOE acknowledges in the EIS that some information is incomplete or not available, and that views and conclusions might exist that differ from those of DOE. The EIS identifies where there is incomplete information, the unavailability of some information, results and conclusions that differ from DOE's, and uncertainties associated with analytical results. In addition, the EIS describes the relevance and importance of the incomplete or unavailable information and then describes the assumptions and preliminary information used in the analysis. DOE has done this to help the reader understand the results or conclusions and their context. If the Secretary of Energy, the President, or Congress believed that these uncertainties were substantial enough to delay the program, a decision to put the project on hold could occur at any time during the approval process.

3.2 (8984)
Comment - EIS001040 / 0021
Why hasn't DOE considered the economic, environmental and public safety impacts of the Yucca site?

Response
Chapters 4 and 5 of the EIS describe the short- and long-term impacts, respectively, of constructing, operating and monitoring, and closing a repository at Yucca Mountain. Chapter 6 describes the impacts of transporting the waste to Yucca Mountain from the current storage sites.

3.2 (9039)
Comment - EIS001866 / 0003
On page S-20 in the Summary of the DEIS in the highlighted box, it states, "... the current level of repository design is insufficient to meet information needs for a License Application to the Nuclear Regulatory Commission. The design will continue to evolve through the submittal of the License Application." The public cannot meaningfully comment on an "evolving design" or any other part of the proposed action that is not a firm decision. And it is clear to the Task Force that attempts to show computer-modeled compliance with the Environmental Protection Agency (EPA) standards will drive all design decisions -- not public input.

Response
DOE noted in the Draft EIS (see Section 2.1.1.5, for example) that the analyzed designs were preliminary, and that it was investigating various design options and features to effect a predicted improvement in repository performance and to reduce associated uncertainties. The Department published the Supplement to the Draft EIS, which focused on a more recent repository design (called the flexible design) that included various heat-management scenarios. DOE believes that the EIS adequately analyzes each element of the Proposed Action (such as waste handling facilities, heat management scenarios, and transportation implementing alternatives and scenarios).

DOE acknowledges that it will continue to use the results of computer-based models, in part, to help shape the repository design. However, the Department will also continue to consider public input to the EIS process and other aspects of the Yucca Mountain Program and to the development of the design.

3.2 (9110)
Comment - EIS001937 / 0002
The scope of the site characterization, as represented in the draft EIS, has been framed such that certain potentially problematic aspects of the project have not been included. I am not referring to elements of need, timing, alternatives to isolating spent nuclear fuels and radioactive wastes in a repository, or alternative sites, as, under the Nuclear Waste [Policy] Act (NWPA), the Department of Energy (DOE) is not required to consider these aspects in the draft EIS.

I have two concerns regarding the issue of omissions. First, without explanation of the proper place or time where and when "the views and concerns not related to the scope of content of the Proposed Action," will be addressed, there is a danger in approving the document as it is currently proposed. It could appear that one unequivocally approves the project in entirety, when [its] entirety is not actually presented. Granted, the document makes these exclusions clear, but it does not indicate or acknowledge their validity. Secondly, without explaining the reason for the omission of the elements of need, timing, alternatives to isolating spent nuclear fuels and radioactive wastes in a repository, or alternative sites, the public clearly is only providing comments on a portion of the proposed action.

Response
The NWPA states that the EIS need not consider the need for a geologic repository, the time at which a repository could become available, and alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository. In addition, it addresses the issue of potential alternative sites by indicating that the EIS does not need to consider any site other than Yucca Mountain for repository development (see Section 1.5).

With regard to the concern that the public is only providing comments on a portion of the Proposed Action, DOE believes that it has provided a complete description of the Proposed Action and that comments submitted on the Draft EIS or the Supplement to the Draft EIS could be helpful to the Department in its preparation of the Final EIS. In the event Yucca Mountain is ultimately authorized and the project moves forward, DOE would submit a license application to the Nuclear Regulatory Commission. The Commission's licensing process would afford the public additional opportunities to review and comment on the specific design elements of the proposed Yucca Mountain Repository. In the event DOE incorporates additional design modifications subsequent to the submittal of the License Application, the Nuclear Regulatory Commission's licensing process would provide additional opportunities for the public to comment on the repository.

3.2 (9141)
Comment - EIS001971 / 0001
Our citizen's group C.U.R.E. has remained active trying to keep abreast of developments. Through our experience, we gained a vastly expanded understanding of "our back yard," which continues to apply to Prairie Island and extends, as far as we can tell, to Utah and even to Nevada. We remain deeply concerned about the standards and criteria applied to any site, timely promulgation of rulings, environmental impacts, and the siting of nuclear waste on Native American lands. We continue to look to state and federal agencies for the cohesive analysis of possible nuclear waste scenarios that is so critical to a successful and responsible long term waste management program. Unfortunately, the D.E.I.S. for Yucca Mountain, despite its cost, bulk and data, does not seem to have put us any closer to this goal.

Response
Chapter 11 of the EIS discusses the status of the Environmental Protection Agency and Nuclear Regulatory Commission regulations, as well as other relevant statutes and requirements germane to the construction, operation and monitoring, and eventual closure of a repository at Yucca Mountain (the Proposed Action). Chapters 4 through 8 and 10 discuss potential environmental impacts from the Proposed Action and the No-Action Alternative. Sections 3.1.6, 3.2.2.1.5, 3.2.2.2.5, and 4.1.5 discuss Native American lands.

3.2 (9230)
Comment - EIS001888 / 0032
The DEIS is insufficient and incomplete with regard to National Environmental Policy Act requirements, Executive Order 12898, and professional practice because the DEIS:

- Provided insufficient scope and detail to allow for impact determination that could result in the planning and implementation of mitigation and management plans.

- Narrowly defined the scope and nature of impacts, thus assuring that few impacts of significance would be identified. For example, the DEIS ignored potential impact categories important to Clark County's economy ... (e.g., stigma effects on tourism, land use conflicts, property diminution and unfunded mandates on local government) although there is credible evidence that shows that these may occur.

- Failed to include minorities and low-income groups in the scoping, interactive and hearing processes related to the EIS.

Response
As discussed in Section 1.5.1 of the EIS, DOE received input during the scoping process from the public and a number of organizations. DOE considered the comments and information received during public scoping, and modified the analytical approach to the EIS accordingly. DOE also identified those comments and information unrelated to the planned scope or the content of the Proposed Action such as the constitutional basis for disposal in Nevada, or those comments that would have resulted in analyses that would be uncertain or speculative such as those related to risk perception or stigmatization, and loss of tourism. Section 1.5.1 has been modified accordingly. Based on the results of the scoping process, DOE analyzed a variety of alternatives and scenarios that would implement a Proposed Action to construct, operate (including transportation) and monitor, and eventually close a repository at Yucca Mountain. These alternatives and scenarios reflect potential design and operating modes, waste packaging approaches, and transportation options for shipping spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site from 77 commercial and DOE sites around the Nation.

DOE believes that its approach to the public involvement process during the development of the EIS is consistent with the National Environmental Policy Act, the Council on Environmental Quality and DOE regulations, DOE guidance on public participation, and Executive Order 12898 during the preparation of EISs. A *Federal Register* notice announced the release of the Draft EIS. Before each hearing, DOE placed advertisements in local newspapers, including Spanish language newspapers, and distributed public service announcements and press releases to more than 175 local and national stakeholders and media outlets to publicize information that would be accessible to the general public and to minority and low-income communities.

3.2 (9273)
Comment - EIS001938 / 0008
The DEIS contains numerous information gaps. There are references throughout the document to incomplete or unavailable information, information which is essential to ensuring that [the] DEIS contains a thorough and accurate review of the project.

The DEIS is rife with examples where scientific information is either incomplete, unavailable, or in dispute. The failure of DOE to fully acknowledge and resolve such controversies makes the document vulnerable to legal challenge.
As an example, the DEIS fails to address the safety of the repository containers in the instance of seismic activity. In fact, the DEIS states that the "DOE needs to complete additional investigations of ground motion site effects before it can produce the final seismic design basis for the surface facilities." The same section indicates that there may be higher crustal strain rates than would be predicted by reviewing the area's Quaternary volcanic and tectonic history. In other words, the DOE indicates that there may be a need for additional studies and those that have been done could have significantly underestimated the potential volcanic and seismic hazards at the site. If a problem results from the fact that this project is being sited in a geologically active system, protected National Park, NWR [National Wildlife Refuge] and Wilderness resources are downstream and are likely to suffer from contamination from a leak at the repository site. Even if the chances of such an accident are small, the impact would be so profound that this risk mandates thorough analysis and scrutiny.

Another example of incomplete information is the need to more thoroughly understand the groundwater resources and relationships between Yucca Mountain and the aquifer underlying DVNP [Death Valley National Park] and environs. As noted [above], the DEIS fails to acknowledge the existence of other hydrological information which may contradict DOE-generated information. There is little question that additional study will be necessary to fully understand the groundwater flow system, and this basic knowledge will be required to accurately determine the potential environmental impacts of utilizing Yucca Mountain as a repository for high-level radioactive waste. Effective modeling must also consider a response of the flow system to a number of likely variables, including continued development, increased groundwater withdrawals, variations in precipitation, and groundwater recharge. Absent that kind of data and analysis, the DEIS will not be able to conclusively determine potential environmental impacts, and is therefore incomplete.

In sum, the DEIS contains numerous references to incomplete or unavailable information. Repository functions are based on computer models and like much of the analysis in this document, the data are incomplete and are being fed into untested models. There is sufficient scientific uncertainty surrounding the proposed project that additional study needs to be conducted. The controversial nature of the scientific studies conducted regarding the project (i.e., varying results and interpretations) also warrants further discussion in the revised DEIS.

NEPA [National Environmental Policy Act] case law is instructive in this regard. An EIS must provide sufficient detail and analysis to fulfill the requirement of NEPA to "ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken." 40 CFR 1500.1(b). NEPA requires the federal agency to "consider every significant aspect of the environmental impact of a proposed action" Vermont Yankee Power Corp. v. Natural Resources Defense Council [NRDC], 435 U.S. 519, 553 (1978), and to ensure "that the agency will inform the public that it has indeed considered environmental concerns in its decision making process." Baltimore Gas and Electric Company v. NRDC, 462 U.S. 87, 97 (1983).

CEQ [Council on environmental Quality] regulations place specific requirements on federal agencies when NEPA review is based on incomplete or unavailable information:

"When an agency is evaluating reasonably foreseeable significant adverse impacts on the human environment or in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

(a) If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall cost of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

(b) If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:

(1) A statement that such information is incomplete or unavailable; (2) a statement of the foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment, and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community."

40 CFR 1502.22

The aforementioned provision requires the "disclosure and analysis of the costs of uncertainty [and] the costs of proceeding without more and better information." Southern Oregon Citizens Against Toxic Sprays, Inc. v. Clark (SOCATS), 720 F.2d 1475, 1478 (9th Cir. 1983). "On their face these regulations require an ordered process by an agency when it is proceeding in the face of uncertainty." Save Our Ecosystems v. Clark, 747 F.2d 1240, 1244 (9th Cir. 1984).

Thus, 40 CFR 1502.22 imposes three mandatory obligations on the DOE in the face of uncertainty: (1) a duty to disclose the uncertainty; (2) a duty to complete independent research and gather information if no adequate information exists (unless the costs are exorbitant or the means of obtaining the information are not known); and (3) a duty to evaluate the potential, reasonably foreseeable impacts in the absence of relevant information, using a four-step process. The DOE has failed to meet the requirements of 40 CFR 1502.22 in the face of uncertainty regarding many of the foreseeable environmental impacts of the proposed project.

The Ninth Circuit Court determined that "Section 1502.22 clearly contemplates original research if necessary" and held that "NEPA law requires research whenever the information is significant. As long as the information is ... essential or significant, it must be provided when the costs are not exorbitant in light of the size of the project and the possible harm to the environment." Save Our Ecosystems, 747 F.2d at 1244n.5. See also SOCATS, 720 F.2d at 1479 (40 CFR 1502.22(a) requires the BLM [Bureau of Land Management] to independently assess the safety of the herbicides it uses if existing data is inadequate). Although NEPA does not mandate substantive results, its action-

forcing procedural provisions "are not highly flexible, [and] establish a strict standard of compliance." Calvert Cliffs Coordinating Comm. V. United States Atomic Energy [Commission], 449 F.2d 1109, 1112 (D.C. Cir. 1971).

The duty to delay finalization of NEPA documentation when faced with incomplete or unavailable information ensures that agencies comply with NEPA's central purpose -- "to obviate the need for speculation by insuring that available data is gathered and analyzed prior to the implementation of the proposed action." Save Our Ecosystems, 747 F.2d at 1248-49. NEPA "envisions that program formulation will be directed by research results rather than that research programs will be designed to substantiate programs already decided upon." Id. See also 40 CFR 1500.1(b) (NEPA procedures ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken).

Response
As discussed in Section 2.5 of the EIS, some of the analyses relied on incomplete information. DOE identified the use of incomplete information or the unavailability of information in accordance with Council on Environmental Quality regulations. In these instances, the Department described the basis for the analyses, including assumptions, the use of preliminary information, or conclusions from draft or incomplete studies.

DOE acknowledges (see Section 2.5) that the results of analyses often have associated uncertainties, which could be the result of the assumptions used, the complexity and variability of the process being analyzed, the use of incomplete information, or the unavailability of information. To enable an understanding of the status of its findings, the EIS describes any uncertainties associated with the results.

An uncertainty identified in the Draft EIS was the potential for changes to the design due to ongoing site characterization activities and design evaluations. Since the publication of the Draft EIS, DOE has acquired an improved understanding of the interactions of potential design features with the natural environment, and the advantages of a number of design features to enhance waste isolation and containment. As a result, in May 2001 DOE published the Supplement to the Draft EIS. The Supplement focused on the most recent base design enhancements, including various operating modes to manage heat generated by emplaced spent nuclear fuel and high-level radioactive waste.

DOE continues to study issues relevant to an understanding of what could happen in the future at Yucca Mountain and the potential impacts associated with its use as a repository (see Section 2.1.2.3, for example). As a result, this Final EIS includes information that was not available for the Draft EIS. Ongoing studies will continue to improve the Department's understanding of the potential interactions of repository features with the natural environment, and the advantages of design features to enhance waste containment and isolation and to further reduce uncertainties.

DOE believes that the information in this Final EIS on impacts that could result from either the Proposed Action or the No-Action Alternative is consistent with National Environmental Policy Act requirements. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts, and the use of bounding assumptions if information was incomplete or unavailable and if there were uncertainties, combine to provide a meaningful assessment of impacts consistent with the regulations.

3.2 (9291)
Comment - EIS001888 / 0016
Because of the lack of compliance with NEPA [National Environmental Policy Act] requirements, consideration of important individual and cumulative impacts, and inclusion of affected groups in the process, the DEIS is inadequate and incomplete. Therefore, the DEIS does not provide enough scope and detail to allow for meaningful mitigation planning.

The rationale for this statement takes into account the following points. The Draft EIS:

- does not comply with the letter and intent of NEPA since it did not provide a realistic alternative that allows for consideration of a No Action Alternative,
- provided insufficient scope and detail to allow for impact determination that could result in the planning and implementation of mitigation and management plans,

- narrowly defined the scope and nature of impacts, thus assuring that, few impacts of significance would be identified. For example, the DEIS ignored potential impact categories important to Clark County's economy and (e.g., stigma effects on tourism, land use conflicts, property diminution and unfunded mandates on local government) although there is credible evidence that shows that these may occur, and,

- failed to include minorities and low-income groups in the scoping, interactive and hearing processes related to the EIS.

Response
The NWPA specifies that it is not necessary for this EIS to consider the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. Although the NWPA does not require DOE to evaluate alternatives to the repository, DOE chose to evaluate a No-Action Alternative to provide a basis for comparison with the Proposed Action. With regard to the reasonableness of the No-Action Alternative, guidance in the Council on Environmental Quality's "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations" (46 *FR* 18026, March 23, 1981) states that the No-Action Alternative is "...no change from current management direction or level of management authority..." Therefore, DOE believes that continuing to store spent nuclear fuel and high-level radioactive waste at its current locations is an appropriate description of the No-Action Alternative.

As discussed in Section 1.5.1 of the EIS, DOE received input during the scoping process from the public and a number of organizations. DOE considered the comments and information received during scoping, and modified the analytical approach to the EIS accordingly. In addition, DOE identified comments and information it believes to be unrelated to the planned scope or the content of the Proposed Action, such as the constitutional basis for disposal in Nevada, or those comments that would have resulted in analyses that would be uncertain or speculative (such as risk perception or stigmatization, and loss of tourism). Section 1.5.1 has been modified accordingly. Based on the results of the scoping process, DOE analyzed a variety of alternatives and scenarios that would implement the Proposed Action. These alternatives and scenarios reflect potential design and operating modes, waste packaging approaches, and transportation options for shipping spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site from 77 commercial and DOE sites around the Nation.

DOE believes that its approach to the public involvement process during the development of the EIS is consistent with the National Environmental Policy Act, the Council on Environmental Quality and DOE regulations, and DOE guidance on public participation during the preparation of EISs. Planning for the public comment period began during the scoping period for the EIS at which time DOE indicated that the public comment period on the Draft EIS would be at least 180 days. DOE later extended this period nearly three weeks to further accommodate comment submittal after additional hearings were scheduled. A *Federal Register* notice announced the release of the Draft EIS at which time more than 2,400 copies were mailed to stakeholders including members of Congress, state and territorial governors, state legislators, Federal agencies, interest groups, and members of the public. Since release of the Draft EIS, a cumulative total of more than 3,400 copies of the document have been distributed. Before each hearing, DOE placed advertisements in local newspapers, including Spanish-language newspapers, and distributed public service announcements and press releases to more than 175 local and national stakeholders and media outlets to publicize information that would be accessible to the general public and to minority and low-income communities.

3.2 (9305)
Comment - EIS001888 / 0030
Clark County staff met with 19 Town Advisory Boards/Citizens' Advisory Councils, representatives from local jurisdictions and other groups to exchange information and receive comments on the Draft EIS. It is clear from the comments recorded that not only county officials, but also citizens, are very concerned about the negative impacts that the Yucca Mountain Program may have on Southern Nevada.

Specific issues raised in the comments include the need to acknowledge and assess the impacts on Native Americans, and more fully consider public safety, environmental impacts, environmental justice, funding to local governments, effects on land use, perception-based impacts of DOE activities, performance assessment, interaction of the repository program of local and regional plans, public participation, regulatory standards, schedule [and] licensing, socioeconomic impacts, storage, and transportation issues.

Response
DOE believes that the EIS is consistent with National Environmental Policy Act and NWPA requirements. The scope and level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions to address incomplete or unavailable information or uncertainties provide a meaningful assessment of environmental impact consistent with applicable requirements.

Chapter 3 and 5 of the EIS provides estimates for the short- and long- term impacts of the repository for a wide range of environmental disciplines, including public health and safety, socioeconomics, environmental justice, and land use. Chapter 6 provides comparable analyses for transportation actions. The long-term impacts described in Chapter 5 are based on the total system performance assessment. Chapter 8 of the EIS estimates the cumulative impacts of the past, present, and reasonably foreseeable actions. Impacts where applicable are compared to regulatory standards. With regard to perception-based impacts, DOE acknowledges that stigmatization can be envisioned in some scenarios but stigma is not inevitable or measurable. Consequently, DOE addressed but did not attempt to quantify any potential for impacts from perception or stigma in this EIS. The EIS also describes the public participation process and the decisionmaking process including the potential licensing of the repository by the Nuclear Regulatory Commission (see Section 1.5.1 and 1.3.2.3 of the EIS, respectively).

Local financial and technical assistance would be based on the evaluation of requests for assistance from affected units of government pursuant to Sections 116 and 180 of the NWPA.

3.2 (9325)
Comment - EIS001373 / 0001
My first comment will be presented as a question: Is Congress above the laws that they previously enacted? I am not an expert in legislative issues and procedures, but I provide the following commentary regarding this question.

The 1982, the NWPA was structured in such a manner to meet the 1969 NEPA [National Environmental Policy Act] requirements. Environmental documents and procedures prepared and performed up to the 1987 amendment to the NWPA clearly demonstrated an environmental approach that was in line with the spirit and intent of the NEPA requirements. However, the 1987 Congressional amendment to the NWPA appears to be a blatant attempt to bypass NEPA procedures and consequently, I believe that this DEIS is flawed and remiss in meeting the intent of the NEPA process.

In simple terms, I believe that one of the principal purposes of the NEPA process is to provide a procedure to select that option for achieving the desired outcome through the minimum disruption to ALL the environmental considerations upon its implementation. Is that the case for the evaluation performed in this DEIS? From my perspective, this does not appear to be true.

As indicated in the *Federal Register*/Vol. 64 No 229/Tuesday, November 30, 1999, page 67058 Section II D. 1987 Amendment to NWPA: "...In sum, Congress made clear its intent for DOE to focus its resources on investigating Yucca Mountain, and only Yucca Mountain, as a potential site for a high-level radioactive waste repository."

I believe that this Congressional action is in direct violation of NEPA procedures. The Council for Environmental Quality Regulations for Implementing NEPA Sec. 1502.14 Alternatives including the proposed action, reads as follows:

"This section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (Sec. 1502.15) and the Environmental Consequences (Sec. 1502.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public. In this section agencies shall:

(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

(b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

(c) Include reasonable alternatives not within the jurisdiction of the lead agency.

(d) Include the alternative of no action.

(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

(f) Include appropriate mitigation measures not already included in the proposed action or alternatives."

Based on the above CEQ guidelines, I see two major flaws with this DEIS (if indeed Congress must abide by the law):

1. The lack of discussion of other potential site locations
2. The lack of discussion of alternatives to the proposed action aside from the No Action option

In summary, the NEPA process was ignored and essentially circumvented by the 1987 Congressional amendment to the NWPA. From that point forward, the process has been flawed and contrary to the intent of NEPA. The present process is nothing more than a political charade -- using the terminology of the NEPA procedures and process, but clearly with the preconceived decision as to where the repository will be located -- Yucca Mountain.

Response
The NWPA includes four provisions relevant to the EIS. The Secretary of Energy is not required to consider (1) the need for a geologic repository, (2) the time at which a repository could become available, (3) alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository, and (4) the need to consider any site other than Yucca Mountain for repository development (see Section 1.5 of the EIS).

Within this framework, DOE has prepared this EIS consistent with Council on Environmental Quality and DOE regulations. DOE believes that the EIS appropriately describes the types and magnitudes of environmental impacts that could occur if it constructed, operated and monitored, and eventually closed a geologic repository at the Yucca Mountain site.

3.2 (9351)
Comment - EIS001373 / 0002
The last sentence on page S-2 in the Summary indicates that additional environmental and engineering analyses and National Environmental Policy Act [NEPA] reviews will be performed as part of future efforts for transporting the waste to the Yucca [Mountain] site. Again, it appears that this is an attempt to manipulate the NEPA process to achieve the desired outcome.

On the one hand, DOE is advocating a Total System Performance Assessment (TSPA) approach for characterizing the Yucca site. On the other hand, it is viewed as completely acceptable to decouple environmental considerations as to how the waste will actually get to the site with certainty (with regards to meeting other federal, state, and local regulations and obtaining the proper permits and approvals). This rationale appears to be very self serving -- when it's to our (DOE) advantage, use the TSPA approach; when it's not, then it can be rationalized that any additional and necessary environmental analyses can be performed independent of the Yucca site environmental impact analysis.

The environmental impacts associated with dealing with the nation's high-level nuclear waste problem cannot be fragmented into a series of separate and independent actions and still meet the intent of NEPA. To illustrate this point, suppose that the Yucca site is found to be completely acceptable through this questionable DEIS process and then it turns out that due to transportation problems a large percentage of the waste cannot be transported to the site, then what happens? Such a situation would not occur if the NEPA process was properly followed and the site, which minimized all environmental considerations, is selected -- whether it is Yucca Mountain or some other location.

Response
DOE has made no decision on the proposed monitored geologic repository at Yucca Mountain. After the completion of this Final EIS, the Secretary of Energy will determine whether to recommend to the President development of a repository at Yucca Mountain. If the Secretary made such a recommendation, the President would then decide whether to recommend the site to Congress.

The Secretary of Energy will use the information in the EIS and other information to determine whether to recommend Yucca Mountain to the President as the site for the proposed repository. In making this determination, the Secretary will consider short- and long-term environmental and human health risks from the construction and operation of the repository and from transportation of nuclear waste to the repository. The Secretary will also consider issues such as long-term risk and cost.

DOE believes that the EIS provides the information necessary to make transportation-related decisions about the basic approaches (for example, mostly rail or mostly truck shipments), as well as the choice among candidate rail corridors in Nevada. DOE has committed to prepare additional National Environmental Policy Act studies and documentation for the specific alignment of a rail route in an identified corridor.

DOE considered the potential environmental impacts associated with all elements of the Proposed Action in the EIS. To enhance understanding, DOE described the proposed repository in terms of surface and subsurface facilities, and assessed the impacts of each. Further, because transportation of spent nuclear fuel and high-level radioactive waste is a necessary component of the Proposed Action, the EIS includes an analysis of transportation impacts. To present a more focused description of impacts in Nevada, the EIS discusses Nevada Transportation separately. DOE included all elements and phases of the Proposed Action in the EIS and analyzed the potential impacts associated with each.

3.2 (9387)
Comment - EIS001888 / 0100
Another example is found in the public health sections. By insisting that the DEIS is not an emergency planning document, the DOE avoided preparing any estimates of the costs necessary to mitigate the impacts of emergency planning, response, evacuation and cleanup. This approach is consistent with other DOE impact assessments (notably the Nevada Test Site EIS), but does not conform to best practice in the field of impact assessment. While this approach may have facilitated speedy preparation of the DEIS, it did not result in a thorough analysis of the impacts of the program and violates the letter and spirit of NEPA [the National Environmental Policy Act].

Response
The preparation of cost estimates, as suggested by this comment, would require a level of information that is not available. For example, the details associated with the development and implementation of emergency response plans would not be available until about 4 years before the first shipments of spent nuclear fuel and high-level radioactive waste (if the site was approved). Furthermore, cost estimates of evacuation and cleanup would be highly uncertain and would require speculation to develop. The magnitude of the cost would depend on a host of factors including, for example, the amount of material released, weather conditions that would dictate in part the spread of contamination, surrounding land use (for example, urban setting versus farmland), population, and others. For these reasons, DOE believes the development of such costs is unnecessary.

3.2 (9479)
Comment - EIS001888 / 0147
[Clark County summary of comments it has received from the public.]

Requests for a review of the effects of past DOE (and predecessor) activities in Southern Nevada have not been addressed in the DEIS, however others asked that DOE address inequalities and the "political" aspects of the issue but these were similarly not addressed in the DEIS.

Response
As part of the cumulative impacts analysis in Chapter 8 of the EIS, DOE evaluated past, present, and reasonably foreseeable future actions. As discussed in Section 1.5.1, DOE received input during the scoping process from the public and a number of organizations. DOE considered the comments and information received during scoping and

modified the EIS analytical approach accordingly. DOE also identified comments and information that it believed were unrelated to the scope or the content of the Proposed Action, such as the constitutional basis for disposal in Nevada, political inequities, or those comments that suggested analyses into areas that cannot be measured, such as those related to risk perception or stigma. DOE has modified Section 1.5.1 of the EIS accordingly.

3.2 (9737)
Comment - EIS001888 / 0322
For more than a decade, Clark County has recorded comments pertaining to the Yucca Mountain Project and [its] potential impacts on Clark County. The comments date back to 1988. From the very beginning, great concern has been expressed by Clark County officials, staff, citizens and other commenters. Specific issues raised in the comments include: the need to acknowledge and assess the impacts on Native Americans; cumulative impacts; issues to be addressed in the EIS; emergency response considerations; environmental impacts; environmental justice; funding; land use; perception-based impacts of DOE activities; performance assessment; planning considerations; public participation; regulatory standards; schedule [and] licensing; socioeconomic impacts; storage; transportation; and trust issues.

From the comments recorded, it is clear that not only Clark County, but also its citizens, are very concerned about the negative impacts that the Yucca Mountain Program could have on Southern Nevada.

Response
DOE believes that the EIS is consistent with National Environmental Policy Act and NWPA requirements. The scope and level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions to address incomplete or unavailable information or uncertainties provide a meaningful assessment of environmental impact consistent with applicable requirements.

Chapter 3 and 5 of the EIS provides estimates for the short- and long- term impacts of the repository for a wide range of environmental disciplines, including public health and safety, socioeconomics, environmental justice, and land use. Chapter 6 provides comparable analyses for transportation actions. The long-term impacts described in Chapter 5 are based on the total system performance assessment. Chapter 8 of the EIS estimates the cumulative impacts of the past, present, and reasonably foreseeable actions. Impacts where applicable are compared to regulatory standards. With regard to perception-based impacts, DOE acknowledges that stigmatization can be envisioned in some scenarios but stigma is not inevitable or measurable. As a consequence, DOE addressed but did not attempt to quantify any potential for impacts from perception or stigma in this EIS. The EIS also describes the public participation process and the decisionmaking process including the potential licensing of the repository by the Nuclear Regulatory Commission (see Section 1.5.1 and 1.3.2.3 of the EIS, respectively).

Local financial and technical assistance would be based on the evaluation of requests for assistance from affected units of government pursuant to Sections 116 and 180 of the NWPA.

3.2 (9738)
Comment - EIS002070 / 0002
NCCRG [North Carolina Citizens Research Group] has read over the Nuclear Regulatory Commission's comments [on the DEIS] and when the NRC says you have defects in your analysis of something nuclear, you can have very high confidence that you do.

Response
DOE has responded to the Nuclear Regulatory Commission comments on the Draft EIS in this Comment-Response Document.

3.2 (9741)
Comment - EIS001888 / 0325
[Clark County summary of comments it has received from the public.]

Others asked that DOE address inequalities and the "political" aspects of the issue but they were not addressed in the DEIS.

Response
As discussed in Section 1.5.1 of the EIS, DOE received input during the scoping process from the public and a number of organizations. DOE considered the comments and information received during scoping, and modified the analytical approach to the EIS accordingly. In addition, DOE identified comments and information that it believes to be unrelated to the scope or the content of the Proposed Action, or comments for which analyses would be uncertain and speculative (such as inequalities). Section 1.5.1 has been modified accordingly.

3.2 (9761)
Comment - EIS001888 / 0345
[Clark County summary of comments it has received from the public.]

The Action Alternatives should include (or not include) other activities besides the construction, operation (including transportation), and closure of the repository. Other activities included: (1) impacts of construction of shipping containers and waste packages, (2) infrastructure development, (3) future construction and operation of new and existing power plants, (4) additional SNF [spent nuclear fuel] and HLW [high-level radioactive waste] generation because on-site storage space will become available, (5) global activities associated with foreign research reactor SNF transfer, and (6) no longer generating SNF as part of the action alternatives. One commenter stated that future operation of new and existing reactors and construction of new reactors should not be part of the action alternatives.

Response
As discussed in Section 1.5.1 of the EIS, DOE received input during the scoping process from the public and a number of organizations. DOE considered the comments and information received during scoping, and modified the analytical approach to the EIS accordingly. The EIS analyzes connected actions, such as those associated with the manufacture of shipping casks and disposal containers. DOE also identified comments and information that it believes are unrelated to the scope or content of the Proposed Action, or comments for which analyses would be uncertain and speculative. DOE has not analyzed actions that are not directly related to or connected to the Proposed Action. Thus, the EIS does not cover future construction and operation of powerplants, or terminating the generation of spent nuclear. Section 1.5.1 has been modified accordingly.

In the Draft EIS and the Supplement to the Draft EIS, DOE analyzed a variety of scenarios and implementing alternatives that it could in implement to construct, operate, and monitor, and eventually close a repository at Yucca Mountain. To enable an improved understanding of the potential environmental impacts from a more specifically defined Proposed Action in the Final EIS, DOE has identified its preferred alternatives, simplified aspects of the Proposed Action, and modified its analyses and presentation of information to illustrate the full range of potential environmental impacts likely to occur under any foreseeable mode of transportation or repository design and operating mode.

3.2 (9762)
Comment - EIS001888 / 0346
[Clark County summary of comments it has received from the public.]

Three commenters stated that the description of baseline conditions described in the EIS should be those conditions that existed prior to the start of site characterization.

Response
The NWPA distinguishes between site characterization as a preliminary decisionmaking activity not subject to an EIS. As such, the baseline environment from which DOE has examined impacts under the Proposed Action is the environment that will exist at the conclusion of site characterization. An annual Site Environmental Report for Yucca Mountain describes the environmental impacts of site characterization. DOE has prepared these publicly available reports since 1991.

3.2 (9768)
Comment - EIS001888 / 0353
[Clark County summary of comments it has received from the public.]

Several commenters provided "broad" or general recommendations as to how the EIS process and document preparation should proceed. One said that the EIS should be organized by issues, rather than a traditional organization by subjects (air quality, geology, etc.), and rely on stand-alone technical reports for each issue. Another requested that the implementation plan include a list of decisions that the EIS needs to support, along with a discussion of the factors that DOE will use to make comparisons among all decision choices. Other commenters requested that the EIS be part of a comprehensive risk management process (independently prepared and acceptable to stakeholders), and reflect scoping comments from the NTS [Nevada Test Site] site wide EIS and the Multi-Purpose Canister EIS, and that all commitments for mitigation be included in the Record of Decision.

Response
As discussed in Section 1.5.1 of the EIS, DOE received input during the scoping process from the public and a number of organizations. DOE considered the comments and information it received and modified the information bases and analytical approach to the EIS accordingly. The Department provided responses to those comments in a summary of public scoping comments (DIRS 104630-YMP 1997). In addition, DOE identified comments and information it believed to be unrelated to the EIS scope or to the Proposed Action, or comments for which analyses would be uncertain and speculative. Section 1.5.1 has been modified accordingly. As requested by comments, DOE based the EIS discussions of the decisions to be made (see the Foreword, for example) in part on the information and analyses in the EIS. However, DOE developed the EIS format in accordance with the regulations of the Council on Environmental Quality, rather than using the format suggested by those comments. Although it is unclear what this comment means by a "comprehensive risk management process," the EIS provides an assessment of short- and long-term public and worker risk from exposure to radionuclides and toxic chemicals.

With regard to the Record of Decision, Section 114(a)(1) of the NWPA authorizes the Secretary of Energy to determine whether to recommend approval of the Yucca Mountain site to the President for development as a repository for the disposal of spent nuclear fuel and high-level radioactive waste. A comprehensive statement of the basis for the recommendation, including a Final EIS, would have to accompany such a recommendation. The decision to approve the site rests not with the Secretary, but with the President and Congress, if necessary. Because the President and Congress would make this determination, DOE does not anticipate issuing a Record of Decision on the determination to recommend if the Secretary recommended the site to the President.

Because DOE does not anticipate issuing a Record of Decision, it might not prepare a Mitigation Action Plan. However, the Yucca Mountain site, if approved in accordance with provisions of the NWPA, would be subject to licensing by the Nuclear Regulatory Commission. DOE, in submitting its application to construct and operate the repository to the Commission, would identify relevant commitments, including those identified in the Final EIS, to the Commission for its consideration, and could reasonably expect a comprehensive set of mitigation measures or conditions of approval to be part of the licensing process.

3.2 (9773)
Comment - EIS001888 / 0357
[Clark County summary of comments it has received from the public.]

In general commenters recommended that the EIS address general policy issues relevant to the NEPA [National Environmental Policy Act] process, management of that process, and impacts due to site characterization activities at the Yucca Mountain site. The EIS must present a thorough description of the natural, social, economic, and as-built aspects of the project that are sufficient to enable delineation of subarea (i.e., specific community) impacts (including probability of occurrence and degree of consequence). Commenters indicated that preparation of the EIS required the development of a structure (or plan) for data collection, analysis, and research that is comprehensive, and relies on related project activities. Sufficient data should be collected so as to minimize, if not avoid, uncertainties and, thus, the 5-year time frame allotted for completion of the EIS should not be a requirement, but rather a guideline. This requires an interdisciplinary approach to: (1) acquire empirical baseline information; (2) acquire empirical information about potential adverse impacts; (3) reduce uncertainties through risk analysis; and

(4) develop adequate plans for monitoring, managing and mitigating potential impacts for up to 1 million years. Commenters suggested that the extent of uncertainty must be identified in the EIS.

Response
As discussed in Section 1.5.1 of the EIS, DOE received input during the scoping process from the public and a number of organizations. DOE considered the comments and information received during scoping, and modified the analytical approach to the EIS accordingly. In addition, DOE identified comments and information it believes to be unrelated to the scope or content of the Proposed Action, or comments for which analyses would be uncertain and speculative. Section 1.5.1 has been modified accordingly.

DOE believes that the EIS provides the appropriate information and analyses identified in this comment. Section 1.5 of the EIS discusses the National Environmental Policy Act process, Chapter 2 describes proposed repository design features, and Chapter 3 contains a resource-by-resource discussion of the affected environment. Section 2.5 discusses uncertainties and the use of incomplete or unavailable information to identify uncertainties in the data or analytical approaches. DOE acknowledges that the results of analyses often have associated uncertainties and has described such uncertainties throughout the EIS.

3.2 (9775)
Comment - EIS001888 / 0359
[Clark County summary of comments it has received from the public.]

Commenters requested that alternatives in the EIS address all phases (e.g., construction, transportation, operation, retrieval, closure) and major activities (e.g., emplacement, construction methods, backfill, ownership and management of transportation systems, maintenance). Some commenters suggested that alternatives be developed based on reducing exposure risk and uncertainty, increasing safety, and enhancing economic benefit.

Response
DOE believes the information and analyses presented in the EIS represent conservatively the reasonably foreseeable impacts that could occur for all actions and phases associated with the proposed Yucca Mountain Repository. Since the publication of the Draft EIS, DOE has improved its understanding of the interactions of potential repository features with the natural environment, and the advantages of a number of design features such as titanium drip shields to enhance waste containment and isolation. The flexible design incorporates elements that would also reduce some of the uncertainty associated with the long-term performance of the repository. DOE published the Supplement to the Draft EIS in May 2001 to provide the updated information to the public

3.2 (9904)
Comment - EIS001888 / 0450
[Clark County summary of comments it has received from the public.]

Some commenters felt that the NEPA [National Environmental Policy Act] process was costly; others felt the process only served to provide environmental extremists a method to delay or halt important projects. Some commenters felt that the ultimate decision on the repository should be left up to a national vote.

Response
The NWPA requires that a Final EIS accompany any recommendation by the Secretary of Energy to the President to approve the Yucca Mountain site.

3.2 (9929)
Comment - EIS001860 / 0009
The decision to use geologic disposal is 20 years old. In the last 20 years waste management experts have come to the belated realization and open admission that the environment is always degraded by dumps and that all dumps inevitably fail.

When the decision to go with geologic disposal of nuclear waste was made 20 years ago, other methods, such as transmutation and recycling, were inadequately explored before this decision was reached. The Draft EIS does not address this issue adequately.

Response
DOE prepared this EIS to describe the potential beneficial and adverse environmental effects of the Proposed Action and the No-Action Alternative. The Department recognizes that knowledge about other technologies for the management of spent nuclear fuel and high-level radioactive waste has advanced during the past 20 years (see the discussion on transmutation in Section 9.1.3, for example). However, this Nation's policy, as established by the Nuclear Waste Policy Act of 1982, is to dispose of these materials in a geologic repository.

3.2 (10172)
Comment - EIS002092 / 0003
The Draft Environmental Impact Statement does not describe the proposed project in a way that allows for reasonable analysis of its impacts. The document contains a number of design alternatives and options from which the Department of Energy will presumably choose. All of the design alternatives admittedly and inevitably result in releases of radionuclides from the repository into Nevada's groundwater. The end result will be contamination of both drinking water and water used for agriculture. The Draft Environmental Impact Statement simply does not inform the public what the future risks of the repository are to people and to the environment.

Response
DOE recognizes that the Proposed Action, which involves various implementing alternatives and scenarios, is complex. The implementing alternatives and scenarios reflect potential repository design and operating modes (such as thermal load scenarios and approaches to heat management) and waste packaging approaches (such as canisters and disposal containers). DOE also recognizes that since the publication of the Draft EIS key aspects of the design (such as disposal container components and the use of drip shields) have changed in ways that would be important to repository performance and reduction of uncertainties. For this reason, DOE published a Supplement to the Draft EIS that focused on the most recent design enhancements, including various heat-management scenarios. This information was carried forward to the Final EIS. The Department believes that the level of information provided for each element of the Proposed Action (such as waste handling facilities, heat management scenarios, and transportation implementing alternatives and scenarios) is sufficient to provide a meaningful assessment of environmental impacts for review by the public.

DOE has organized the EIS to present information, methods of analysis, and results of analyses in a clear and concise manner. For example, Chapter 5 discusses the consequences of long-term repository performance to humans and the environment, and Appendix I provides supporting information. Together Chapter 5 and Appendix I discuss the locations of the reasonably maximally exposed individual and the population of concern for which DOE estimated impacts, and the waterborne and airborne radiological consequences for the thermal load scenarios (among other aspects). The results of these analyses indicate that releases would be below applicable standards.

3.2 (10208)
Comment - EIS001479 / 0009
I agree with Cynthia that the people that are working on this are human beings as well and that they will be able hopefully to look at all the aspects of the decision that they're making and the effect that it will have on other people, and that we can have a lot more democracy in the decision making about this.

Response
As discussed in Section 2.6 of the EIS, the Secretary of Energy would consider not only the potential environmental impacts and public comments on the EIS, but also other factors in determining whether to recommend the Yucca Mountain site to the President. Factors could include those identified through public input, but others as well, including:

- Ability to obtain necessary approvals, licenses, and permits
- Ability to fulfill stakeholder agreements
- Consistency with DOE mission
- Assurance of safety facility construction and operations flexibility
- Cost of implementation
- Ability to mitigate impacts

3.2 (10220)
Comment - EIS001888 / 0582
[Clark County summary of comments it has received from the public.]

Commenters expressed general support for the NEPA [National Environmental Policy Act] process, specifically the information distributed to the public, the process for preparing an EIS, and the need to consider the potential for environmental impacts. Some said they would support the project if it proved to be the best option. Others emphasized that the public would never be for the project, but a decision must be made.

Response
Thank you for your comment.

3.2 (10787)
Comment - EIS000144 / 0008
How does the U.S., be it the NRA, EPA [Environmental Protection Agency], or AEC [Atomic Energy Commission] build 10,000 years of accountability into this project? Surely you recognize, given the mega changes in society now, that guaranteeing responsibility over such a period is not possible. Ten thousand years ago, after all, mankind had just begun the age of agriculture.

Response
DOE assumes that "the NRA" means the NRC (Nuclear Regulatory Commission).

The commenter correctly recognizes that societal uncertainty makes an assignment of responsibility for 10,000 years impossible. The Nuclear Regulatory Commission and the Environmental Protection Agency have also recognized this fact and, although they encourage the maintenance of monitoring and physical oversight for as long as possible, they recognize that projecting society's willingness and ability to provide such a function for more than 100 years into the future is not reasonable. The fact that there can be no assurance of institutional responsibility or control for 10,000 years is the principal reason for the selection of a deep geologic repository as the way to deal with these materials. Such a repository would provide passive control of the materials rather than relying on perpetual institutional control. The disadvantage to this is that we must accommodate uncertainty to project the behavior of the system.

3.2 (10815)
Comment - EIS000290 / 0001
The DEIS findings demonstrate that proposed actions of constructing and operating a repository at Yucca Mountain result in relatively small and acceptable environmental impacts when compared to the no-action alternatives evaluated. Leaving used nuclear fuel at reactor sites on an indefinite basis is not an alternative, and it is not sound national policy. We must take responsibility for disposing of used nuclear fuel and not leave it for other generations to deal with. The conclusion that the impact of the proposed actions are small was reached by DOE without taking into account that there are additional benefits associated with the continued viability of nuclear power and in spite of DOE's overestimation, in my opinion, of a number of environmental consequences associated with the proposed action.

Response
The NWPA limits the responsibilities of the Secretary of Energy specifically to characterization and evaluation of the Yucca Mountain site as a geologic repository. Therefore, the EIS analyses did not consider the benefit of the continued viability of nuclear power, as identified in this comment. As discussed in Section 1.3.2 of the EIS, under the NWPA DOE is responsible for providing permanent disposal of spent nuclear fuel and high-level radioactive waste. Therefore, the indefinite storage of these materials at the current sites is not a viable option, and DOE considered it only for purposes of analysis.

DOE believes that the implementing alternatives and analytical scenarios used to evaluate the Proposed Action and No-Action Alternative ensure that it considered the associated range of the potential environmental impacts from either alternative.

3.2 (10882)
Comment - EIS001632 / 0005
Page 2-6 indicates that there are many uncertainties about the final design of the repository and several of its components:

"This EIS describes and evaluates the current preliminary design concept for repository surface facilities, subsurface facilities and disposal containers."
"Plans for the repository would continue to evolve during the development of the final repository design and as a result of the NRC licensing review."

"For these reasons, DOE developed implementing alternatives and analytical scenarios to bound the environmental impacts likely to result from the Proposed Action."

Page 2-10 states:

"DOE continues to investigate design options ... for final repository design; Appendix E identifies design features and alternative design concepts that DOE is considering for the final design (for example, smaller waste packages, a waste package design using two corrosion-resistant materials ...)... DOE has assessed each of the design options still being considered for the expected change it would have on short- and long-term environmental impacts and has compared these impacts to the potential impacts determined for the packaging, thermal load and transportation scenarios evaluated in the EIS... DOE has concluded that the analytical scenarios and implementing alternatives evaluated in this EIS provide a representational range of potential environmental impacts the Proposed Action could cause."

The continuing site characterization and data collection raise questions about whether a supplemental environmental impact statement (SEIS) is needed once the final design and waste content are determined. CEQ regulations (sec. 1502.9) require a supplement to a draft or final EIS when there are substantial changes to a proposed action relevant to environmental concerns or where there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impact.

If the Department's subsequent analysis of design choices indicates that the draft EIS/final EIS bounded the potential impacts, a supplemental may not be needed. However, even if a supplemental is not strictly required by NEPA, a supplemental or other document subject to public review and comment may be advisable given the potentially significant changes in final design and waste content. At a minimum, the final EIS must describe the changes from the draft EIS and update the discussion of impacts on the environment and public health. Examples of areas of uncertainty which lead to this conclusion are given below in the comments referring to pages 2-6, 2-10, 2-32, 2-37 (Section 2.1.2.4), and 2-81.

Response
As the Environmental Protection Agency notes, the Draft EIS evaluated the preliminary design concept described in the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) for repository surface facilities, and disposal containers (waste packages). DOE noted in the Draft EIS (in Section 2.1.1.5, for example) that the analyzed designs were preliminary and were likely to evolve in various ways. Since it issued the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The results of the design evolution process was the development of the Science and Engineering Report flexible design. This design focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading), but the basic elements of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain are unchanged. DOE evaluated the flexible design in a Supplement to the Draft EIS, which was released for public review and comment in May 2001.

Aspects of the design in the Supplement to the EIS (as well as this Final EIS) are likely to continue to evolve, particularly in relation to the means of controlling heat generated by spent nuclear fuel and high-level radioactive waste. Under Section 114(a) of the NWPA, DOE must provide a description of the proposed repository, including preliminary design specifications, as part of any Site Recommendation. If the Yucca Mountain site was approved, a

more refined flexible design would be determined only at the time of License Application to the Nuclear Regulatory Commission. That design probably would continue to change as a result of the License Application process.

In this Final EIS, DOE varied design parameters to create lower- and higher-temperature operating modes in such a way to provide the range of potential environmental impacts. DOE believes that the EIS adequately analyzes each design element investigated, the resulting short- and long- term environmental impacts, and mitigation measures. Further, the analyses incorporate conservative assumptions that tend to overestimate impacts, as identified in the EIS. For example, in Section G.1.1 of the EIS the total nonradiological air quality impacts were the sum of the calculated maximum concentrations regardless of wind direction. This conservatively maximized air quality impacts. This type of approach to estimate impacts conservatively was applied to all other resources, as appropriate.

Because of the various implementing alternatives and scenarios analyzed as well as the conservative nature of the analyses, DOE believes that the analyses represent a realistic upper bound of environmental impact that could occur from the implementation of the Proposed Action.

3.2 (10903)
Comment - EIS001912 / 0003
DOE provides no substantive details about the proposed action and action alternatives. Instead, the DEIS attempts to use inclusive boundary analysis to substitute for missing information and design attributes which have not been proven to work. Unfortunately, without a performance assessment capability, DOE can not establish boundaries for various design alternatives. Although we recognize the need to maintain some flexibility for the final repository design, the description of the action in the DEIS is done in very generic terms and fails to adequately describe the waste management system associated with Yucca Mountain.

Response
DOE believes that the EIS adequately analyzes each element of the Proposed Action (such as waste handling facilities, heat management scenarios, and transportation implementing alternatives and scenarios) and the No-Action Alternative. The Department bases this belief on: (1) the level of detail and analysis accorded the repository design and transportation aspects of the Proposed Action, (2) the analytical methods and approaches used to represent conservatively reasonably foreseeable impacts that could occur, and (3) the use of conservative assumptions if information is incomplete or unavailable and if there are uncertainties (as discussed in Section 2.5). The design elements discussed in the EIS are based on similar requirements and practices that have been in use for several decades in the mining and commercial utility industries and at DOE sites. Even the more unusual aspects of the design, such as titanium drip shields and Alloy-22 disposal containers, would take advantage of the fabrication experience of manufacturers that design and construct radioactive waste transport packages and other specialty equipment for commercial nuclear utilities. Based on this experience, DOE is confident that the designs under consideration can be built and operated in a manner that would protect worker and public health and safety and the environment.

With regard to the DOE performance assessment capability, the most recent report of the Total System Performance Assessment Peer Review Panel concluded that the overall performance assessment framework and the approach used to develop the Total System Performance Assessment were sound and followed accepted methods (DIRS 102726-Budnitz et al. 1999). The Supplement to the Draft EIS and this Final EIS discuss repository performance results based on assessment tools that reflect improvements due to the observations and suggestions of the Peer Review Panel.

3.2 (10909)
Comment - EIS001927 / 0032
It's hard to believe, but DOE has proceeded with this DEIS even though the exact repository design remains to be determined. How environmental impacts can be assessed without that basis covered is hard to understand.

It's akin to DOE proceeding full speed ahead with the EIS while claiming that the exact routes of high-level radioactive waste transportation to Yucca Mountain has yet to be determined. Or DOE assuming that repository casks will remain intact for thousands and thousands of years. Or DOE assuming that the groundwater will dilute contamination to safe levels, even though DOE doesn't even know for sure the direction of groundwater flow. How

then can the DOE claim there will be no significant impacts to public health or the environment from this Proposed Action? How can it know? What are its findings based on?

Response
The Site Recommendation (should the Secretary of Energy recommend Yucca Mountain to the President) would be accompanied by several supporting documents, including this Final EIS. Only if the President determined the site was qualified, and the Congress approved the site in the event the State of Nevada objected to the recommendation, would DOE submit a License Application to the Nuclear Regulatory Commission. Therefore, it is possible the repository design could further evolve. DOE believes, however, that the information submitted with any Site Recommendation, including this Final EIS, would provide an accurate representation of the design DOE would expect to use based on current information, should the repository receive authorization to proceed. DOE expects any additional design changes would result in further reductions in the uncertainties associated with long-term performance and would measure estimated releases against the Environmental Protection Agency's environmental standards at 40 CFR Part 197 and Nuclear Regulatory Commissions licensing criteria at 10 CFR Part 63.

In the Draft EIS and the Supplement to the Draft EIS, DOE analyzed a variety of scenarios and alternatives that could be implemented to construct, operate and monitor, and eventually close a repository at Yucca Mountain. These scenarios and implementing alternatives reflect potential design modifications and waste packaging approaches. The intent was to provide the full range of potential environmental impacts and to maintain flexibility in the design of the repository to maintain the ability to reduce uncertainties in or improve long-term performance, and improve operational safety and efficiency. Many of the issues relating to how a repository would be operated and how spent nuclear fuel and high-level radioactive waste would be packaged would be resolved in the context of developing the detailed design for a possible license application. DOE cannot predict with certainty how these issues would eventually be resolved. However, to enable an improved understanding of the potential environmental impacts from a more clearly defined Proposed Action, DOE has identified its preferred alternatives, simplified aspects of the Proposed Action, and modified its analyses and presentation of information to illustrate the full range of potential environmental impacts likely to occur under any foreseeable repository design and operating mode.

As DOE has acknowledged, the flexible design could evolve further. In that event, DOE's License Application would be "as complete as possible in the light of information that is reasonably available at the time of docketing," as stipulated in 10 CFR 63.24. Part 63.24 contemplates the possible necessity for updating the application after license submittal for a number of reasons, including possible changes resulting from "research programs carried out to confirm the adequacy of designs, conceptual models, parameter values, and estimates of performance of the geologic repository." The commenters should be aware that in the event DOE does further modify the repository design, the Nuclear Regulatory Commission licensing and related National Environmental Policy Act processes would provide a number of opportunities for the public to comment on DOE's application and possible updates.

3.2 (11330)
Comment - EIS002267 / 0004
The DEIS ignored potential impact categories important to our economy, the stigma effects on tourism, land-use conflicts, potential property loss along routes, unfunded mandates on local government to create and maintain programs. Although there is credible evidence that shows that such impacts may occur, they have also failed to include minorities and low-income groups in the scoping, interactive, and hearing processes.

Response
Since DOE published the Draft EIS, it has reexamined the relevant literature and assessed the state of research on perception-based impacts and stigma effects. The Department reevaluated the independent reviews conducted by the Nuclear Waste Technical Review Board and others, and identified and reviewed relevant published studies. DOE has concluded that while stigmatization can be envisioned in some scenarios, it is not inevitable or measurable. Any stigmatization that could occur would likely be the aftereffect of unpredictable events such as a serious accident. Consequently, DOE addressed but did not attempt to quantify potential impacts from risk perception or stigma in the EIS.

The NWPA mandates funding to the State of Nevada and affected units of local government so they can participate in the process of characterizing and selecting a site for a geologic repository. In addition, the NWPA requires DOE to provide financial and technical assistance to the State and affected units of local government to mitigate impacts

of the development of a repository and site characterization. The NWPA authorizes the State and any affected unit of local government to collect an amount equal to the amount that the State or local government would receive if authorized to tax site characterization activities. If DOE built and operated a repository at Yucca Mountain, the State and local governments would also be able to collect an amount equal to the taxes imposed on non-Federal real property and industrial activities. Financial assistance would come primarily from the Nuclear Waste Fund, which is funded by contributions from nuclear utility ratepayers, although Federal tax revenues would fund the portion of the costs attributed to the management and disposal of Federally produced and owned materials.

Appendix M of the EIS contains information on emergency response in the event of an accident and compensation for injury to life or property, and information on potential impacts to Native American communities along transportation routes. Section 4.1.3 and other sections of this EIS discuss Environmental Justice issues. DOE has held regular interactive discussions with representatives of Native American tribes and organizations and has held special sessions to provide Native Americans the opportunity to comment on the Draft EIS and Supplement to the Draft EIS.

3.2 (11334)
Comment - EIS001106 / 0028
In the numerous cases where sound information is missing from the YMP [Yucca Mountain Project] DEIS, the shortcomings should be recognized and a framework set forth for resolving the difficulties and uncertainties created. Included in the framework should be the concept of monitoring and mitigating unforeseen consequences. At times, uncertainty in EIA [environmental impact assessment] can be lessened if the methods and techniques followed for environmental documentation are clearly set forth. This is lacking in the YMP DEIS and should be resolved. Also needed is information regarding standard practices used for impact assessment and prediction. Lack of such insights is an indication in the DEIS that sound interdisciplinary expertise in EIA was [not?] assembled for the YMP.

Response
Section 2.5.1 of the EIS describes the use of incomplete or unavailable information to identify uncertainties in the data or analytical approaches. This section describes the basis for the analyses, including assumptions, the use of preliminary information, and conclusions from draft or incomplete studies. DOE continues to study issues that are relevant to an understanding of what could happen in the future at Yucca Mountain, and the potential impacts associated with the site's use as a repository. As a result of these studies, the Final EIS contains information that was not available for the Draft EIS.

If DOE was to construct and operate a repository at Yucca Mountain, it would develop an environmental monitoring program consistent with applicable laws, regulations, and DOE directives. In addition, it would monitor repository performance and would continue geotechnical testing. If the results of this monitoring indicated the need for changes in repository and site management, DOE would implement such changes.

Because DOE does not anticipate issuing a Record of Decision for the determination whether to recommend the Yucca Mountain site, it might not prepare a Mitigation Action Plan. However, the site, if approved in accordance with provisions of the NWPA, would be subject to licensing by the Nuclear Regulatory Commission. DOE, in submitting its application to the Commission to construct and operate the repository, would identify relevant commitments for consideration, including those identified in the Final EIS, and could reasonably expect a comprehensive set of mitigation measures or conditions of approval to be part of the licensing process.

DOE anticipates that the repository project plan and design will continue to evolve, creating additional opportunities for mitigation and potentially eliminating the need for some mitigation measures currently under consideration. Chapter 9 of the EIS, which contains DOE's current list of potential mitigation measures, identifies impact reduction features, procedures and safeguards; and mitigation measures DOE is considering for inclusion in the project plan and design. In addition, Chapter 9 identifies ongoing studies that could eventually influence mitigation measures related to the plan and design.

3.2 (11366)
Comment - EIS002278 / 0003
I think that if we look at some of the other problems, like terrorism and the fact that there will be 40,000 protesters stopping these shipments, there will be many people that will become active because of this. Because we

understand that this world is -- we are all connected. And that if people, you know, don't consider the fact of, you know, each other, that people will become enraged.

I don't even see any consideration of the amount of lawsuits and the amount of time that that could possibly hold up some of the shipments as has happened in the past.

Response
The purpose of this EIS is to analyze and describe potential environmental impacts associated with a geologic repository at the Yucca Mountain site and with the No-Action Alternative. The extent to which a decision to approve Yucca Mountain as the site for a repository – a decision that the President would make under the terms of the NWPA – might engender public protests and litigation is speculative and unrelated to potential impacts. For that reason, the EIS does not address the potential for such activities. The EIS addresses impacts that could occur as a result of terrorism.

3.2 (11392)
Comment - EIS002284 / 0004
"Should Yucca Mountain be the place for the waste?" Well, after looking at this document, it's hard to tell. It's hard to know. And I think this is one point I want to underscore, is that this document should create a focused picture of the action intended here, including a clear sense of ... how Yucca Mountain would function as a repository, how it's intended. And I don't think this document does that.

Response
Chapter 2 of the EIS describes the Proposed Action for the construction, operation and monitoring, and eventual closure of a repository at Yucca Mountain. Chapter 5 provides the analysis of the ability of the repository to isolate radionuclides and toxic chemicals from the environment for long periods (thousands of years).

3.2 (11411)
Comment - EIS002251 / 0009
Another thing is the cumulative impact section assumes a ten-year extension of reactor life. I always was told that if you assume something, you make an ass out of me and you, which is, I think, basically the basis of the DOE documents.

Response
Section 2.5 of the EIS acknowledges that the results of analyses often have associated uncertainties. Uncertainties could be the result of the complexity and variability of the process analyzed, the use of incomplete information, or the unavailability of information. In these instances, the EIS describes the uncertainties.

If information is incomplete or unavailable or if uncertainties exist, the use of assumptions often enables analyses to proceed. In such instances the assumptions and analytical methods conservatively represent (that is, they tend to overestimate) reasonably foreseeable impacts that could occur from the Proposed Action and the No-Action Alternative.

3.2 (11465)
Comment - EIS002285 / 0001
One of the things that I didn't see noted too much in this DEIS is the factor of human error. And we are human beings; we make mistakes; we have accidents; we slip and trip and whatever. And because of that, and because of human error, that's why we had Three Mile Island. That's why we had these three fellows die at Tokai, because they loaded too much waste, and they blew up that reactor or that processing plant there in Japan -- because of human error. And they are fallible.

We make mistakes, and it happens a lot, and I don't know how that is counted very well in this DEIS. I would like to see a little bit more on that in the Final Environmental Impact Statement.

Response
DOE incorporated human error into the analyses for each resource as appropriate. For example, the transportation analyses in Chapter 6 of the EIS rely on accident rate information that reflects human error, as well as other factors

such as mechanical failure; Section J.1.4.2.1 also discusses the effects of human error on transportation accident impacts. As another example, DOE based the analyses of potential accident scenarios (see Section 4.1.8) on a human-based initiating event (for example, shipping cask drop). For other resources, such as biological and cultural, impacts are determined primarily by loss or change of habitat, or loss of individuals; human error does not typically enter the estimation of impacts, although the analyses considered indirect impacts due to human activities (for example, accidental damage to cultural resources).

3.2 (11714)
Comment - EIS000586 / 0001
The NWPA [Nuclear Waste Policy Act] requires that the Secretary of Energy prepare an EIS consistent with the requirements of the National Environmental Policy Act, and the Nuclear Regulatory Commission is required to prepare an EIS to support decisions to license major nuclear facilities. The NWPA requires that the NRC [Nuclear Regulatory Commission] to the maximum extent practical adopt the Department of Energy's EIS as its own.

However, NRC staff's preliminary review has already found deficiencies in DOE's process regarding the no action alternative, consultations with local governments and other entities, description of mitigation measures, analysis of cumulative effects, and environmental justice, description of the transportation system, description of socioeconomic impacts, and cultural impacts, and even the proposed action. This reinforces our belief that the EIS is seriously deficient and incomplete.

Decisions will be supported by the Yucca Mountain EIS during the years 2001 to 2005. The Secretary of Energy will depend on this document to decide whether to recommend to the President that Yucca Mountain be nominated to Congress as the first repository for spent nuclear fuel.

The administration in Congress needs to decide whether to construct, operate, monitor and eventually close the repository. They need to decide what modes of transportation to use and what highway routes, corridors and/or intermodal transfer facilities to use. And they need to base their decisions on good complete information such as should be included in the EIS. And the Nuclear Regulatory Commission has the requirement to decide whether to issue a license to the DOE to construct the repository and a license to operate the repository. So there is a lot riding on this.

Response
DOE has addressed comments on the Draft EIS from the Nuclear Regulatory Commission, other Federal agencies, the State of Nevada, Native American tribes, affected units of local government, other organizations, and the public in this Comment-Response Document. The Department has modified the EIS in response to some of these comments.

3.2 (12121)
Comment - EIS001887 / 0420
Where field studies are necessary, suitable experimental design, sampling, and data analysis must be carried out, with or without replication. Methods for ecosystem-level studies involve various assumptions about the system at hand that influence the design and execution of the study. If the ecosystem to be affected is a native one, duplication of it for purposes of statistical replication [is] problematic because no two ecosystems are alike. Extreme care must be taken to choose the appropriate experimental design and analytical model to be used during the EIA [environmental impact assessment] process. In most cases involving a single, unreplicated natural ecosystem, traditional statistical approaches are unsuitable and yield results that are highly questionable. The ecological study design and the methodology adopted for EIA analysis for the YMP [Yucca Mountain Project] were flawed due to the inability to conduct credible replication of the ecosystem. Standard statistical techniques based on reliable replicates and controls do not apply in such cases.

Response
Section 4.1.4 of the EIS describes potential impacts to plants and animals from a repository at Yucca Mountain. Because the analyses determined that the magnitude of impacts to biological resources would be low to very low Section 4.1.4.3, DOE did not replicate the ecosystem, as suggested by this comment. The time and money spent for such an effort would not be commensurate with the significance of the expected impacts. This approach is consistent with regulations issued by the Council on Environmental Quality (40 CFR 1502.15), which state that data

and analyses in an EIS should be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced. This avoids useless bulk and concentrates the analysis on relatively more important issues.

3.2 (12128)
Comment - EIS001887 / 0428
While NEPA [National Environmental Policy Act] regulations amended in May, 1986, eliminated the worst case analysis requirement, it did not eliminate the requirement that agencies evaluate the reasonably foreseeable significant adverse impacts of an action, even if information is unavailable or incomplete. Rather, it specified that the evaluation must be carefully conducted and based on credible scientific evidence. Furthermore, NEPA regulation (40 CFR 1502) requires disclosure of all credible scientific evidence, including responsible opposing views which are supported by theoretical approaches or research methods generally accepted in the scientific community.

We suggest that to be in compliance with NEPA that the DOE is required to consider effects of credible alternative models in the DEIS. While the DEIS recognizes differing viewpoints regarding groundwater flow (Section 3.1.4.2 and Section 5.2.3.4) and references the State of Nevada funded studies of Lehman and Brown, 1995, there has been no evaluation of the impacts.

Response
The relevant Council on Environmental Quality regulation (40 CFR 1502.9) states that a Draft EIS must disclose and discuss at appropriate points all major points of view on the impacts of the alternatives, and that the Final EIS must discuss responsible opposing views that the Draft EIS did not adequately discuss and present the agency's responses to the issues. Consistent with these requirements, DOE identified the criteria by which it identified opposing views (see Section 2.5 of the EIS) and then reviewed submitted documents (for example) and evaluated their findings for inclusion as part of the EIS analyses. If the information represented a substantive view, DOE attempted to incorporate that view in the EIS and to identify its source. If it did not incorporate the view in the analyses, DOE attempted to identify and address it.

DOE considered all the comments it received on the Draft EIS and on the Supplement to the Draft EIS. The Department understands that there are qualitative and quantitative ways in which it could disclose and discuss opposing views; however, there are no requirements for analyses, as suggested by this comment.

3.2 (12196)
Comment - EIS001887 / 0442
The Council on Environmental Quality regulations require that the agency preparing the EIS "[i]dentify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference" (40 CFR 1502.14(e)). DOE admits that it has not chosen the preferred transportation alternative at this time and that when it does, additional field surveys, state and local government consultations, environmental and engineering analyses, and National Environmental Policy Act [NEPA] reviews will be required. DOE's own guidance document on the preparation of environmental impact statements also cautions against improper segmentation of connected actions and directs that connected actions should be considered together in a single NEPA document. It specifically recommends that DOE "include transportation activities as part of the proposed action when the transportation activities would be necessary to make the action happen"(Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements, U.S. Department of Energy, Office of NEPA Oversight). The disposal of waste at the proposed repository cannot happen without transportation. Therefore, DOE should have included a preferred transportation alternative within the Draft EIS and conducted all of the necessary analyses to reach a decision.

Response
Section 2.6 of the EIS states that DOE's preferred alternative is to proceed with the Proposed Action to construct, operate (including transportation) and monitor, and eventually close a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain. At the time it published the Draft EIS, DOE did not have a preferred mode of transportation. In this Final EIS, DOE identifies mostly rail as its preferred mode in the State of Nevada. If the Yucca Mountain site was approved, and assuming that DOE would issue a Record of

Decision identifying mostly rail, DOE would:

- Construct a branch rail line in Nevada from existing tracks to the repository site.
- Encourage carriers to use rail to ship spent nuclear fuel and high-level radioactive waste to the repository, although DOE would not require the use of rail. Therefore, truck transportation in Nevada would continue to be an option.

At this time, DOE does not have a preference for a particular rail corridor implementing alternative in Nevada. The Department would identify its preference for a corridor in the future in consultation with potentially affected stakeholders, if the Yucca Mountain site was approved.

The identification of a preferred alternative is distinct from a decision to "select" an alternative for implementation. An agency can implement an alternative it has not identified as preferred. This distinction is important, as noted in Section 1.1 of the EIS, which states, "The EIS provides the information necessary for DOE to make decisions regarding basic transportation approaches in Nevada (for example, rail or truck shipments)...".

DOE believes that the information in the EIS on impacts that could result from the Proposed Action is adequate. In addition, the EIS provides the information necessary to make transportation-related decisions on the basic approaches to transporting spent nuclear fuel and high-level radioactive waste (for example, mostly rail or mostly truck), and the choice among candidate rail corridors or intermodal transfer stations and associated heavy-haul truck routes in Nevada. These conclusions are based on the following:

- The level of detail and analysis accorded the repository design, transportation, and other aspects of the Proposed Action
- The analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur
- The use of conservative assumptions if information is incomplete or unavailable and if uncertainties exist.

3.2 (12198)
Comment - EIS001888 / 0597
There are also methodological and data problems within the DEIS, especially, as they relate to population health risks, uncertainties in site characterization models, and the analysis of environmental justice impacts.

Response
DOE believes that the EIS presents information sufficient to estimate potential impacts from the construction, operation and monitoring, and eventual closure of a repository at Yucca Mountain. Section 4.1.7 of the EIS discusses health risks to populations around the proposed repository, and Section 4.1.13 discusses environmental justice concerns related to the repository. In addition, the EIS acknowledges that the results of some analyses have associated uncertainties. These could be the result of the complexity and variability of the process being analyzed, the use of incomplete information, or the unavailability of information. DOE describes such uncertainties throughout the EIS (see Section 5.2.4, for example) to help the reader understand the results or conclusions and their context.

3.2 (12288)
Comment - EIS001888 / 0412
[Clark County summary of comments it has received from the public.]

Three commenters believe that the EIS should address construction of the exploratory shaft facilities as a de facto repository, although the suitability of the site has not been decided.

Response
The Exploratory Studies Facility was developed to provide access to, and perform site characterization studies on, the subsurface portions of the repository pursuant to the NWPA. The exploratory tunnels would in effect become

part of the access route to the subsurface facility and the drifts or cells that would be used for the disposal of spent nuclear fuel and high-level radioactive waste, should Yucca Mountain receive authorization to accept waste materials.

3.2 (12347)
Comment - EIS001520 / 0002
It is clear that the nature of environment risks posed by both alternatives, and the uncertainty about those risks, change over time. Tables S-1 and 2-7, which categorize all impacts as either short-term or long-term, should be supplemented by a discussion that explains how the environmental risks of both alternatives progress over time, including the period beyond 10,000 years.

Response
The short-term impact analyses assumed, for the most part, that environmental conditions would remain unchanged for the foreseeable future. For some resource areas (for example, biological, soils, cultural) conditions would not be likely to change in ways in which impacts could be predicted. Impacts to these resources would depend primarily on the amount of habitat disturbed from the construction, operation and monitoring, and closure of a repository. For other resource areas, such as socioeconomics, estimated changes in population could reflect future trends. DOE has modified Section 3.1.7 of the EIS to reflect changes in population through 2035. For still other areas, impact analyses can be based on future predictions. For example, the EIS analyzes the potential impacts from a variety of accidents that have a probability of occurring of greater than or equal to 1 in 10 million during the operating life of the repository (see Section 4.1.8, for example). DOE assessed the potential for volcanic activity and found that an event intersecting the repository would be below the frequency of a credible event. In addition, DOE considered the impacts of a regional event (ash fall) and concluded that repository structures would not be affected. Section H.2.1.3 provides more information. With regard to long-term impacts, Chapter 5 discusses dose estimates to the public up to 1 million years after closure.

3.2 (12533)
Comment - EIS000573 / 0001
I looked through the Environmental Impact Statement. I couldn't find anything negative.

Now there's something negative in everything. You are not going to find anything that's totally positive. But we're not given the negative aspects. They do not allow us to have the negative aspects because they are afraid we're going to ruin their program.

So I get up here, I'm trying to voice my opinion. But it's hard to do because I don't have all the facts.

Now what we need to do is look into this thoroughly, read the Impact Statement that has all aspects, that shows us exactly what's going on positive or negative, instead of what's good about it. There may be good aspects. But I can't judge that because I don't see the negative aspects.

Overall, our opinion counts. And to achieve someone's opinion they need to know both sides. We're not given both sides.

The DOE comes in here and says this is the spot we're going to be. This is the spot that we're going to hold this repository.

Fifteen years ago Nevada was a small state unable to vote. Now we do not have a vote. We're not allowed to vote. Instead, Congress tells us where we're going to have this. We don't make this nuclear waste, but because of Congress we have to take it.

They say it's not permanent yet. They don't know if they are going to put it there or not. As it looks, they show us that it's the perfect spot. Nothing is wrong with it.

They know there's stuff wrong with it. The earthquakes, volcanic eruptions. They see this, but they don't show us. Because they want us to think there is nothing wrong.

Now before this goes through, I think we should have an Environmental Impact Statement that gives us both sides so we know what's really going on.

Response
Section 2.4 of the EIS compares the potential environmental impacts of the Proposed Action and the No-Action Alternative. Although generally small, adverse environmental impacts could occur under the Proposed Action. DOE would seek to reduce or eliminate many such impacts with mitigation measures. The EIS analyses considered earthquakes and volcanoes as potential accident-initiating events. DOE believes that the beneficial effects of constructing and operating the repository would outweigh the adverse effects of taking no action.

3.2 (12675)
Comment - EIS001887 / 0416
Despite state-of-the-art science, uncertainties remain regarding the consequences of most proposed actions because critical factors associated with risks remain unknown. For example, unexpected environmental trends may affect the outcome of impacts. For reasons such as these, a one-time assessment may not suffice as a reliable indicator of outcome. To compensate for such unknown risks, long-term monitoring and revisiting predictions and cumulative impacts are necessary for reliable and effective EIA [environmental impact assessment]. This is known as "adaptive environmental management," a modern-day component of responsible EIA, and is meant to be based on the concept and practice of ecosystem management that includes the human environment. Often uncertainty can be reduced through environmental monitoring and adaptive management based on the resulting information. Such a [tack] should be followed during development and the useful lifetime of the YMP [Yucca Mountain Project], as well as far into the future. This is because initial assumptions about an action change due to new knowledge, social values and human needs change over time, and significant changes can occur in the environment. Intentions and plans for such changes, based on a framework of integrated EIA, should be included in the YMP DEIS, but are not. This is unacceptable given the certainty of long-term environmental and health consequences associated with the program.

Response
As discussed in Sections 2.1.2.3 and 2.1.2.4 of the EIS, DOE would conduct performance confirmation and post-permanent-closure-monitoring programs in accordance with applicable laws, regulations, and Departmental directives. Although DOE has not developed the details of such programs, their intent would be to accomplish multiple goals related to its obligation to protect public health and safety and the environment. DOE has updated these sections of the EIS to reflect the current status of the planning for the performance confirmation and post-permanent-closure-monitoring programs.

3.2 (12753)
Comment - EIS001888 / 0484
[Clark County summary of comments it has received from the public.]

One commenter requested that the EIS discuss the ethics of no action, including the eventual shutdown of the nuclear industry, increased consumption of fossil fuels, impacts to the U.S. economy from diminished supplies of electricity.

Response
DOE analyzed the No-Action Alternative to serve as a basis for comparing the magnitude of potential environmental impacts of the Proposed Action. The scope of this EIS is defined by the NWPA, which instructs the Secretary of Energy to perform site characterization activities at the Yucca Mountain site, and if the site is found suitable, make a recommendation to the President on whether to approve the site for a development as a repository. Analysis of the effects of shutdown of the nuclear industry, increased consumption of fossil fuels, and the impact to the U.S. economy from diminished supplies of electricity is outside the scope of this EIS.

3.2 (12763)
Comment - EIS001898 / 0002
The NRC [Nuclear Regulatory Commission] 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.

Response
In the Final EIS, DOE has identified and analyzed a higher-temperature operating mode and a range of lower-temperature operating modes. Chapter 2 and other related sections of the Final EIS have been revised to reflect this refinement in design selection, which basically is an establishment of design fundamentals such as drift layout, drift spacing, depth and location of emplacement areas, and location of ventilation raises. The Final EIS describes a design for the repository with variations on the operating mode. The key parameters defining the operating mode are package spacing, drift temperatures, length of active ventilation, and age of the fuel being emplaced. The range of variances in these parameters basically determine the extent of the repository design that will be utilized for the emplacement of the 70,000 metric tons of waste and fuel; the higher-temperature operating mode would require only the main central segment of the repository; several of the lower-temperature operating modes would use that segment and the western extension, while the "ultra" low-temperature operating modes would require use of the entire planned initial design. In this way, DOE has focused its analysis on a more clearly defined proposal, and demonstrated that the environmental impacts of the construction and operation of the proposed repository would not be likely to exceed the upper range of the estimated impacts. Tables in Chapter 2 of the EIS demonstrate the bounding nature of the flexible operating modes within construct of a fixed design.

3.2 (13069)
Comment - 010248 / 0001
Consistent with its February 2000 comments on the DEIS, the NRC [Nuclear Regulatory Commission] 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 [Science and Engineering Report] 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, if 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.

Response
In the Draft EIS and the Supplement to the Draft EIS, DOE analyzed a variety of scenarios and implementing alternatives that it could deploy to construct, operate and monitor, and eventually close a repository at Yucca Mountain. The purpose of these scenarios and implementing alternatives, which reflect potential design considerations, waste packaging approaches, and modes for transporting spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site, was to: (1) provide the full range of potential environmental impacts of the Proposed Action and No-Action Alternative; (2) reflect potential decisions, such as the mode of transport, that the EIS would support; and (3) retain flexibility in the design of the repository to maintain the ability to reduce

uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The design and operation enhancements presented in the Supplement have been carried forward to the Final EIS.

Many of the issues relating to how a repository would be operated and how the spent nuclear fuel and high-level radioactive waste would be packaged would be resolved only in the context of developing the detailed design for a possible license application. DOE cannot predict with certainty how it would eventually resolve these issues. However, to enable an improved understanding of the potential environmental impacts from a more specifically defined Proposed Action, DOE has identified its preferred alternatives, simplified aspects of the Proposed Action, and modified its analyses and presentation of information to illustrate the full range of potential environmental impacts likely to occur under any foreseeable mode of transportation, or repository design and operating mode. Thus, for example, DOE has identified rail as its preferred mode of transport both nationally and in Nevada, and demonstrated through analysis that the mostly truck and mostly rail national transportation scenarios provide the full range of environmental impacts.

In the Final EIS, DOE has identified and analyzed a range of operating modes from higher- to lower-temperature. Chapter 2 of the EIS and other related sections of the Final EIS have been revised to reflect this refinement in design selection, which basically is an establishment of design fundamentals such as drift layout, drift spacing, depth and location of emplacement areas, and location of ventilation raises. The Final EIS describes a design for the repository with variations on the operating mode. The key parameters defining the flexible operating modes are package spacing, length of active ventilation, and waste package loading (principally the age of the fuel being emplaced). The range of variances in these parameters basically determine the extent of the repository design that will be utilized for emplacement of 70,000 metric tons of waste and fuel; the higher-temperature operating mode would require only the main central segment of the repository, several of the lower-temperature operating modes would use that segment and the western extension, while the "ultra" low-temperature operating mode would require use of the entire planned initial design.

3.2 (13370)
Comment - 010296 / 0015
On page 3-1, the DSEIS states, "To evaluate the environmental impacts of the lower-temperature mode, DOE maximized each of the three primary operational parameters in turn, while assigning the remaining two parameters with the corresponding proportional values that enabled meeting the lower-temperature operating mode criteria. The Department expressed the environmental impact results of this evaluation as a range, dependent on the particular operating parameter maximized for the analysis. DOE expects that the environmental impacts for the lower-temperature mode would fall somewhere within the ranges presented for all areas evaluated." This is not correct. DOE did not examine the universe of possibilities, and whether the best, the worst, or some in between scenarios were selected cannot be determined at this time. DOE must perform additional work to support their analysis of potential impacts, and the limitation of the current analyses must be disclosed in the FEIS.

Response
In this Final EIS, design parameters were varied to create seven scenarios to illustrate lower- and higher-temperature operating modes in such a way to provide the range of potential environmental impacts. To demonstrate the nature of this range, DOE has identified primary impact indicators for each environmental resource area. These indicators are the most important contributors to determining the specific impacts for an environmental resource area (short- and long-term impacts are presented in Chapters 4 and 5, respectively.

3.2 (13449)
Comment - 010296 / 0034
Similarly, information on page 2-13 indicates that an onsite landfill would be sited to support repository operations. The FEIS should disclose whether the impacts from the proposed landfill have been identified, and the extent to which additional NEPA [National Environmental Policy Act] review may be required at siting to address site-specific environmental concerns.

Response
A site for the landfill has not yet been identified. DOE would identify an appropriately sized landfill at the repository site for nonhazardous and nonradiological construction and sanitary solid waste, and for similar waste generated during operation, monitoring, and closure of the repository. The EIS analysis assumed the landfill would

be at the repository. By doing so, the environmental impacts of these facilities were considered in the EIS. DOE believes that the analyses of these facilities in the EIS are adequate.

3.3 Draft EIS - Public Involvement

3.3 (1)
Comment - 8 comments summarized
Commenters stated that the Draft EIS should have been available in Spanish and in Braille so that the Hispanic community and those with visual impairments could have greater and more effective involvement in the public participation process. Commenters stated that the Draft EIS should be republished in Spanish and Braille and the comment period extended. Commenters also stated that translators should have been at the public hearings to better serve citizens with primary languages other than English and believe that DOE did not make a diligent effort to involve low-income and minority populations in the public participation process.

Response
Between August 7 and December 5, 1995, DOE solicited written and oral comments and held 15 public scoping meetings across the country to enable interested parties to provide comments on the scope of the EIS. During this period, DOE received no comments requesting publication of the EIS in Braille or in languages other than English. In addition, DOE received no such requests during subsequent interagency and intergovernmental discussions. However, in concert with the publication of the Draft EIS, DOE made available two Spanish-language fact sheets about Yucca Mountain and the proposed repository.

DOE representatives also met with 13 Native American tribes and organizations to describe the EIS scoping process and to request tribal involvement in the process. Section 1.5.1 and Appendix C of the EIS discuss the scoping process and the interagency and intergovernmental interactions, respectively, undertaken by DOE to ensure public involvement.

DOE was prepared to provide assistance for those with visual or hearing impairments at the public hearings, if it had received requests before the hearings. DOE received no such requests.
Before each hearing, DOE placed advertisements in local newspapers, including Spanish-language newspapers, and distributed text for public service announcements and press releases to more than 175 local and national stakeholders, and media outlets to publicize information that would be accessible to the general public and to minority and low-income communities.

3.3 (50)
Comment - 321 comments summarized
Overall, commenters were disappointed with the DOE efforts to involve the public in the repository program and specifically the EIS. Many commenters said that the Department failed to educate the public adequately about important issues. Some said that DOE could have better informed the public about the program through the media, schools, and community education programs. Others said DOE should publish project information, create informational materials, and develop unbiased education classes. These efforts would have helped the public better understand the repository program and the issues that surround it.

With regard to public involvement with the EIS, commenters said that the length of the comment period was insufficient because the Draft EIS was very long and complex; others said they were unable to even acquire copies of the Draft EIS. Some said that DOE did not advertise the public hearings on the Draft EIS adequately and that the hearings did not include all places potentially affected by waste shipments. Some said that these shortcomings in the public involvement process would effectively leave the public out of the decisionmaking process. Based on these concerns, some commenters said that DOE should withdraw the EIS or recirculate it to a broader audience.

With regard to public hearings on the Draft EIS, commenters said that the accommodations, such as room size and parking facilities, were inadequate; the format of the meetings (that is, podium and microphone) was intimidating; the notices describing the purpose of the meetings were not clear or were misleading and lacked relevant information (for example, state-specific routes analyzed); and hearing-presentation times were too limited.

Response

DOE believes that its approach to the public involvement process is consistent with the National Environmental Policy Act, Council on Environmental Quality and DOE regulations, and the intent of the NWPA. For this reason, a major element of the Yucca Mountain Project has been to ensure that stakeholders, the media, and the public have an opportunity to participate in the Project, and to acquire information they need to make informed decisions. This effort is focused on building and maintaining relationships with stakeholders and the media through regular interactions for information and educational opportunities.

The Yucca Mountain Project has developed many public information products, including permanent and portable exhibits, information materials, models, audiovisuals, electronic media, publications, and public outreach announcements. These products are available at science centers in Las Vegas, Pahrump, and Beatty, Nevada; on Internet sites operated by the Project and the DOE Office of Civilian Radioactive Waste Management (www.ymp.gov and www.rw.doe.gov, respectively); at public meetings and hearings on topics related to Yucca Mountain; during tours of the Yucca Mountain site; and in response to inquiries and requests for information. The Project provides speakers and technical experts on Yucca Mountain-related topics to technical groups, community groups, professional organizations, schools, and other audiences and has created programs and materials to enhance area educators' and students' awareness of issues related to the disposal of spent nuclear fuel and high-level radioactive waste. For more information on public outreach activities, call 1-702-295-1312 or 1-800-225-6972.

With regard to the EIS, DOE believes that the process it used to involve the public in the development of the EIS is consistent with the National Environmental Policy Act, the Council on Environmental Quality and DOE regulations, and DOE guidance on public participation during the preparation of EISs. Planning for the public comment period began during the initial scoping period for the EIS. DOE indicated during the public scoping meetings and in associated documentation that the comment period on the Draft EIS would be at least 180 days because of the national interest in the Yucca Mountain Project and because of the complexity and likely length of the Draft EIS. DOE later extended this period by 19 days to accommodate comment submittals from additional hearings.

It was impractical for DOE to hold public comment meetings on the Draft EIS at every location potentially affected by the transport of the spent nuclear fuel and high-level radioactive waste. Therefore, the Department selected major metropolitan areas most likely to experience large numbers of shipments if it built the repository, as well as cities close to nuclear power plants. In Nevada, DOE selected hearing locations based on their proximity to Yucca Mountain and to candidate transportation routes, and on the size of the population center. DOE originally scheduled and advertised 16 hearing locations and later added 5 locations to expand public opportunity to comment on the EIS. DOE selected facilities for these hearings after consultation with county representatives, members of Congress, DOE Field Offices, and other stakeholders. The Department made an effort to hold public hearings at locations and times that were most convenient for the general public. Facilities and meeting room accommodations were planned to provide ample seating, and both afternoon and evening sessions were held at locations to accommodate those having conflicting work schedules and to maximize attendance. DOE faxed reminders of the meeting times and locations to local officials at each location to help encourage their participation and that of their constituents. At all hearing locations, literature was available at information tables and DOE personnel were present to answer questions.

A *Federal Register* notice announced the release of the Draft EIS and DOE mailed more than 2,400 copies to stakeholders, including members of Congress, state and territorial governors, state legislators, Federal agencies, special interest groups, and members of the public. DOE developed the distribution list using its Stakeholder Directory for the National Environmental Policy Act, Yucca Mountain Project databases, and a postcard mailing to more than 4,000 individuals notifying them of the upcoming release of the document. (The public notice materials did not provide technical information such as state-specific routes analyzed, because this information was in the Draft EIS, on the DOE web site, or in associated publicly available documents.) After the release of the Draft EIS, DOE distributed more than 3,400 copies of the document (the Draft EIS was sent to anyone requesting a copy). After DOE announced the initial list of hearing dates and locations, it mailed fliers to each recipient on the EIS distribution list. As DOE added more hearings, it sent three subsequent mailings to these stakeholders to notify them of the additional opportunities to provide comments. DOE made the Draft EIS, references, and other supporting materials available on the Yucca Mountain Project web site (www.ymp.gov) throughout the comment period. DOE also made the Draft EIS available on its NEPA website (http://tis.eh.doe.gov/nepa/).

DOE distributed paper and electronic copies of the Draft EIS to 38 reading rooms in 17 states and the District of Columbia. In addition, DOE shipped an electronic version of the noncopyrighted references on compact disks to these outlets. DOE also placed paper copies of references in the libraries at the University of Nevada-Las Vegas, the University of Nevada-Reno, the Yucca Mountain Site Characterization Office Science Centers at Pahrump and Beatty, Nevada, and DOE Headquarters in Washington, D.C.

Before each hearing, DOE placed advertisements in local newspapers, including Spanish-language newspapers, and distributed text for public service announcements and press releases to more than 175 local and national stakeholders and media outlets to publicize information that would be accessible to the general public and to minority and low-income communities. DOE also conducted three prehearing meetings, one each in Las Vegas, Reno, and Amargosa Valley, to help inform the residents of Nevada about the Draft EIS and the public participation process.

During the 199-day comment period, DOE encouraged stakeholders to offer comments on the document during the public hearings and by mail, facsimile, and via the Internet (the Yucca Mountain Project web site). DOE received oral comments at public hearings in 21 locations across the country. As a result of this effort, DOE identified more than 11,000 comments in more than 2,300 individual letters, facsimiles, emails, and hearing presentations on the Draft EIS.

DOE presented an overview of the Proposed Action, alternatives, and potential impacts at each hearing in a manner to allow sufficient time for individual commenters. Oral comments were initially limited to 5 minutes to permit maximum participation by those in attendance; however, individuals requiring additional time were given the opportunity to complete their remarks on completion of commentary by other participants. The meeting facilitator also demonstrated considerable flexibility by allowing commenters more time than originally scheduled at meetings where relatively few people attended.

Section 1.5 of the EIS had been modified to describe the public involvement process.

3.3 (88)
Comment - 15 comments summarized
Commenters requested that rather than providing generic comment responses, DOE respond to each comment individually and indicate how the comment resulted in a Draft EIS revision to be reflected in the Final EIS before its release.

Response
DOE identified more than 13,000 individual comments in the letters, facsimiles, emails, and oral presentations submitted during the public comment periods for the Draft EIS and the Supplement to the Draft EIS. The Department considered every comment to determine if it needed to perform additional research and subsequent EIS text changes to respond adequately. Because many comments were identical or similar or presented common themes that would cause individual responses to be repetitive, DOE determined that the use of summary comments and responses was appropriate in some cases. The Council on Environmental Quality regulations permit individual and collective assessment and consideration of comments and the use of comment summaries where the number of comments received is voluminous (40 CFR 1503.4). DOE believes this approach allows it to use its resources more effectively and efficiently in responding to all comments. Therefore, the Comment-Response Document identifies each comment by an identification number and addresses every comment individually or in a comment summary. In addition, the Comment-Response Document describes changes made to the EIS in response to comments. The Secretary will consider the Final EIS, including the comments and their responses, in determining whether to recommend approval of the Yucca Mountain site to the President.

3.3 (163)
Comment - 9 comments summarized
Commenters expressed their support for comments provided by Mr. Richard Arnold, who was the spokesperson for the Consolidated Group of Tribes and Organizations.

Response
DOE notes the support for the comments tendered by Mr. Richard Arnold. DOE considered Mr. Arnold's comments in the development of the Final EIS.

3.3 (875)
Comment - EIS000139 / 0002
DOE has made great strides in communicating with the Affected Units of Local Government (AULG) concerning site characterization decisions and its future license application. We both believe the recent AUG meeting held in Las Vegas was the most open, concise meeting we have attended thus far. We applaud the DOE and its contractors for this effort and hope future meetings can be conducted in this manner.

Response
Thank you for your comment.

3.3 (1649)
Comment - EIS000554 / 0003
Also I wanted to point out that I had ordered a CD-ROM of the DEIS quite a while ago, and much to my surprise, I was unable to print anything out from it. It's read only from the computer screen. That to me also does not help with the public process. How many people are going to sit down in front of the computer screen and read section by section and not [be] allowed to print any of it?

I did submit a comment, and the response I got was that that was unfortunate, but that's basically it. So my further comment is as it is unfortunate and can we do something about it. I'd like to see something more acceptable that way.

Response
DOE provided both paper and electronic versions of the Draft EIS to the public for comment. DOE did not believe it necessary to provide an electronic version that would allow printing of the EIS because paper copies were available.

3.3 (3575)
Comment - EIS001260 / 0001
CP&L [Carolina Power & Light] encourages the Department of Energy to consider those comments made by the Nuclear Energy Institute (NEI) on behalf of the nuclear power industry.

Response
DOE notes your support of comments provided by Nuclear Energy Institute. DOE has considered all oral and written comments received in the development of this EIS.

3.3 (4697)
Comment - EIS001438 / 0001
We would greatly appreciate receiving a summary of the findings of your current hearings.

Response
This commenter, the St. Louis Council on Environmental Health and Safety, was added to the Department's mailing list to receive the Supplement to the Draft EIS and the Final EIS.

3.3 (4774)
Comment - EIS001390 / 0003
I strongly encourage your agency to reconsider and respond with a waste disposal plan that would minimize the danger to all of our communities and provide opportunities for direct citizen involvement in its design and implementation.

Response
DOE has reviewed and considered all comments received on the Draft EIS. DOE recognized that since publication of the Draft EIS certain key aspects of the design (for example, disposal container components, use of drip shields)

have changed in ways that are important to repository performance and reduction in uncertainties. To provide updated information to the public, DOE published the Supplement to the Draft EIS that focused on the most recent design enhancements. Responses to public comments received on the Supplement to the Draft EIS are included in this Comment-Response Document.

3.3 (5477)
Comment - EIS000543 / 0007
I also would like to suggest that since we are here for a hearing, and we have those people who are preparing the EIS present, at least in the area someplace, that they probably should be here to listen to these comments directly rather than to read them.

Response
At least one DOE representative who was also a member of the EIS preparation team was present at all times during the public comment hearings, as were contractor representatives.

3.3 (5888)
Comment - EIS001803 / 0005
Further, I am very disappointed to see that those who made the decisions to develop nuclear weapons and nuclear waste are not here to listen to our comments.

Response
DOE has considered all oral and written comments received on the Draft EIS in the development of this Final EIS. The Final EIS, which includes this Comment Response Document, will be available to the decisionmakers, including the Secretary of Energy, the President, and Congress.

3.3 (6322)
Comment - EIS001881 / 0006
DOE should hold hearings on how to start over on the waste program.

Response
DOE is required to establish a schedule for the siting, construction, and operation of a repository that would provide a reasonable expectation that the public and the environment will be adequately protected from the hazards posed by high-level radioactive waste and spent nuclear fuel. Thus, the intent of the public comment period was to receive comments on the Department's proposal (and alternatives) to construct, operate and monitor, and eventually close a repository at Yucca Mountain.

3.3 (6595)
Comment - EIS001878 / 0001
Our [Eureka County] comments consist of the attached document, together with several exhibits. One of our exhibits is the videotape of the DOE's Draft EIS hearings in Crescent Valley, Eureka County, Nevada on December 9, 1999. Please make the enclosed five (5) videotapes and their contents, including the question and answer sessions, part of our official comments. Our purpose in submitting detailed comments and the videotapes is to ensure that DOE has a full understanding of Eureka County's concerns about the proposed Yucca Mountain project and the Draft EIS.

Response
The question and answer period preceding the comment period at each hearing was intended to help inform attendees of the purpose and scope of the Draft EIS, and to discuss and clarify any issues of concern. As an information forum, DOE believes that including the questions and answers on the record is unnecessary. In addition, the videotapes mentioned by this commenter provide another means to record comments at the Crescent Valley public hearing. Comments at this hearing were recorded by a stenographer (a transcript), and these comments were identified and responded to throughout this Comment-Response Document as appropriate. Transcribing the videotapes would be duplicative and is unnecessary.

3.3 (6640)
Comment - EIS001878 / 0030
Regarding the transportation aspects of the proposed action, the DEIS fails to satisfy the purpose of the National Environmental Policy Act (NEPA), as expressed in 40 CFR 1500.1(b), because it: fails to make environmental information available to public officials and citizens before decisions are made and actions are taken; fails to present information of high quality; and, therefore, does not allow accurate scientific analysis, expert agency comments, and public scrutiny, which are essential to implementing NEPA.

Response
The purpose of the National Environmental Policy Act is to promote an understanding of the environmental consequences of Federal actions before an agency takes action. DOE believes that the EIS adequately analyzes environmental impacts that could result from the Proposed Action and is consistent with the NWPA and the National Environmental Policy Act. DOE also believes that the EIS provides the information necessary to make transportation-related decisions on the basic approaches to transporting spent nuclear fuel and high-level radioactive waste (such as mostly rail or mostly truck shipments), as well as the choice among alternative rail corridors in Nevada. However, follow-on implementing decisions, such as the selection of a specific rail alignment in a corridor, would require additional field surveys, State and local government and Native American tribal consultations, environmental and engineering analyses, and National Environmental Policy Act reviews.

Section 1.5.1 of the EIS discusses the public scoping process that was conducted to determine the scope and significant issues to be analyzed in depth in the EIS. Chapter 6 of the EIS discusses the transportation-related impacts of the Proposed Action, and Appendix J provides additional details in support of the results in Chapter 6. DOE provided the information and results in the Draft EIS, which underwent public review. The Draft EIS has been modified and Appendix M was added in response to public comments. As discussed in Section 2.6 of the EIS, the Secretary will use the information from the EIS process in recommending the site to the President.

3.3 (6730)
Comment - EIS001377 / 0004
By process design, the burden to review and question the DOE Draft EIS falls to individuals and organizations often comprised of interested volunteers who lack legal representation, science consultants, or funding to analyze DOE studies and offer their own preferred alternatives–a point that your Section S.4.1.14-Environmental Justice, fails to reflect.

Individuals and organizations who take time away from families and work to review and comment on the Draft EIS (as opposed to staff who are paid to produce this EIS), have no way of knowing how their comments are weighted against scientific, economic or political interests, or if their concerns are even incorporated in the EIS scoping, draft, final and recommended decision.

Response
DOE's public involvement program strives to involve and educate the public through a variety of means, such as the use of reading rooms to maintain up-to-date project publications, a speaker's bureau, publication and distribution of newsletters, other mailings, and the EIS. This information is available to everyone, regardless of economic status or cultural background.

3.3 (6754)
Comment - EIS001377 / 0013
I wish that I could spend more time in commenting on your DOE Draft EIS, and hope that the DOE will acknowledge that every one written comment they receive opposing the DOE Proposed Action represents many unheard voices of affected people, the animals and plants, the air and the water--all the voices of our common home, all the voices of our future.

Response
All oral and written comments received on the Draft EIS have been considered by DOE in the development of this Final EIS. Comments in opposition to the Yucca Mountain Project are included, and responded to, in this Comment-Response Document.

3.3 (7125)
Comment - EIS001106 / 0016
NEPA [the National Environmental Policy Act] is a procedural act rather than a substantive act, and it alone does not determine the outcome of an action. In the case of the YMP [Yucca Mountain Project], the outcome will be influenced by biased interests inside and outside the DOE such as the nuclear industry. Thus, public stakeholders such as the citizens of Nevada may not substantially affect the outcome of the YMP through their comments on the DEIS. Speaking on behalf of the citizens, the influence of the state government in this respect may be more effective but still may be outside the final decisionmaking regarding execution and form of the proposed action for the YMP.

Response
As discussed in Section 2.6 of the EIS, in making a recommendation to the President the Secretary of Energy will consider not only potential environmental impacts and public comments on the EIS, but other factors. Such factors include those identified through public input and others, including the following:

- Ability to obtain necessary approvals, licenses, and permits
- Ability to fulfill stakeholder agreements
- Consistency with the DOE mission
- Assurance of safe facility construction and operations flexibility
- Cost of implementation
- Ability to mitigate adverse impacts

DOE has revised Section 2.6 of the EIS to reflect the basis for the Secretary's recommendation.

3.3 (8068)
Comment - EIS002177 / 0001
Because of the desire of this office [Senator Richard G. Lugar] to be responsive to all inquiries and communications, your consideration of the attached is requested.

Response
DOE has considered all oral and written comments received on the Draft EIS in the development of this Final EIS. The Final EIS, which includes this Comment-Response Document, will be available to the decisionmakers, including the Secretary of Energy, the President, and Congress.

3.3 (8210)
Comment - EIS000497 / 0002
The Office of Civilian Radioactive Waste Management's, OCRWM, record in addressing the concerns of western states has been extremely poor.

Response
In the course of producing this EIS, DOE interacted with a number of Federal, state, and local government agencies and other organizations. The purposes of these interactions have been to:

- Discuss issues of concern with organizations having an interest in or authority over land that the Proposed Action would affect directly, or organizations having other interests that some aspect of the Proposed Action could affect

- Obtain information pertinent to the environmental impact analysis

- Initiate consultations or permit processes, including the provision of data to agencies with oversight, review, or approval authority over some aspect of the Proposed Action

In addition to the EIS-related interactions, DOE has continued to meet with and discuss issues with government agencies and other organizations. DOE believes that these interactions have been useful in modifying ongoing site

characterization efforts, the development of the EIS, and the course of the overall program. Appendix C discusses the results of the EIS-related interactions.

3.3 (8532)
Comment - EIS002256 / 0002
I asked a question during the question-and-answer period regarding the site recommendation process and whether there would be information that would be uniquely given to the president, different from what the public will have a chance to see.

And the answer I got back I thought was not very useful; but nevertheless, it was indicated that there is certainly some doubt of whether it will be unique information or not. So Citizen Alert is concerned about that, that the public has access to all the information that's going to go to the president and proper comment has been made on all the information.

Response
The Secretary of Energy will make a determination on whether to recommend the site to the President on the basis of a number of different types of information, including that contained in the Final EIS. Any recommendation would be accompanied not by the Final EIS, but also by those other materials designated in Section 114 of the NWPA. These include, for example, a description for the facility, a description of the proposed waste form, an explanation of the relationship between the proposed waste form packaging and the geologic medium of the site, a discussion of the site characterization data that relate to the safety of the site, preliminary comments of the Nuclear Regulatory Commission concerning the sufficiency of information for inclusion in any Department license application and the views and comments of the Governor and legislature of any state or the governing body of any affected Native American tribe. DOE does not anticipate that any of the information related to a determination of site suitability would be sensitive. As a consequence, the site suitability information would be available for public inspection and would be part of the basis for the recommendation to the President.

3.3 (8600)
Comment - EIS001837 / 0005
PARD [People Against Radioactive Dumping] asked to be included on the DOE's mailing list when PARD's Director, Ruth Lopez signed up at the DOE's annual conference in November of 1998. Why did you ignore us and not send us a copy of the Draft Yucca Mountain DEIS or apprise us of its existence? You knew that we were the local grassroots organization in Needles and San Bernardino County, California and Ruth Lopez has even visited your office in Las Vegas. Our organization has not had 180 days to review the DEIS since we only heard about the DEIS after the San Bernardino Sun ran an article about it in January. We need at least until May to review both the DEIS and the 10CFR963 and to have time for our organization to meet and discuss this issue. We would like the DOE to pay for the cost of our review of your plans and for our organizational meeting to discuss the proposal as you apparently pay private organizations to do.

Response
DOE's records indicate that nine copies of the Draft EIS were mailed to Ruth Lopez on January 18, 2000. However, there was no address on record for People Against Radioactive Dumping (the address has since been added to the mailing list based on this comment). Unless required by provisions of law or in unique circumstances, DOE does not fund organizations to review the Draft EIS during the public comment period.

3.3 (8990)
Comment - EIS001922 / 0018
This DEIS should be redone with close attention paid to the hundreds of comments made on this project because in the end, the people who will have to live near this waste will be the true stewards, and they deserve to have their concerns genuinely addressed.

Response
DOE reviewed and considered each of the more than 11,000 comments identified in over 2,300 individual letters, facsimiles, emails, and oral presentations provided on the Draft EIS. Many of the comments resulted in changes to the EIS that expanded upon or clarified the description of the existing environment and impact analyses; new

analyses also were performed and included and were also considered in the preparation of the Supplement to the Draft EIS.

In May 2001, DOE issued the *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,* which it distributed to more than 4,000 stakeholders. The Department encouraged these stakeholders to submit comments during a 45-day comment period, which it later extended to 57 days (May to July 6, 2001).

In June, during a review of its mailing records, the Department discovered that it had inadvertently not sent the Supplement to the Draft EIS to about 700 stakeholders who had requested and received a copy of the Draft EIS. DOE announced this oversight, sent the Supplement to the Draft EIS to these stakeholders, and provided them an opportunity to submit comments during a separate 45-day comment period (June 29 to August 13, 2001).

DOE held three public hearings in Nevada during the comment period. It held no hearings outside Nevada because the Supplement focused primarily on matters involving repository design. Commenters were encouraged to submit comments at public hearings and by mail, facsimile, and the Internet during the comment periods. DOE used means comparable to those it used for the Draft EIS (advertisements, releases, and announcements) to notify the public.

DOE considered each public comment it received in its development of this Final EIS. In response to comments, DOE has modified the EIS in a variety of ways, including clarifications or changes to the text, new or more recent information (such as 2000 Census data and population projections), and modified analyses (such as those for transportation impacts in which it modified the characteristics of the representative commercial spent nuclear fuel and accident source terms). DOE also modified the EIS to include new information obtained since it issued the Draft EIS. The Department obtained such information from site characterization activities and design evaluations, including, for example, updated radon emanation data and the most recent design features.

3.3 (9037)
Comment - EIS001866 / 0002
During the scoping meetings citizens were told that their comments would lead to decisions regarding repository design (primarily heat load) and transportation modes. Discussion and comment at those meetings, between the Department representatives and the audience made it clear that members of the public realized that they would not be in a position to influence those decisions.

Response
As discussed in Section 1.5.1, the EIS scoping process was intended to determine the scope and the significant issues to be analyzed in depth in the EIS. DOE has stated in the EIS (see Foreword and Section 1.1) that it has developed the information about potential environmental impacts that could result from either the Proposed Action or the No-Action Alternative. The EIS also indicates that sufficient information is available to make transportation-related decisions regarding the basic approaches (for example mostly rail, mostly truck shipments) as well as the choice among alternative transportation corridors. The Secretary will also consider information, such as data relating to the safety of the site, preliminary comments from the Nuclear Regulatory Commission, and comments from the State of Nevada, affected Native American tribes, and others. DOE has clarified in Section 2.6 that it would consider not only the potential environmental impacts and public comments on the EIS, but also these other factors in determining whether to recommend the Yucca Mountain site to the President.

3.3 (9047)
Comment - EIS001866 / 0005
All of the deficiencies in the DEIS are due, we believe, to two basic reasons. First, as has been stated for the past six years, "this project is not EISable." According to DOE, it is still just a study. And, in fact, many of the study results are not due until well after significant decisions are made, using the premature EIS. Secondly, the Yucca Mountain EIS is seen by the public as merely a symbol on the DOE schedule that must be completed within a certain time frame in order to keep the project rolling along as projected. The Department must choose how to ... proceed. It must decide whether to do a careful job, allowing for the completion of necessary scientific studies, and public comment on realities instead of concepts. Or will the Department continue to frustrate interested and involved citizens by soliciting their comments at meetings only to allow for the checking off of boxes in order to stay on a

predetermined, fast-track schedule? To do the latter is unfair, a subversion of the NEPA process, and clear evidence that the real public involvement is not important to the DOE.

This DEIS must be withdrawn and the process must be postponed until site characterization is completed at the mountain. Then a scoping process can occur that addresses factors required by NEPA and matters where public input is valuable and truly useful. This will allow the writing of a DEIS with well defined decisions, where the rationale in transparent, and the public is allowed and encouraged to effectively do its job.

Response
In the EIS, DOE has used information from a broad range of studies undertaken to obtain or evaluate the information needed for the assessment of Yucca Mountain as a monitored geologic repository. Because some of these studies are ongoing, some of the information remains incomplete. As discussed in Section 2.5 of the EIS, DOE has identified the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches in accordance with the Council on Environmental Quality regulations (40 CFR 1502.22). In such instances, the EIS describes the basis for the analysis, including assumptions, the use of preliminary information, or conclusions from draft or incomplete studies.

DOE believes that the EIS adequately analyzes the Proposed Action and the No-Action Alternative. This determination is based on: (1) the level of detail and analysis accorded the repository design, and transportation and other aspects of the Proposed Action, (2) the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and (3) the use of conservative assumptions when information is incomplete or unavailable and when uncertainties exist.

3.3 (9111)
Comment - EIS001937 / 0003
You may find it interesting to know that, recently, I became involved in an email dialogue with a person who represented himself as a technical advisor to a Yucca Mountain citizen's advisory group. I had posed a question about the transportation plan for the proposed Yucca Mountain repository to a professor of mine at UNLV. My professor forwarded my email to a group of persons, one of whom responded (the alleged technical advisor).

I found the tone and content of this, and several subsequent emails from this individual on this issue, disturbing. It suggests that the project is a done deal and that the public comment process period is merely an annoying inconvenience that is consuming precious time from the schedule. It also suggests an attitude of paternalism by those on the inside.

This individual went on to claim that he knows so much more about all aspects of the project than I do that I couldn't possibly be enlightened via email. It as only after I revealed that I had worked at the former Nuclear Valve Division of Borg-Warner, Van Nuys, California, from 1976-1980, that this alleged technical advisor apologized for his belittling remarks and confrontational style. (The company manufactured parts and assemblies, including feed-water isolation valves, for nuclear applications. Clients included Three Mile Island, Hanford and the TVA, among others.)

His point seemed to be that the public lacks the knowledge to comprehend the significant points of the issue and that public comment serves only to delay the process.

Response
DOE is unaware of the technical advisor referred to in this comment. However, the Department believes that comments and input by the public and other interested parties have been useful and have assisted in the modification of ongoing site characterization efforts, the development of the EIS, and the course of the overall program. The Final EIS, which includes this Comment-Response Document, is available to the decisionmakers, including the Secretary of Energy, the President, and the Congress.

3.3 (9340)
Comment - EIS001888 / 0056
Federal code requires that agencies "make diligent efforts to involve the public in preparing and implementing their NEPA [Nuclear Environmental Policy Act] procedures" (40 CFR 1506.6(a)). It goes on further to say that they are

required "to inform those persons and agencies who may be interested or affected" (40 CFR 1506.6(b), [emphasis added]. However, in the DEIS, DOE does not demonstrate how they have made diligent effort to involve those who may be interested or affected.

40 CFR 25.3, Requirements for RCRA [Resource Conservation and Recovery Act] Public Participation, requires access to the decision-making process by the public. The participation guidelines expect public "access" to the decision-making process, and expect that "dialogue" be created. That is, the agency must assimilate public viewpoints and purposes, and then demonstrate that this assimilation has occurred.

The NWPA states that public participation is "essential to promote public confidence in the safety of [the repository]", so, therefore, "appropriate procedures must be taken to ensure [that the Yucca Mountain Site Characterization Plan and attributes of the site] do not adversely affect public health and safety and the environment for this or future generations."

Public participation under Executive Order 12898, and the DOE Environmental Justice Strategy, which are binding upon the preparation of the DEIS, require that six principles must be implemented:

- Agencies should consider the composition of the population in affected by actions, whether minority or low-income communities or Indian tribes are present, and whether there may be disproportionately high and adverse effects on them.
- Agencies should consider data regarding potential multiple or cumulative exposures.
- Agencies should recognize that cultural, social, occupational, historical, or economic factors may amplify effects of actions; for example, effects on populations with heightened sensitivities to exposures, or effects on community structure.
- Agencies should develop public participation strategies, and acknowledge and strive to overcome barriers to participation.
- Agencies should assure early and meaningful representation in agency processes of all groups within the affected population.
- Agencies should seek representation from Indian tribes affected by actions.

The Council on Environmental Quality stipulates that these six principles include translation of documents, and the holding of hearings in more than one language if and as needed, and that a Federal agency must ensure that all documents and hearings shall be understandable.* What has been done to implement this requirement of environmental justice? There is no Spanish translation of the DEIS available, reports, notifications and newsletters are not published in Spanish even though the DOE is aware that a significant proportion of the residents of Nevada and along potential transportation routes speak and read Spanish as their first language. Likewise, interpreters were not present at DOE hearings.

More deeply, since 'understand' is not confined to 'use my language,' we must ask what efforts DOE has made to translate its thoughts, evidence, plans or proposals into standard English as utilized by the majority, lay population? There has been very little such effort to interpret often complex concepts into standard English.

Although some portions of the DEIS show editing, graphics, examples, definitions or illustrations meant to render text more comprehensible, the document is written primarily in the language of DOE management. Even though acronyms are explained, the sense of the reasoning used is not readily apparent to users of standard English. Considerable interpretation is required, to make the document and its many concepts comprehensible and, therefore, capable of analysis and discussion by members of the public.

Further, the CEQ requires that the DOE use facilities that are local to any affected sub-population. This would mean holding meetings in the neighborhoods of any such affected populations. In Clark County, these meetings have been

held at Cashman Field or in the adjacent State of Nevada Sawyer Building, or at UNLV all easily reached by those with a car and with time for an afternoon or evening meeting. But, in a practical sense, this means that anyone who wants to be heard by the DOE must have the time and the ability to meet at pre-arranged DOE meeting sites, rather than at neighborhood locations more convenient for those people who would be affected by the project. DOE' attempt at outreach has failed miserably.

We are, therefore, concerned that DOE made no substantial effort to reach the people who would be most affected by the Yucca Mountain project. To counter this deficiency in outreach, from October 1999 through January 2000, Clark County NWD staff presented information about the DEIS at more than 20 public meetings in Clark County and to a large number of individuals. Almost without exception, we were asked why DOE wasn't doing more to directly inform the public about the DEIS?

In DEIS Section 1.5.1, DOE indicated that during the scoping process, they invited members of the general public to participate in the process. The Department mailed a series of information releases to Yucca Mountain stakeholders and members of the public notifying them of the opportunity to comment. However, there is no indication of the number of members of the general public or which groups were sent the information.

Section 1.5.1 further noted that during the scoping process, DOE "...submitted press releases and public service announcements to newspapers and television and radio stations; ..." Again, there is no indication regarding which newspapers or television and radio stations were notified. There is no indication that DOE made any attempt to encourage public involvement during the public comment period on the DEIS.

There is also no description of any efforts made to contact the public about the DEIS during the comment period. With a project as important as the Yucca Mountain Program, one that may affect generations of Nevadans, it would have been in the spirit of NEPA to broadly disseminate advertisements, in addition to public service announcements on radio and television. Public service announcements and press releases often only reach a small proportion of the population. Public service announcements, generally, compete for a limited amount of airtime with other community events. There is indeed no guarantee that they will be given any airtime or not relegated to off prime time scheduling. DOE has in fact violated its own Environmental Justice Strategy objectives that require DOE not only to use public service announcements, but also radio, TV, and minority publications to advertise forthcoming hearings or meetings.

One example of the inadequacy of DOE's public information process occurred at the Salt Lake City DEIS public hearing on January 13, 2000. In the entire State of Utah, notice was published only in the "Salt Lake Tribune." However, there is another major Salt Lake City newspaper, the "Deseret News," which attracts a large, separate readership. As a result, many residents were unaware of the public hearing. It should be noted that there are also a number of other papers in Utah serving major population centers in the Ogden and Provo/Orem areas as well as other cities along potential transportation routes throughout Utah. The poor turnout of citizens at the Salt Lake public hearing is indicative of the meeting notification not being well publicized.

In summary, DOE did not demonstrate that they met the federal requirements to "make diligent efforts to involve the public" in the NEPA process. It appears that DOE has performed the bare in public involvement. Considering that the Yucca Mountain Program could impact a sizable segment of the nation now and for many future generations, more effort should have been made to ensure that those "who may be interested or affected" would know about the DEIS, how it could affect them and how they could participate in the public process.

*Council on Environmental Quality Guidelines, p, 29.

Response

DOE believes that its approach to the public involvement process during the development of the EIS is consistent with the National Environmental Policy Act (NEPA), Council on Environmental Quality and DOE regulations on implementing NEPA, and DOE guidance on public participation during the preparation of EISs.

Before publishing the Notice of Intent to prepare this EIS, DOE notified its stakeholders, the media, Congressional representatives, the Office of the Governor of Nevada, affected units of local government in the Yucca Mountain vicinity, the Nuclear Regulatory Commission and other Federal agencies such as the Bureau of Land Management

and National Park Service, and the Nuclear Waste Technical Review Board of its plans to prepare the EIS and its approach to the scoping process. In addition, DOE met with 13 Native American tribes and organizations and provided them the same information.

When DOE published the Notice of Intent, it mailed a series of information releases to Yucca Mountain stakeholders notifying them of the opportunity to comment on the scope of the EIS; sent press releases and public service announcements to newspapers and television and radio stations; and made information about Yucca Mountain, the EIS, and the NEPA process available on the Internet (www.ymp.gov) and in public reading rooms across the country. To reach low-income and minority communities, DOE contacted news publications and radio stations that tend to service these communities to notify them of the scoping meetings and the locations of available information.

In 1995, DOE held 15 public scoping meetings across the country during a 120-day public scoping period. DOE considered each of the comments included in the more than 1,000 documents it received during the scoping process and, in response, included additional information, modified analytical approaches, and evaluated additional implementing alternatives in the Draft EIS. For example, DOE evaluated potential impacts from the transportation and disposal of an expanded inventory, such as Greater-Than-Class-C low-level waste.

During the preparation of the EIS, DOE held discussions with a number of government agencies and other organizations to discuss issues of concern, obtain information for inclusion or analysis in the EIS, and initiate consultations or permit processes. For example, DOE asked the American Indian Writers Subgroup to prepare a document that recorded the viewpoints and concerns of Native Americans about Yucca Mountain and the EIS.

DOE distributed 3,400 copies of the Draft EIS to stakeholders and held 10 public hearings throughout Nevada and 11 public hearings elsewhere across the country during a 199-day comment period. During the comment period, DOE encouraged stakeholders to offer comments on the document during the public hearings and by mail, facsimile, and the Internet.

Before each hearing, DOE placed advertisements in local newspapers, including Spanish-language newspapers, and distributed public service announcements and press releases to more than 175 local and national stakeholders and media outlets to publicize information that would be accessible to the general public and to minority and low-income communities. In addition, in concert with the publication of the Draft EIS, DOE made available Spanish-language fact sheets about Yucca Mountain and the proposed repository.

DOE designed the advertisements and public notices to provide the public with notice of the availability of the Draft EIS, and the opportunities and ways in which stakeholders could participate in public hearings (at specific locations and times) or provide comments by other means. The notices and advertisements introduced the purpose of the EIS by indicating that it evaluates the potential impacts of constructing, operating and monitoring, and eventually closing a repository at Yucca Mountain in Nye County, Nevada, to dispose of our Nation's spent nuclear fuel and high-level radioactive waste. They also indicated that the EIS will help Federal officials make informed decisions, and further informed the reader how interested parties could obtain additional information, including copies of the Draft EIS.

DOE generally selected locations for public hearings in Nevada based on their proximity to potential transportation routes and the potential repository site, or based on communities having relatively large populations. Given the impracticality of holding hearings at every location potentially affected by the transportation of spent nuclear fuel and high-level radioactive waste, DOE selected national hearing locations in the major metropolitan areas most likely to experience large numbers of shipments or at locations close to nuclear power plants.

In May 2001, DOE issued the *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*, which it distributed to more than 4,000 stakeholders. The Department encouraged these stakeholders to submit comments during a 45-day comment period, which it later extended to 57 days (May 4 to July 6, 2001).

In June, during a review of its mailing records, the Department discovered that it had inadvertently not sent the Supplement to the Draft EIS to about 700 stakeholders who had requested and received a copy of the Draft EIS.

DOE announced this oversight, sent the Supplement to the Draft EIS to these stakeholders, and provided them an opportunity to submit comments during a separate 45-day comment period (June 29 to August 13, 2001).

DOE held three public hearings in Nevada during the comment period. It held no hearings outside Nevada because the Supplement focused primarily on matters involving repository design. Commenters were encouraged to submit comments at public hearings and by mail, facsimile, and the Internet during the comment periods. DOE used means comparable to those it used for the Draft EIS (advertisements, releases, and announcements) to notify the public.

DOE considered each public comment it received in its development of this Final EIS. In response to comments, DOE has modified the EIS in a variety of ways, including clarifications or changes to the text, new or more recent information (such as 2000 Census data and population projections), and modified analyses (such as those for transportation impacts in which it modified the characteristics of the representative commercial spent nuclear fuel and accident source terms). DOE also modified the EIS to include new information obtained since it issued the Draft EIS. The Department obtained such information from site characterization activities and design evaluations, including, for example, updated radon emanation data and the most recent design features.

3.3 (9441)
Comment - EIS001593 / 0003
I think I also have to mention that this hearing, as limited a scope as it is, it's something of a nuclear college of complexes, where we have a presentation, a question period, a rebuttal period and the only difference is that I think at the college of complexes we have kind of a little rule against speaking on the subject.

Response
The Department has provided an opportunity for the public and interested parties to provide comments on the Draft EIS and the Supplement to the Draft EIS. DOE has considered all oral and written comments received on the Draft EIS and the Supplement in the development of this EIS. The comments made at all the hearings and DOE's responses are provided in this Comment-Response Document.

3.3 (9500)
Comment - EIS001888 / 0159
[Summary of comments noted by Clark County Nuclear Waste Division staff at various citizens' meetings.]

Wondered if gaming is involved because their weight behind opposing Yucca Mountain would have greater influence.

Response
The Department is not involved in the gaming industry and therefore cannot comment on any involvement by the industry in opposing or supporting the proposed repository.

3.3 (9750)
Comment - EIS001888 / 0451
[Clark County summary of comments it has received from the public.]

Commenters requested that DOE develop and implement a process that would maximize public involvement during finalization of the alternatives and preparation of the EIS and the Record of Decision. DOE should also provide a means to inform and educate the public of the risks and consequences of developing the repository. This process could be facilitated by developing "citizen advisory boards around transport communities" or public citizen's action committees. Other commenters requested that DOE "seriously" consider all comments provided.

Response
DOE believes that its approach to the public involvement process is consistent with the National Environmental Policy Act and the Council on Environmental Quality and DOE regulations. The 199-day public comment period and 21 public hearings as well as the distribution of more than 3,400 copies of the Draft EIS illustrate the extensive nature of the public involvement program.

In addition, in the course of producing this EIS, DOE interacted with a number of government agencies and other organizations. The purposes of these interactions have been to:

- Discuss issues of concern with organizations with an interest in or authority over land that the Proposed Action would affect directly, or organizations with other interests that some aspect of the Proposed Action could affect.
- Obtain information pertinent to the environmental impact analysis.
- Initiate consultations or permit processes, which includes providing data to agencies with oversight, review, or approval authority over some aspect of the Proposed Action.

In addition to EIS-related interactions, DOE has continued to meet with and discuss issues with government agencies and other organizations. DOE believes that these interactions have been useful and assisted in modifying ongoing site characterization efforts, the development of the EIS, and the course of the overall program. Appendix C discusses the results of the EIS-related interactions.

DOE considered all comments it received on the Draft EIS and the Supplement to the Draft EIS in the development of this Final EIS.

Because the NWPA contemplates a recommendation whether to develop a repository at Yucca Mountain from the Secretary of Energy to the President, DOE might not issue a Record of Decision.

3.3 (9765)
Comment - EIS001888 / 0350
[Clark County summary of comments it has received from the public.]

Others said the EIS should discuss how public trust and confidence in the nuclear waste program (including public acceptance of health effects from transporting the waste) and DOE's management of the program will be achieved.

Response
While DOE notes that some segments of the public lack trust and confidence in the nuclear waste program, this is not a subject that is germane, per se, to an analysis of environmental impacts in an EIS. However, as discussed in Section 2.6, the Secretary of Energy will consider public input (as well as other factors) in developing a recommendation to the President on the suitability of the Yucca Mountain site for development of a geologic repository.

3.3 (9896)
Comment - EIS001888 / 0443
[Clark County summary of comments it has received from the public.]

Many commenters requested that DOE complete the Implementation Plan soon after closure of the scoping period, and that DOE provide a draft Implementation Plan for further review and comment by the public (both as a written document and from additional public meetings). Some commenters requested that the Implementation Plan provide a "comprehensive road map" describing how the EIS will support decision-making. Others requested that the implementation Plan provide a demonstration of the necessary methodology, scientific accuracy, and professional integrity needed to develop the EIS, possibly by involving the Council on Environmental Quality and/or independent peer review. One commenter noted that the Implementation Plan should discuss how DOE will address the inevitable changes in programmatic assumptions and parameters. One commenter suggested that DOE provide the comments from scoping to the affected state agencies and another requested the comments be sent to DOE's Bartlesville Research Facility.

Response
As discussed in Section 1.5.1 of the EIS, DOE received input during the scoping process from the public and a number of organizations. The Department considered the comments and information received during scoping, and modified the analytical approach to the EIS accordingly. In addition, it identified the comments and information it

believes to be unrelated to the scope or content of the Proposed Action, or the comments for which analyses would be uncertain and speculative. Section 1.5.1 has been modified accordingly.

3.3 (9906)
Comment - EIS001888 / 0452
[Clark County summary of comments it has received from the public.]

Commenters said that the public and Native American Tribes had not been well informed about potential activities presented in several DOE EISs including: the Foreign Research Reactor, Multi-Purpose Canister, Programmatic Spent Fuel Management and Idaho National Engineering Laboratories, Programmatic Waste Management, Nuclear Weapons Nonproliferation Policy, Transfer and Disposition of Surplus Highly Enriched Uranium, Fissile Materials, Uranium Supply and Recycling, and Stockpile Stewardship EISs.

Response
DOE's approach to conducting the public involvement process is consistent with Council on Environmental Quality regulations (40 CFR Parts 1500 to 1508) and commonly includes efforts to reach those segments of the population most affected by and with an interest in the Proposed Action. Regarding this EIS specifically, the outreach program incorporated lessons learned from the scoping meetings for the EIS and other subsequent interactions with the public to help ensure that stakeholders were informed of the hearing schedule and locations. Notification flyers were mailed to those on the EIS distribution list (more than 3,400 individuals). Prior to each hearing, DOE placed advertisements in local newspapers, and text for public service announcements was distributed to local radio and television stations. Press releases also were distributed to more than 175 local and national stakeholders and media outlets.

3.3 (9907)
Comment - EIS001888 / 0453
[Clark County summary of comments it has received from the public.]

Commenters requested that DOE hold meetings in communities within all states and counties through which SNF [spent nuclear fuel] and HLW [high-level radioactive waste] will be transported, asserting that without which, the public's right to comment is compromised. Commenters also requested that additional scoping meetings be held in Nevada (e.g., Elko, Eureka, Ely, Amargosa Valley), in various other identified communities (e.g., Belen, New Mexico), and in affected Indian communities. Others expressed concern that Yucca Mountain Project scoping meetings were scheduled coincident with other Departmental meetings thereby minimizing public input into the scoping process. These commenters suggested that a formal policy be institutionalized requiring meetings to first be cleared with the hosting site. One commenter noted that scoping meetings should not be held on the Jewish Sabbath.

Response
Given the impracticality of holding public hearings at every location potentially affected by the transportation of spent nuclear fuel and high-level radioactive waste shipments, DOE selected hearing locations in the metropolitan areas most likely to experience large shipments and in proximity to nuclear powerplants. The selected Nevada locations were those nearest the proposed transportation corridors and the repository site. DOE made every effort to ensure that the times and dates of the hearings did not conflict with other known Yucca Mountain Project-related meetings. If conflicts could not be avoided and individuals could not attend the hearings, there were other means (such as e-mails, facsimiles, and letters) for individuals who wished to submit comments.

3.3 (9909)
Comment - EIS001888 / 0455
[Clark County summary of comments it has received from the public.]

Commenters requested that the scoping process (i.e., meetings, written comments) be restructured to develop a broad-based public consensus process. Some commenters requested that: (1) the scoping period be extended (2 months), (2) the public participate in the identification of impacts, (3) they be allowed to provide pre- decisional input, and (4) the EIS include interviews with Nevada residents previously exposed to radiation. Other options to the scoping meeting format used by DOE were suggested that would allow for: (1) round-table panel discussions;

(2) the formation of citizen advisory boards in reactor communities; (3) a shortened introduction, without the use of visual aids, by the DOE speaker; (4) the use of personal recording devices; (5) question and answer sessions exclusively; (6) no limitations on the number of speakers; (7) the elimination of "biased" materials presented by DOE, and improved answers to audience questions; and (8) relocating the microphone to enable speakers to address the audience. One commenter requested written acknowledgment that comments were received by DOE. Some commenters found that parking facilities were inadequate, that meeting rooms were difficult to locate and that e-mail did not work properly, all of which act as a deterrent to public participation.

Response
DOE held 15 scoping meetings across the country between August 29 and October 24, 1995, to allow all interested parties to present verbal and written comments for the EIS. All interested persons, including Federal, state, and local government agencies, Native American tribal organizations, public interest groups, transportation interests, industry and utility organizations, regulators, and members of the general public were notified of this scoping process and given the opportunity to present verbal and written comments. Prescoping briefings and meetings were held for oversight and stakeholder groups, including the Native American tribes, Nuclear Regulatory Commission, Nuclear Waste Technical Review Board, and the 10 affected units of local government. The ample opportunities provided throughout the scoping period for public input did not necessitate use of other options to augment this process. As a result of the scoping process, 785 people attending the 15 scoping meetings and 568 submitted comments, which were responded to in the Summary of Public Scoping Comments document published by DOE in May 1997.

3.3 (9918)
Comment - EIS001732 / 0001
The first thing I would like to ask is why are these nuclear industry people, who have such a vested interest, allowed to speak before the citizens who actually live along these routes?

Response
DOE sometimes receives advance requests to speak from individuals who have schedule constraints. The Department attempts to honor such requests.

The order of presentation by commenters at DOE public hearings has no significance in the evaluation of their comments. DOE records every word from each speaker. Experienced analysts review each comment as part of the process of producing the Final EIS.

3.3 (9962)
Comment - EIS002287 / 0003
Ironically, during the Advisory Council on Nuclear Waste conference in Las Vegas, the agenda included the topic of why people or the public distrust risk assessment. It appears to me that the DOE is concerned with public perceptions regarding the proposed Yucca Mountain Repository, its risk assessments, and the DEIS. Hopefully, after this hearing, the DOE will work directly with the Affected Units of Tribal Governments, as designated, as well as all concerned citizens affected by this proposed site.

Response
As discussed in Section C.2.1.4 of the EIS, the Native American Interaction Program began formally in 1987. Twice annually, representatives from the Consolidated Group of Tribes and Organizations have met with DOE to discuss a range of issues. In addition, Native American subgroups have been convened periodically to discuss various issues with DOE. The Consolidated Group of Tribes and Organizations represents 17 individual tribes.

3.3 (10112)
Comment - EIS002168 / 0008
What solutions did your 6-month series of 20 hearings produce?

Response
The public comment period on the Draft EIS produced more than 11,000 comments that were considered by DOE in the development of the Final EIS.

3.3 (10301)
Comment - EIS002094 / 0006
The example of Germany should serve as a warning about what happens when the public is locked out of the decision-making process. The numbers from March of 1997 tell the story. Just six nuclear waste casks, nearly 200 people injured, 500 arrested, 20,000 protesters, 30,000 police, one hundred million dollars. Interestingly, another cross-country peace march is about to begin, and one of the messages that they're carrying to the people of America is that Yucca Mountain is still targeted as a nuclear waste dump. The question I'd like them to ask people is: Should we change the American flag to have just forty-nine stars and one radiation symbol for Nevada? I thought our pledge of allegiance says: "One nation under God with liberty and justice for all." Not when nuclear wastes are involved, I guess.

Response
Thank you for your comment. DOE has considered all oral and written comments received on the Draft EIS in the development of this Final EIS. The Final EIS, which includes this Comment-Response Document, will be available to the decisionmakers, including the Secretary of Energy, the President, and Congress.

3.3 (10398)
Comment - EIS001927 / 0019
Only under pressure from Members of Congress did DOE publish its maps of projected irradiated nuclear fuel/high-level nuclear waste shipment routes, but not until January 21 – after 17 hearings had already taken place, and only days before the remaining hearings. How was the public supposed to comment on these very significant but well hidden maps? How are members of the public supposed to learn that they live on high-level nuclear waste shipment routes, let alone participate in the public comment process, when DOE hides the maps until just two weeks before the end of the original 180 day public comment period?

Response
The information on the routes used to calculate impacts associated with shipment of spent nuclear fuel and high-level waste was and is available in the references to the EIS. Information on these references is available on the Internet (http://www.ymp.gov) and at DOE public reading rooms (see EIS Appendix D for a list of locations).

Section J.1.2.2.1 of the EIS provides numerous tables detailing the location of sources of spent nuclear fuel and high-level radioactive waste that would be shipped to Yucca Mountain and the miles these materials would travel through various types of populations: urban, suburban, and rural. In January 2000 (during the public comment process for the Draft EIS), DOE posted maps of likely nuclear waste transport routes for each state on the Yucca Mountain Project website (www.ymp.gov). DOE has included these maps in the Final EIS (Section J.4). This is in addition to the route maps that were already included in the Draft EIS (see Section 2.1.3.2 for national routes and Section 2.1.3.3 for Nevada maps). Included on each map is a table of shipments originating in and passing through the state and the impacts within the state from incident-free transportation and accidents for each mode of transportation. In addition, Section J.4 includes the numbers of shipments in each state as well as a state-by-state assessment of the impacts. The routes shown on the maps and used in the analysis are preliminary and are based on the best information available at this time. However, final route and mode selection will not occur for some years and is not entirely within DOE's control (that is, state and Native American tribal governments have the opportunity to designate "preferred" routes in accordance with 49 CFR 397.103). Thus, the analyzed routes might not be the ones actually used, if the Proposed Action was approved. In addition, DOE expects to interact with all affected stakeholders on routing and related local issues as transportation plans develop. Stakeholders will have an opportunity to provide input to DOE on the proposed routes.

As stated in the EIS (see Section 2.1.3.2.2), a truck carrying a shipping cask of high-level radioactive waste or spent nuclear fuel would travel to the repository in accordance with U.S. Department of Transportation regulations (49 CFR 397.101), which require the use of preferred routes. These routes include the Interstate Highway System, including Interstate beltways and bypasses. Alternative routes could be designated by states and Native American tribal governments following U.S. Department of Transportation regulations (49 CFR 397.103) that require consideration of the overall risk to the public and prior consultation with affected local jurisdictions and with any other affected states. The highway routes that would be used would be selected in accordance with these Federal transportation regulations as described in the request for proposal for Regional Services Contractors as outlined in

Section M.3 of the EIS. Once the routes had been identified through the consultation process and agreed to by DOE, DOE would submit them to the Nuclear Regulatory Commission for approval.

3.3 (10526)
Comment - EIS002211 / 0006
I request to be on your mailing list. I request receipt of -- the timely receipt of the entire public comment minutes and proceedings of all of your hearings, every one of them all across the country and I request a response to what my request was of you to do where the Congress and the president are concerned.

I want to know what you did, and if not, why not and rest assured that your names will be listed -- I really mean this -- as among those people in our current generations who failed utterly ourselves, each other and all posterity.

Response
The commenter has been added to the Department's mailing list.

3.3 (10801)
Comment - EIS002043 / 0002
When the Final Environmental Impact Statement is released we request a presentation by the DOE to our Board to discuss how the DOE responded to our specific comments.

Response
Appendix C of the EIS describes the interactions DOE has conducted with government agencies (including Esmeralda County, for example) and other organizations in the course of preparing the EIS. The purpose of these interactions was to discuss issues of mutual concern, obtain information and initiate consultations or permit processes. DOE has continued these interactions during the preparation of this Final EIS for the same purposes and to provide information relevant to the development of responses to public comments on the Draft EIS and the Supplement to the Draft EIS. DOE's responses to public comments are contained in this Comment-Response Document.

3.3 (10840)
Comment - EIS001516 / 0001
Bluntly stated DOE Office of Civilian Radioactive Waste Management must consider compliance with National Environmental Policy Act--directly in draft EIS--and indirectly as DOE funding is provided to other entities through ARC (Appalachian Regional Commission). Other entities include Ohio Valley Regional Development Commission which consults and promotes funding to counties in the region of the Portsmouth Gaseous Diffusion Plant site located in Piketon, Ohio.

As of today's date, Brown County [Ohio] Economic Development Director Mike Miller "announced and received" permission from the Brown County Board of Commissioners to form a special (forces???) team for economic development during calendar year 2000 in the county. I have no idea what happened to the 600 surveys mailed out on or before February 4, 2000 to selected residents of Brown County. Apparently, that plan has been "put on hold" so that "in-put" from specialists from Brown County can be included in regional planning by the Ohio Valley Regional Development Commission. Compliance with letter and intent of NEPA is mandatory, how the process is implemented is COMPLIANCE OR, IN THIS CASE—LACK THEREOF.

"I think we have put together a team, which can contribute the ideas and concerns necessary for long-term strategic planning, Miller said.

Miller plans to meet regularly throughout the year with the committee. Public hearings are also planned. (THE LEDGER INDEPENDENT, "BROWN COUNTY ECONOMIC TEAM FORMED," pg. B-1)
Public meetings held without citizen/resident/interested party/citizen access to the decision-making process is meaningless. The order of things—as progressing—in Brown County, Ohio renders the process meaningless. The strategy seems to me to be: get the victims to ask for whatever it is that is already been decided for them anyway, and with strategic tactics convince them—for as long as possible—that somehow the ideas for the strategic plan began with them! Surveys are effective means of determining citizen opinion—re-surveys sound like more "out of

bounds after the buzzer." The latest strategy sounds like changing the game already in progress—when the rules are too confining—-change the rules.

These tactics are definitely tacky, and I believe, illegal. Closed door meetings have been created de-facto by the newly created "strategic team of specialists." What happened to "I want in-put from people" as Mr. Miller said just days ago? Whose two-cents worth is apparent by the interests represented on the newly formed team which certainly appears designed to get the job done.

Solutions as to what to do with DOE legacy nuclear waste and "surplus/excess materials" (produced with intent to save democracy) cannot reasonably be allowed to undo democratic process.

DOE is respectfully requested to address what is happening to the public participation process in order to implement decisions already made in closed access regional planning sessions. DOE has authority and responsibility to address what is going on here.

In closing, it appears that Mr. Miller is somewhat uniquely qualified—along with the board of commissioners--to address long term strategic planning for Brown County of Ohio. As far as I am aware—neither Mr. Miller nor the commissioners have had opportunity to review (let alone react and respond) to my comments to the agency written on February 1, 2000 and/or February 7, 2000. Could it be that considerable "feedback" has already surfaced locally from the proposal to re-survey of 600 selected recipients derived from Brown County Board of Election voter records??

Response
DOE has considered all oral and written comments received on the Draft EIS in the development of the Final EIS. This EIS, which includes this Comment-Response Document, will be available to the decisionmakers, including the Secretary of Energy, the President, and Congress.

3.3 (10985)
Comment - EIS001115 / 0006
Lack of publicity and information to the potentially directly affected communities along the Yucca Mountain HLW [high-level radioactive waste] transportation corridors provides potential for 'lapse' in attention and accountability among local elected officials. Has DOE notified local elected officials, including county Boards of Commissioners, and local mayors along the alternative routing corridors presently being considered by the agency? If DOE has provided notification to mayors, city councils, boards of commissioners, emergency management agencies and fire departments, discussion, and comment have not been well-circulated throughout Southern Ohio and Northern Kentucky using the local news media as a barometer.

Response
Consistent with the Council on Environmental Quality requirements for inviting comments (40 CFR 1503.1), DOE provided copies of the Draft EIS to Federal, state, and local elected and appointed officials and agencies of government; Native American tribes; national, state, and local environmental and public interest groups; and other organizations and individuals listed in Appendix D of the Draft EIS. DOE provided notification of each public hearing through a combination of *Federal Register* notices, media advertisements, notices to local and national media outlets, notices to key stakeholders (state senators/members of Congress, governors, deputy governors, mayors, and chairs of county commissions), and public service announcements to radio and television stations.

3.3 (11251)
Comment - EIS001887 / 0400
NEPA [National Environmental Policy Act] is not self-executing in that it does not alone determine the outcome expressed by a preferred course of action. Outcomes are influenced by many other considerations including the biases of an agency and organized interests. NEPA is a procedural policy act rather than a substantive act, and it alone does not determine the outcome of an action. In the case of the YMP, the outcome will be influenced by biased interests inside and outside DOE, such as the nuclear industry. Thus, public stakeholders such as the citizens of Nevada may not substantially affect the outcome of the YMP [Yucca Mountain Project] through their comments on the DEIS. Speaking on behalf of the citizens, the influence of the State government in this respect may be more

effective but still may be outside the final decision making regarding execution and form of the Proposed Action for the YMP. This is a shortcoming on the part of DOE.

Response
As described in the Foreword and Sections 1.3 and 2.6 of the EIS, the NWPA establishes a process leading to a determination by the Secretary of Energy on whether to recommend that the President approve Yucca Mountain for development of a geologic repository. If the President considers the site qualified for application to the Nuclear Regulatory Commission for a construction authorization, the President will submit a recommendation of the site to Congress. The Governor or Legislature of Nevada may then object to the site. In such a case, site approval could occur only if Congress passed a joint resolution of approval that the President signed into law.

In making the recommendation to the President, the Secretary of Energy will consider not only potential environmental impacts and public comments on the EIS, but also factors identified through public input and other means including, for example:

- The ability to obtain necessary approvals, licenses, and permits
- The ability to fulfill stakeholder agreements
- Consistency with DOE missions
- Assurance of safety facility construction and operations flexibility
- The cost of implementation
- The ability to mitigate impacts

Section 2.6 has been modified to reflect the basis for the Secretary's recommendation.

3.3 (11354)
Comment - EIS002271 / 0004
I am going to cut my reading short. I want to say that I concur as an elected official with the commentary provided by San Bernardino County officers, staff, Mr. Robert Laurie of the California Energy Commission representing 13 California state agencies, and Mr. Corbin Harney of the Western Shoshone.

Response
DOE notes your support of comments provided by Mr. Laurie and Mr. Harney. The Department considered all comments it received on the Draft EIS and the supplement to the Draft EIS in the development of the Final EIS.

3.3 (11704)
Comment - EIS001104 / 0001
We have a lot of people that are very interested in this issue. They are hungry for information. And they come to me to get that information. I need to feed them information. And so the message that I would like you to take back is that, yes, at least in Eureka County, in Crescent Valley, there are people who are really concerned, who really care, who really want to know what's going on. And so as I tell all federal agencies, when you are scheduling meetings, it would be great if you could, federal government, talk to each other so that we do not have meeting conflicts.

Unfortunately, it was the Nuclear Regulatory Commission who yesterday scheduled a meeting on the modal study, already knowing that this meeting was being scheduled for today and that the Austin meeting was scheduled for Tuesday. We were not able to be represented at the Nuclear Regulatory Commission's modal study meeting because we had to be here. And Department of Energy was on the calendar first.

There are other times when Department of Energy is on the calendar second, and I'm just saying, there's got to be enough days in the year so we can get to all of these meetings.

Response
DOE worked closely with the Nuclear Regulatory Commission and other groups to minimize schedule conflicts between the different meetings and conferences held on repository and nuclear waste issues. In some cases, these meetings were intentionally scheduled close together so out-of-town participants could attend the different forums.

DOE apologizes for any inconvenience or hardship this might have caused those who were unable to attend all scheduled meetings. Minutes or transcripts of individual forums might be available from the sponsoring organizations.

3.3 (12110)
Comment - EIS001887 / 0410
Agencies and their bureaucrats often look at the informational substance of NEPA [National Environmental Policy Act] as an imposition that encumbers and delays the agency's mission and statutory responsibilities. These same bureaucrats are hostile to having the agency's expertise and preordained decisions open to scrutiny by NEPA. Agencies also are tempted to reveal as little as possible about their intentions to outsiders and the public. The full-disclosure provisions of NEPA are meant to avoid deception involving an agency's technical expertise, full intent, and the true cost of projects. Related to the issue of avoiding deception is that NEPA and environmental protection are seen by some agency bureaucrats as being viewed too sentimentally and impractically by the public and other outsiders. Such bureaucratic misconceptions lead to the attitude that NEPA and its documents are too costly and impose unnecessary burdens on moving forward with "serving" the public, as an agency believes it knows best how to do without interference. In the YMP [Yucca Mountain Project] DEIS, DOE has failed to achieve NEPA's intent that proposed actions be treated with full disclosure and openness. This reflects a reluctance of the bureaucrats involved with the project to have their full intent, costs, and preordained decisions revealed to the public and other outside interests. This holds also for revealing the expertise of those responsible for the EIA process and the DEIS, which these review comments show to be lacking in accordance with standard environmental practice in the private sector.

Response
DOE has fully disclosed information and specifically information related to the Proposed Action and its potential impacts since beginning the development of the EIS. After completing the scoping process and during the course of producing the EIS, DOE interacted with a number of government agencies and other organizations. The purposes of the interactions were to discuss issues of concern, obtain information, and initiate consultations or permit processes. Appendix C of the EIS describes these interactions.

In addition, DOE used information from a broad range of studies it undertook to obtain or evaluate information needed for the assessment of Yucca Mountain as a geologic repository. The Department presents this information in the EIS, and in greater detail in the appendixes. The EIS acknowledges that some of the studies are ongoing. Section 2.5 of the EIS identifies the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches. Furthermore, the EIS acknowledges that the results of analyses often have associated uncertainties, and describes them throughout the EIS. Finally, the input provided by a number of organizations often presents research or information that in some cases disagreed with the views of DOE. The Department reviewed and evaluated these for inclusion as part of the EIS analyses. If the information presented a substantive view, DOE made every effort to incorporate that view in the EIS and to identify its source. If it did not incorporate the information, DOE attempted to identify and address the opposing views.

For these reasons, DOE believes it has disclosed its EIS and supporting information and analyses for public scrutiny as appropriate.

3.3 (12281)
Comment - 010369 / 0007
Earlier this year, I voiced the above concerns in a letter addressed to Secretary Abraham at the DOE's Washington DC address. I did not receive a written response then, nor have I at any time received any kind of response to my concerns about Yucca from the DOE. I hope to receive from you a written response that addresses each of the concerns I have voiced, and strongly urge you and all concerned DOE officials to reconsider your support for this project. Please look out for all Americans, not just those employed by or concerned with the nuclear industry.

Response
Letters addressed to the Secretary of Energy were forwarded to the Yucca Mountain Project team to ensure they were considered in the preparation of the EIS. Because of the volume of comments received, DOE could not respond individually to each commenter. DOE identified more than 13,000 individual comments in the letters, facsimiles, emails, and oral presentations submitted during the public comment periods for the Draft EIS and the

Supplement to the Draft EIS. The Department considered every comment to determine if it needed to perform additional research and subsequent EIS text changes to respond adequately. Because many comments were identical or similar or presented common themes that would cause individual responses to be repetitive, DOE determined that the use of summary comments and responses was appropriate in some cases. The Council on Environmental Quality regulations permit individual and collective assessment and consideration of comments and the use of comment summaries where the number of comments received is voluminous (40 CFR 1503.4). DOE believes this approach allows it to use its resources more effectively and efficiently in responding to all comments. Therefore, this Comment-Response Document addresses every comment individually or in a comment summary. In addition, the Comment-Response Document describes changes made to the EIS in response to comments. The Secretary will consider the Final EIS, including the comments and their responses, in determining whether to recommend approval of the Yucca Mountain site to the President.

3.3 (12290)
Comment - EIS001207 / 0010
DOE obviously has multiple "primary-drivers" in implementing NEPA [National Environmental Policy Act] process, including the NWPA, International treaty, and other agreements. DOE has obligation to apply the same standards of protection to the natural environment and human health through-out the Yucca Mountain Site Project as are required in other agency actions by the U.S. Environmental Protection Agency, the Nuclear Regulatory Commission (when appropriate), and the agency's own regulations and policies. The agency should not rely on "assumption" that state and local decision-making process as implemented necessarily complies with intent or wording of NEPA process, i.e., fully informed participation by the public at the earliest practical stage in the planning process. It would seem that the strategic plan, implemented locally, is more than somewhat selective about who is informed, who is selected to participate, and what decisions are actually being made. The NWPA "selected" the geographic zone where the nation's first high-level radioactive waste "permanent" repository [siting] process would begin. It seems that the same general political [siting] criteria applies to the process now going on in Brown County of Ohio, i.e., nobody lives there (with sufficient political clout, resources, and stamina to halt the creation of a sacrifice zone). Legitimate business has collation to use legitimate practices, including strategies and tactics. Promoting the victimization of some for the benefit of others does not meet criteria of providing acceptable solution to "fatal flaw" (public opposition) during the [siting] process. DOE has obligation to consider all the implications of the suitability of the site, and the direct and indirect impacts likely to occur resulting from agency actions. Tolerating considerable harm to democratic process in order to save democracy cannot be acceptable solution and DOE should use appropriate regulatory authority to prevent, sanction, and discourage such tactics.

Response
DOE believes that the EIS is consistent with the National Environmental Policy Act and the Council on Environmental Quality and DOE regulations, including the public comment process, and believes that the EIS identifies the reasonably foreseeable direct and indirect impacts from the Proposed Action. DOE is committed to evaluating the suitability of the Yucca Mountain site, based on its suitability regulations (10 CFR Part 963). The Final EIS, which includes this Comment-Response Document, will be available to the decisionmakers, including the Secretary of Energy, the President, and Congress.

3.3 (12327)
Comment - EIS001106 / 0039
In the YMP [Yucca Mountain Project] DEIS, the DOE has failed to achieve NEPA's [National Environmental Policy Act's] intent that proposed actions be treated with full disclosure and openness. This reflects a reluctance of the bureaucrats involved with the project to have their full intent, costs, and preordained decisions revealed to the public and other outside interests. This holds also for revealing the expertise of those responsible for the EIA [environmental impact assessment] process and the DEIS, which these review comments show to be lacking in accordance with standard environmental practice in the private sector.

Response
The EIS describes the Proposed Action in a manner consistent with other DOE documents prepared under the National Environmental Policy Act and the current state of the repository design. DOE has not reached any "preordained decisions" about the repository or the results of the EIS analyses. Chapters 1 and 2 of the EIS describe the intent of the EIS and the NWPA. The costs of the Yucca Mountain Project change as the repository design

evolves, and Section 2.1.5 describes the estimated cost of the Proposed Action. Chapter 13 contains a list of EIS preparers, contributors, and reviewers, and a short summary of their experience and expertise.

3.4 Supplement to the Draft EIS - Presentation

3.4 (936)
Comment - 010378 / 0003
NOW THEREFORE BE IT RESOLVED, the City of Ely does not support page 2-19 of the White Pine County Comments.

Response
DOE believes this comment is directed at White Pine County's second comment on the Supplement to the Draft EIS, which suggests the use of Pinyon-Juniper biomass from White Pine and Lincoln Counties as an alternative to fuel oil for a central heating plant at the proposed repository. The Department acknowledges the City of Ely's disagreement with that comment.

3.4 (5712)
Comment - 010124 / 0001
The typical introduction to the document about Yucca Mountain refers to a projection of storing 70,000 or so metric tons of high-level radioactive waste. I think that the DOE would be more honest and forthcoming if it would expand that projection to include some discussion of how much radioactivity that we are really talking about here.

I'd like to suggest three measures of radioactivity. The first one is how much radioactivity in terms of radioactivity that Yucca Mountain would be storing.

The second measure is the atomic bomb that was dropped on Hiroshima back in World War II killed approximately 300,000 people, and to this day people are still dying premature deaths from that bomb.

A typical nuclear power plant generates around a thousand megawatts of electricity. I understand that the rule of thumb is when a 1,000 megawatt nuclear power plant operates at full power for one year, it accumulates the radioactivity equivalent of 2,300 Hiroshima bombs of radioactivity.

If you do a little multiplying here, the projected lifetime of a typical plant is around 40 years, although there's been quite a few closing a lot sooner than 40 years, if we multiply 40 years times say maybe 50 nuclear power plant we are looking at 2000, 40 times 50, 2000 years times 2,300 Hiroshima bombs. We are looking at oh, around five million bombs of radioactivity. For some reason that doesn't fit what I remember my old calculation of several years ago of 50 million, but it's quite a few. Anyway, that's the second measure of radioactivity.

The third measure is Chernobyl. The Chernobyl plant, the explosion back in '86, I remember reading that it cost the Soviet Union and Europe around $300 billion worth of damage. That's one medium sized nuclear power plant. So a third measure of radioactivity is what would be the equivalent of how many Chernobyls of radioactivity if something happens with the dump up at Yucca Mountain.

A couple days ago I was talking on the phone with a rather knowledgeable scientist that many of you people know, Grant Hudlow. He came back from the Bay Area. He was telling me that he was astounded to learn that after the waste fuel is reprocessed the radioactivity is far more than the radioactivity of the fuel before it is reprocessed. So possibly a fourth measure of radioactivity is to take into account radioactivity that is produced after the fuel is reprocessed.

Response
The commenter suggests that DOE broaden the projection of radioactive impacts in the EIS to include the radioactivity associated with nuclear powerplants, fallout from past nuclear weapon detonations, specifically Hiroshima, Chernobyl, and nuclear fuel reprocessing. Many studies have addressed, in quantifiable terms, the radiation levels in the environment from the nuclear fuel cycle. DOE believes that the baseline descriptions of the

affected environment in Chapter 3 capture background levels of radiation that persist in the environment from nuclear facilities such as uranium mines, mills, fuel-processing plants, nuclear powerplants, and DOE complex sites; the transport of nuclear materials; and fallout from past weapons detonations. According to the *Final Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Components*, the estimated dose to individuals from the nuclear fuel cycles is less than 1 millirem per year (DIRS 103218-DOE 1996). That is, the cumulative radioactive fallout from atmospheric weapons tests, emissions of radioactive material from DOE facilities, emissions from mineral extraction facilities, and transportation of radioactive materials contribute less than 1 millirem per year to the average dose to an individual. The cumulative impact assessment in Chapter 8 of the EIS includes past, present, and reasonably foreseeable actions in the affected area.

3.4 (7401)
Comment - 010317 / 0012
In the definition for "heavy metal" insert "and/or generated" after "used."

Response
The Department has modified the definition of "heavy metal" in the glossary to read: All uranium, plutonium, and thorium used and or generated in a manmade nuclear reactor.

3.4 (10163)
Comment - 010175 / 0005
It is not clear that the "S&ER [Science and Engineering Report] flexible design" discussed in the SDEIS is the same as that used in the TSLCC [Total System Life-Cycle Cost] document which uses a "Reference System Design" ("capable of emplacing 97,000 MTHM") from a "Project Description Document" not made available to the public. The FEIS should clarify this.

Response
The commenter is correct in noting that the flexible design is not the same as the reference design referred to in the *Analysis of the Total System Life-Cycle Cost of the Civilian Radioactive Waste Management Program* (TSLCC; DIRS 153255-DOE 2001). The flexible design includes the reference design as the higher-temperature operating mode. The other operating modes of the flexible design, referred to as lower-temperature operating modes, were discussed generally in Chapter 8 of DOE (DIRS 153255-2001). The *Life Cycle Analysis for Repository Flexible Design Concepts* (DIRS 156900-DOE 2001) is an update to the information provided in the May 2001 TSLCC and is for the full range of the flexible design for 70,000 metric tons of heavy metal. The estimated costs associated with the Proposed Action have been updated in the Final EIS (see Section 2.1.5).

3.4 (11031)
Comment - 010073 / 0017
Figure 2-4 - Figure 2-4 of the SDEIS refers only to direct rail access and heavy-haul access to the site. The text on Page 2-12 refers to legal-weight trucks. It is not clear if DOE anticipates legal weight trucks being used to transport waste directly to the Yucca Mountain site.

Response
Depending upon how a shipment of spent nuclear fuel or high-level waste would be transported from the generator sites, one of three modes of transportation would be used in Nevada: rail, heavy-haul trucks, and legal-weight trucks. Legal-weight truck shipments could continue directly to the repository following routes that satisfy the regulations of the U.S. Department of Transportation (49 CFR Part 397). This could entail taking I-15 to U.S. 95 and then traveling U.S. 95 to the repository. The exact highway routes that would be used in Nevada would be specified in adequate time for cities and counties to prepare for the shipments.

Shipments arriving in Nevada by rail would travel to the repository either directly by rail or would be transferred to heavy-haul trucks at one of three possible locations in Nevada and then travel along highways to the repository. A discussion of these scenarios along with maps of the potential routes is in Section 2.1.3.3 of the Final EIS.

3.4 (11551)
Comment - 010398 / 0001
Thank you for sending me a copy of the Supplement to the Draft Environmental Impact Statement (EIS) for a Geologic Repository for the Deposit of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada, for review. The information exhibited in this supplement is overwhelming but quite understandable. The presentation of this material is excellent. My compliments to the staff who worked so diligently to prepare this document in such a concise manner. I know that this was not an easy task.

Response
Thank you for your comments.

3.4 (11853)
Comment - 010165 / 0001
Figure 2-7 in the document talks about the upper and lower block concept. They're not entirely clear. It would be -- I think it would be better to -- they don't entirely label which one is what. One of the figure's captions doesn't really label which one is which and how they're actually going to be used. I think there could be a little more clarity on what that really is representing.

Response
The intent of Figure 2-7 of the Supplement to the Draft EIS is to show conceptually how the flexible design subsurface layout differs from each of the three thermal loads presented in the Draft EIS. As can be seen, the flexible design would use part or the entire layout shown in the lower right quadrant of Figure 2-7. The smallest area that DOE would use is the shaded area that corresponds to the possible higher-temperature repository operating mode. DOE would use the full area shown for some of the possible lower-temperature operating modes. The higher-temperature repository operating mode would utilize the upper (primary) block. A low thermal repository would be in the upper and lower blocks and Area 5. DOE acknowledges that Figure 2-7 is complex and understands it must be reviewed with the explanatory text. Section 2.1.5.1 of the Science and Engineering Report provides more detail.

3.4 (12330)
Comment - 010165 / 0003
And Table 3-6 talks about worker years and radiation exposure years. Please define these for the public. I mean, I think I know what it means, but please define that either by showing how you calculate it. I think I commented on this before, show that and make sure it's clear what that language means.

Response
Table 3-6 of the Supplement to the Draft EIS reports, as primary impact indicators for occupational health and safety, total worker years and exposed worker years. Exposed worker years represent the subset of the total work force that because of their occupation or job classification could be exposed to radiation. In the Final EIS, DOE has eliminated this categorization and presents the potential radiological occupational health and safety impacts as total estimated dose to the individual and worker population over the life of the project.

3.4 (12334)
Comment - 010317 / 0013
In the definitions of "saturated zone" and "water table" insert the word "liquid" before the word "water."

Response
The Department believes that the definition of "saturated zone" and "water table" is sufficiently clear as written in the Glossary.

3.4 (12379)
Comment - 010073 / 0004
Table S-2 - Table S-2 is not consistent in providing a range of impacts for many parameters.

Response
The inconsistencies to which the commenter is referring are not clear to DOE. DOE has attempted to treat each scenario equally and to be consistent in it presentation. Table S-2 of the Supplement to the EIS compares the impacts of the higher-temperature operating mode to impacts of the lower-temperature operating mode (the flexible design described in the Supplement). These operating modes capture the likely range of operating conditions for the repository. Therefore, the impacts described on Table S-2 for each operating mode capture the range of impacts that could reasonably be expected to occur from a repository at Yucca Mountain. Furthermore, Table S-2 compares the range of impacts to the impacts described in the Draft EIS. The updated design information presented in the Supplement was carried forward to the Final EIS.

3.4 (12703)
Comment - 010344 / 0007
Also, speaking about this technical document, people made comments that it's very hard to understand. One thing NEPA states is that these documents should be written in clear language so that the average person can understand these. The way this is written, just like the draft EIS, it's basically raw data and raw data isn't appropriate for these documents.

Response
DOE has taken a number of steps to make the EIS as understandable as possible to a wide range of readers. For example, the EIS includes a number of explanatory text boxes, summary tables, illustrations, and comparison information that stresses and highlights potential environmental impacts. In addition, Appendix B of the Supplement to the Draft EIS and Chapter 14 of the Final EIS is a comprehensive glossary of technical terms.

3.4 (12759)
Comment - 010073 / 0023
Pages 3-4, 3-10, 3-11 - These sections indicate that S&ER [Science and Engineering Report] design fatalities from air quality, occupational health and safety, and accidents will increase from a low of 1.82 to 3.8 deaths. It is not clear if the long-term performance benefits from a latent cancer fatality standpoint are greater than the increase in short-term deaths. In fact, Table 3-14 does not even address latent cancer fatalities. As a consequence, it is not possible within the SDEIS to conclude whether the S&ER flexible design is better from a fatality perspective. This is a critical shortcoming of the SDEIS.

Response
Table S-2 of the Supplement to the EIS compares the range of estimated latent cancer fatalities among the operating modes considered in the flexible design to the estimated latent cancer fatalities described in the Draft EIS. For airborne radiological releases to the public, and for workers at the repository, the range of estimated latent cancer fatalities would be higher for the flexible design than for the design evaluated in the Draft EIS. This increase in estimated latent cancer fatalities is due largely to revised data and analyses. Had these same data and analyses been applied to the design in the Draft EIS, the estimated latent cancer fatalities would likely have been greater than the fatalities reported in the Supplement. The Final EIS has been refined and includes analysis of possible early failures brought on by defects in the waste package. The results show a very small (but nonzero) dose from these failures. See Chapter 5, Section 5.4 of the Final EIS for details.

3.4 (12954)
Comment - 010249 / 0008
Summarize analytical and scientific processes that led to the results.

Inclusion of biographical information on the SDEIS preparers was a positive step in the direction of providing information concerning the technical and scientific foundation underlying the analysis. However, some evidence of the credentials of the larger scientific team that conducted the work behind the EIS should be provided in the FEIS. In addition, general information could be included to describe controls to assure the accuracy of their work, time and resources devoted to the effort, conservative assumptions applied, procedures and internationally accepted scientific practices followed, and peer reviews conducted.

Response
The National Environmental Policy Act process has been structured to provide detached input to the EIS and public scrutiny of the EIS results. An independent contractor was selected to assist DOE in preparing this EIS. Several independent assessments of the EIS have also been performed including, among others, that of the Nuclear Waste Technical Review Board and the National Academy of Sciences, to validate its results. Public hearings and public review of both the Draft EIS and the Supplement to the Draft EIS provided interested parties including opponents and proponents of the proposal with the opportunity to examine the assumptions, analyses, and conclusions in drafts and the opportunity to provide input on how these issues and other concerns should be addressed in the Final EIS

Chapter 13 of the EIS contains a list of individuals who filled primary roles in the preparation of this EIS. DOE directed the preparation of the EIS with primary support and assistance from Jason Technologies Corporation. Consistent with Council on Environmental Quality regulations, DOE has identified those contributors who directly supported the preparation of the EIS. In the Final EIS DOE will not list the names of any individuals not directly related to the preparation of the EIS in the list of contributors.

The Nuclear Waste Policy Act of 1982 established the Nuclear Waste Technical Review Board as an independent organization in the Executive Branch. The Board is responsible for evaluating the technical and scientific validity of activities undertaken by the Secretary of Energy, including activities related to the packaging or transportation of spent nuclear fuel and high-level radioactive waste. The President appoints members of the Board after receiving nominations from the National Academy of Sciences. Board members have no financial interest or other interest in the outcome of the Yucca Mountain Project. Names and qualifications of Board members are a matter of public record.

With regard to the analytical and scientific processes that led to the conclusions reached in the EIS, Appendixes F, G, H, J, K, L, and I provide in-depth discussions of the technical disciplines and the models and methodologies that DOE used.

3.4 (12955)
Comment - 010249 / 0009
Synthesize results and put risks into perspective.

While the DEIS and SDEIS did include summaries of the dose associated with long-term repository performance, more should be done to put the radiological and non-radiological risks into perspective (i.e. providing comparisons against risks associated with other large scale projects).

Response
DOE believes that the comparison of potential impacts to regulatory standards or guidelines, as in the EIS is the appropriate method of putting the repository in perspective. However, DOE has included an enhanced discussion of the risks encountered by individuals in everyday life to the risks associated with radiation exposures in Appendix F of the Final EIS.

3.4 (13011)
Comment - 010334 / 0008
On page D-10 of the Supplemental Draft EIS it mentions Native American groups and under that they have identified tribes, Indian tribes. And because of points in the law and certain requirements, it's inappropriate to have Indian tribes identified as groups and should be so noted and identified as Indian tribes that they are.

On page D-16 it talks and refers to Indian tribes as tribal organizations. There's a distinct inconsistency between the word groups and organizations, but still doesn't specifically address Indian tribes and should be corrected to reflect that.

On page D-10 there is mention that identifies the Las Vegas Paiute Tribe incorrectly as the Las Vegas Indian Paiute Colony and should be corrected to accurately reflect its name as the Las Vegas Paiute Tribe.

Response
DOE has changed the term "Native American groups" to "Native American tribes," as appropriate, throughout the EIS, and has corrected the references to the Las Vegas Paiute Tribe.

3.4 (13030)
Comment - 010311 / 0002
The SDEIS and other Documents are crossed referenced and confusing. It is very time consuming to develop a clear picture of the total project and its impacts, especially TRANSPORTATION.

Response
DOE has taken a number of steps to make the EIS as understandable as possible to a wide range of readers. For example, the EIS includes a number of explanatory text boxes, summary tables, illustrations, and comparison information that stresses and highlights potential environmental impacts. In addition, Appendix B of the Supplement to the Draft EIS is a comprehensive glossary of technical terms, and Chapter 14 is the Final EIS glossary.

3.4 (13299)
Comment - 010317 / 0004
The FEIS should contain proper legal descriptions of all the various boundary lines including the Region of Influence, the Land Withdrawal Areas, the Yucca Mountain vicinity, and the Yucca Mountain site. Hopefully, those legal descriptions will be presented in several ways including the Nevada State Plane Coordinate System, the Universal Coordinate System (in decimal degrees), and in the township and range system. All such description terms should be consistent from one land parcel to another parcel.

Response
The Department believes that the EIS information in the EIS on potential impacts related to the location and size of a potential withdrawal for the repository adequately analyzes the likely impacts of such a withdrawal. If Congress does ultimately withdraw land for the repository, a precise legal description of the area to be withdrawn would be compiled as part of the withdrawal legislation.

3.5 Supplement to the Draft EIS - Adequacy

3.5 (36)
Comment - 31 comments summarized
A number of commenters stated that the Supplement to the Draft EIS failed in that it did not describe a specific or final design. Commenters believe that DOE must have a final design choice to recommend the site to the President and Congress, as well as to apply for a license with the Nuclear Regulatory Commission. Several commenters expressed concerns that DOE will continue to change the design and, as a moving target, the design and its associated impacts cannot be adequately evaluated or reviewed by the oversight agencies and the public. Similarly, commenters asked how Yucca Mountain, absent a specific design, can be evaluated against Environmental Protection Agency exposure standards. According to one commenter, the Supplement offers no explanation as to how additional impacts from ongoing design change will be addressed from the time the Final EIS is released to the point when construction would begin. Commenters also stated that further design changes should result in a supplement to the Final EIS. One commenter stated the Final EIS should evaluate only the flexible design as the design that most accurately describes the repository DOE proposes to build.

Response
The Secretary of Energy will make a determination on whether to recommend the Yucca Mountain site to the President on the basis of a number of different types of information, including that contained in the Final EIS. Any recommendation would be accompanied not only by the Final EIS, but also by those materials designated in Section 114 of the NWPA. This includes, for example, preliminary engineering specifications for the facility, not a final design.

In the Draft EIS and the Supplement to the Draft EIS, DOE analyzed a variety of scenarios and alternatives that could be implemented to construct, operate and monitor, and eventually close a repository at Yucca Mountain.

These scenarios and implementing alternatives reflect potential design modifications and waste packaging approaches. The intent was to provide the full range of potential environmental impacts and to maintain flexibility in the design of the repository to maintain the ability to reduce uncertainties in or improve long-term performance, and improve operational safety and efficiency.

DOE acknowledges in Section 2.1.1.5 of the EIS that it could modify or refine the flexible design further during the License Application process, if the site was approved for development. DOE expects any additional design changes would result in further reductions in the uncertainties associated with long-term performance and would measure estimated releases against the Environmental Protection Agency's final environmental standards at 40 CFR Part 197 and Nuclear Regulatory Commissions licensing criteria at 10 CFR Part 63.

Many of the issues relating to how a repository would be operated and how spent nuclear fuel and high-level radioactive waste would be packaged would be resolved in the context of developing the detailed design for a possible license application. DOE cannot predict with certainty how these issues would eventually be resolved.

However, as DOE has acknowledged in Section 2.1.1.5 of the EIS, the flexible design could evolve further. DOE's License Application would be "as complete as possible in the light of information that is reasonably available at the time of docketing", as stipulated in 10 CFR 63.24. Part 63.24 further contemplates the possible necessity for updating the application after license submittal for a number of reasons, including possible changes resulting from "research programs carried out to confirm the adequacy of designs, conceptual models, parameter values, and estimates of performance of the geologic repository." The commenters should be aware that, in the event DOE does modify the repository design further, the Nuclear Regulatory Commission licensing and National Environmental Policy Act processes related to the Yucca Mountain Repository would provide a number of opportunities for the public to comment on DOE's application and possible updates.

3.5 (113)
Comment - 9 comments summarized
Commenters were dissatisfied that the question-and-answer period at each public hearing did not allow more time for questions and that DOE did not include comments made during this period in the public record. Other commenters questioned if DOE would address statements made during the oral presentations as comments on the Draft EIS.

Response
The purpose of the question-and-answer period preceding the comment period at each hearing was to help inform attendees on the purpose and scope of the Draft EIS and the Supplement to the Draft EIS, and to discuss and clarify issues of concern. Because this was an information forum, DOE believes that including the questions and answers as part of an official record was unnecessary. Often, hearing participants presented the comments and questions they made during the question-and-answer period as comments during the comment period so they could be part of the official record. The length of the question-and-answer period was balanced against that of the public comment period; DOE believes it was more important to maximize the period for public comment at each hearing.

All statements made during the comment period were recorded and included as part of the more than 13,000 comments submitted on the Draft EIS and the Supplement to the Draft EIS. DOE has addressed each identified comment either individually or in a summary comment in this Comment-Response Document. Some of these comments reflect changes made to the Final EIS.

3.5 (204)
Comment - 65 comments summarized
Commenters said that the scope of the Supplement was too narrow and did not adequately examine the full suite of impacts associated with the new design, particularly socioeconomic and health impacts from transporting waste to Yucca Mountain. Some said that the Supplement should have compared the risks and impacts of new design features to the design in the draft. Others criticized DOE's description of impacts in the Supplement as "proportional" to impacts described in the Draft EIS, rather than examining the impacts in detail.

With regard to waste transport, commenters said that the impacts should have been thoroughly analyzed and that a preferred mode and transport route should have been identified in the Supplement. The Supplement should also

have considered the use of multipurpose dry-cask storage and transportation systems, as well as the socioeconomic impacts from a prolonged transportation campaign due to an extended period of waste emplacement because of possible requirements for fuel aging. Others said that the Supplement should have examined the risks from transporting drip shields to the site. Some wanted to know if waste transport would be addressed in the Final EIS, while others objected that an examination of waste transport would be deferred to the Final EIS.

Response

The design evaluated in the Supplement to the Draft EIS (the flexible design) incorporates a variety of enhancements to the design evaluated in the Draft EIS. The basic elements of the Proposed Action, however, are unchanged: DOE proposes to construct, operate and monitor, and eventually close, a geologic repository at Yucca Mountain. Because these design enhancements had little effect on other elements of the repository program, the scope of the Supplement was limited to a discussion of the new design and its associated impacts. For example, the transportation of spent nuclear fuel and high-level radioactive waste to the repository would not be affected by the flexible design or how this design could evolve further. The amount of waste that could be transported to the repository is fixed, regardless of whether the fuel is or is not aged at the Yucca Mountain site. Therefore, waste transport was not evaluated in the Supplement. The flexible design would, however, have different requirements for system components and construction materials. The transportation of these materials and components from manufacturers and suppliers to Yucca Mountain, including the transport of titanium drip shields, could have environmental effects. Furthermore, the flexible design would have different requirements for the transport of workers to the site compared to the design examined in the Draft EIS. Impacts associated with the transport of workers and nonradioactive materials associated with the flexible design are discussed in Section 3.1.14 of the Supplement.

Keeping in mind the analytical exceptions noted in the preceding paragraph, Table S-2 of the Supplement to the Draft EIS compares the impacts described in the Draft EIS to the impacts described in the Supplement. Chapter 3 of the Supplement describes the most important changes that would occur due to the flexible design (radon releases, water use, acreage of new land disturbances, etc.; see Table 3-1 of the Supplement). These changes, scaled accordingly, are, by and large, not substantially different than the impacts described in the Draft EIS (see Table 3-1 of the Supplement). The Department believes that this was a reasonable approach to assessing and reporting the impacts of the flexible design compared to the impacts of the design examined in the Draft EIS.

In the Final EIS, the Department has identified rail as its preferred mode of waste transport nationally and in the State of Nevada, but did not identify preferred routes. At this time--many years before waste shipments could begin—it is impossible to predict accurately which routes could be used. During the interim, state or tribal governments may designate preferred routes, and new rail lines and highways may be constructed or modified. Therefore, for purposes of analysis in the Final EIS, DOE selected potential highway routes in accordance with U.S. Department of Transportation regulations, which require the use of preferred routes (typically Interstate highways or bypasses). Rail lines were selected based on current rail practices, as there are no comparable Federal regulations applicable to the selection of rail lines for the shipment of radioactive materials. For transportation in Nevada, if the Yucca Mountain site was approved, DOE would identify such a preference in consultation with affected stakeholders, particularly the State of Nevada. DOE would announce its preferred corridor in a *Federal Register* notice. Any decision to select a rail corridor would be set forth in a Record of Decision to be issued no sooner than 30 days after the announcement of a preference.

In Chapter 6 of the Final EIS, DOE has modified and updated several analyses related to the transportation of spent nuclear fuel and high-level radioactive waste to Yucca Mountain in response to public Comments. For example, DOE has updated its population estimates and impacts in the regions of influence in Nevada to reflect the most recent state and local population data, as well as data from the 2000 Census. In some instances, population estimates and projections from the Nevada State Demographer's Office were used. The updated population baselines were then used to estimate populations for Clark, Nye, and Lincoln Counties and the Rest of Nevada through 2035. These population projections were then compared and adjusted to the 2000 Census data. In this way, model population projections were calibrated to reflect the most recent available information. DOE used the baseline population for each county in the region of influence and forecasted to the year 2035 to scale impacts from results based on the 1990 census. For example, if a county's population were estimated to double from 1990 to 2035, DOE assumed that the population along the associated rail corridor also would double; radiological impacts

were then doubled accordingly. In certain locales, however, such as around the planned Las Vegas Beltway, local sources of population information were used to better reflect population growth trends.

On a national basis, DOE scaled the 1990 population-based impacts upward in the Final EIS to reflect the relative state-by-state population growth to 2035. The projections were based on 2000 Census data. In general, public health impacts to populations residing along potential transportation routes or rail lines would increase directly with an increase in population (from 1990 to 2035 population estimates), if all other factors relevant to estimating such impacts remained constant. However, some factors, such as the number of anticipated rail shipments and the computer model used to estimate the dose to the public during traffic stops, have changed because of new information or in response to comments. For this reason, the health impacts described in the Final EIS are similar to or, in some instances, less than those reported in the Draft EIS.

In response to public comments, DOE has also included maps in the Final EIS of highway routes and rail lines that were used for analysis. In addition, potential health and safety impacts associated with shipments are provided for each state and tribal nation through which shipments would pass.

3.5 (233)
Comment - 23 comments summarized
Commenters said that the Supplement to the Draft EIS should have addressed the 11,000-plus comments submitted to DOE on the Draft EIS. Some commenters requested that DOE respond to these comments before the Final EIS is released and before a site recommendation is made and that these responses be made available to the public, partly as an aid to counties that are preparing "Impact Assessment Reports" to accompany any site recommendation. Some wanted to know if and when hearings would be held on a site recommendation. Commenters said that responses in the Final EIS would not give the public an adequate chance to review how DOE addressed comments. Some said that DOE should prepare another Supplement that clearly addresses the current proposed undertaking and all the public comments to date, followed by additional public hearings. Others said that the Supplement should have fixed all the discrepancies identified by the public in the Draft EIS (transportation, socioeconomics, dose calculations, etc.) and address comments on the Draft EIS.

Response
The Final EIS includes this Comment-Response Document, which identifies and addresses each of the more than 13,000 comments received on both the Draft EIS and the Supplement to the Draft EIS. In response to public comments, DOE modified the Final EIS in a variety of ways, including clarifications or changes to the text, updating information (for example, using population projections submitted by local governments and baseline information incorporating 2000 Census data), and modifying analyses (such as those for transportation impacts in which the characteristics of the representative commercial spent nuclear fuel and accident source terms were modified). DOE considered comments on the Draft EIS, as appropriate, in the preparation of the Supplement to the Draft EIS. In part, for example, the comments received on the Draft EIS influenced DOE's description of the flexible design elements presented in the Supplement.

Upon issuance of the Final EIS, the public will have the opportunity to examine the Comment-Response Document and the Department's response to the public's comments. This approach is consistent with regulations issued by the Council on Environmental Quality and DOE's implementation procedures at 10 CFR 1021.

Consistent with the applicable regulations, the Department did not release the Comment-Response Document before issuing this Final EIS or hold hearings on the Comment-Response Document or this Final EIS. Should the Secretary of Energy recommend Yucca Mountain to the President, however, the recommendation would be accompanied by several supporting documents including the Final EIS and the Comment-Response Document. In the event Yucca Mountain was authorized and the project moved forward, DOE would submit a License Application to the Nuclear Regulatory Commission. The Nuclear Regulatory Commission's licensing process would afford the public additional opportunities to review and comment on the specific design elements of the Yucca Mountain Repository. In the event DOE incorporated additional design modifications subsequent to the submittal of the License Application, the Nuclear Regulatory Commission's licensing process would provide additional opportunities for the public to comment on the repository.

3.5 (246)
Comment - 2 comments summarized
Commenters stated that DOE asserted that the range of operational modes and design features described in the Supplement to the Draft EIS serves to bound the potential impacts of the repository, and that the Draft EIS made the same claim for the three general design options evaluated. However, the flexible design features and operational modes described in the Supplement result in an increase, beyond the bounds evaluated in the Draft EIS, in nearly all impacts.

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design the central feature of which was areal mass loading.

Since DOE issued the Draft EIS, it has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the flexible design that was evaluated in the Supplement to the Draft EIS and is evaluated in Section 4.1 of the Final EIS. This design focuses on controlling the temperature of the waste package surfaces and rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected these lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts (DOE recognizes that many of the short-term impacts tended to increase over those discussed in the Draft EIS).

In Section 2.1.1.2 of the Final EIS, DOE varied design parameters to create a set of reasonable operating scenarios to illustrate lower- and higher-temperature operating modes in such a way as to provide the range of potential environmental impacts. Furthermore, to not underestimate the environmental impacts that could result from implementing any of the lower- or higher-temperature operating modes, DOE has relied on conservative, yet realistic, assumptions when uncertainties remain. These results are reported in Section 4.1 of the EIS.

3.5 (3778)
Comment - 010388 / 0004
Consider only the S&ER [Science and Engineering Report] flexible design in the Final EIS and not address the viability Draft EIS design.

Response
DOE has decided to focus the discussion in the Final EIS on the flexible design. Therefore, DOE has estimated a range of operational scenarios that reflect the latest information available. DOE has also included a discussion of how the flexible design evolved since the issue of the Draft EIS.

3.5 (6990)
Comment - 010212 / 0008
Chapter 3.1 examines the changes in short-term environmental impacts for eight primary impact indicators for both higher and lower temperature operating modes. While there are changes in most impacts, none seem to us to change the conclusion of the foregoing DEIS that the environmental impacts of the repository are not a basis to not develop and operate the repository. There would be a substantial amount of additional construction to build the lower temperature operating mode repository with commensurate increases in construction impacts and risk of nonradiological accidents, but whether the benefits achieved in long-term performance outweigh those added costs is a judgment that has yet to be made.

Likewise, there are added environmental impacts related to ventilation that were examined but seem to be minimal and would likely be acceptable to obtain the benefits in repository performance.

We note that additional casks are called for in the lower-temperature design along with an aging facility that was not part of the DEIS design. The Supplement does not provide details on that facility. Will there be additional environmental analysis of the aging facility if the lower-temperature mode is selected for the license application design basis?

Response
In the Final EIS, DOE has identified and analyzed one higher-temperature operating mode and six lower-temperature operating modes. Chapter 2 of the EIS and other related sections of the Final EIS have been revised to reflect this refinement in design selection, which basically is an establishment of design fundamentals such as drift layout, drift spacing, depth and location of emplacement areas, and location of ventilation raises. The Final EIS describes a design for the repository with variations on the operating mode. The key parameters defining the flexible operating modes are package spacing, drift temperatures, length of active ventilation, and age of the fuel being emplaced. The range of variances in these parameters basically determine the extent of the repository design that will be utilized for emplacement of 70,000 metric tons of heavy metal of waste and fuel; the higher-temperature operating mode would require only the main central segment of the repository; several of the lower-temperature operating modes would use that segment and the western extension, while the "ultra" low-temperature operating mode would require use of the entire planned initial design.

As discussed in Section 2.6 of the EIS, the analyses did not identify any potential environmental impacts that would be a basis for not proceeding with the Proposed Action.

3.5 (11068)
Comment - 010170 / 0001
The Supplement is little more than an outline, and the public EIS comment process is completely premature. If the repository design is still "evolving" before the ink is dry on the last version, why are we being asked to review it, and why is the EIS process moving forward? This 125-page document outlines in very sketchy format enormous changes to both the design and the entire operation of the proposed repository for many years to come. Entirely new facilities and waste handling processes are barely described, with little mention of relevant studies on environmental impacts. We do not believe that this premature and incomplete approach to the EIS/NEPA [National Environmental Policy Act] process is legal, let alone ethical or responsible to U.S. taxpayers or residents of this region. Is exposing our region to this incomplete plan merely being done to avoid litigation from nuclear utility companies? Future generations and the planet itself deserve far better than that.

Response
DOE prepared the Supplement to the Draft EIS to update information presented in the Draft EIS by focusing on aspects of the design that have changed since the Draft EIS. DOE acknowledged in the Supplement that the central focus of the design has changed from one that relies on areal mass loading (amount of spent nuclear fuel per acre) to one that controls temperature in the rock walls by varying other parameters such as the distance between waste packages. As part of its evaluation, DOE choose primary impact indicators in each environmental resource area and also limited its evaluations to project phases that would result in the highest impacts so as to focus its presentation of the potential environmental impacts. This analysis was based on the best information available to describe the flexible design and its associated facilities. In this Final EIS, DOE has updated and expanded the description of the flexible design and facilities, and performed a complete analysis to describe the range of environmental impacts that could occur under the Proposed Action.

3.5 (11759)
Comment - 010320 / 0002
The introduction of a surface aging facility, "will increase the complexity of the waste handling, increase bare fuel handling activities, increase radioactivity waste generation, and one would expect and it would increase both worker and public risk."

However, it is somehow mitigated since the risk predicted for this new design are predicted to decrease with this new design. That's a bit confusing. The DEIS needs to explain how this risk is decreased.

Response
DOE has incorporated the surface aging facility into its analyses (as was done for all such facilities germane to the Proposed Action). Contrary to this comment, the Final EIS reports that many of the short-term impacts tended to increase over those discussed in the Draft EIS.

3.5 (12025)
Comment - 010096 / 0005
The SDEIS does not provide a summary analysis of the risk benefit/cost implications of the S&ER [Science and Engineering Report] flexible design versus the design assumed in the DEIS. Without such analysis it is not possible to conclude that the S&ER flexible design results in enhanced protection of public health and safety or at what cost. As such, the SDEIS does not provide a basis for the DOE to select the S&ER flexible alternative over others under consideration.

Response
In determining whether to recommend the Yucca Mountain site, the Secretary of Energy would consider the costs and benefits of not only the potential environmental impacts identified in the EIS, but also other technical, economic, and national policy factors and provided in the Science and Engineering Report (DIRS 153849-DOE 2001) and as dictated by the NWPA.

3.5 (12303)
Comment - 010242 / 0031
This Supplement provides nothing that would change our previously stated conclusion regarding the *Draft Environmental Impact Statement for a Geologic Repository for Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada.* We still find the document, including the Supplement, to be legally, procedurally, and substantively deficient, and conclude that it must be withdrawn. The entire National Environmental Policy Act compliance strategy for the proposed Yucca Mountain high-level nuclear waste repository must be reconsidered by DOE. A new scoping process, based on the development of a programmatic environmental impact statement, with tiered EISs to follow, should be implemented when sufficient planning and information are available to support an informed decision by the Secretary of Energy regarding whether to recommend the site to the President for development as a high-level nuclear waste repository.

Response
An earlier EIS (DIRS 104832-DOE 1980) analyzed environmental impacts that could occur if DOE developed and implemented various technologies for the management and disposal of spent nuclear fuel and high-level radioactive waste. It examined several alternatives, including mined geologic disposal, very deep hole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, space disposal, and no action. The 1981 Record of Decision for that EIS (46 *FR* 26677; May 14, 1981) announced the DOE decision to pursue the mined geologic disposal alternative for the disposition of spent nuclear fuel and high-level radioactive waste. DOE believes that sufficient information is available to analyze adequately the impacts of constructing, operating and monitoring, and eventually closing a geologic repository at the Yucca Mountain site.

3.5 (12576)
Comment - 010073 / 0001
White Pine County is submitting these comments with the expectation that they will serve to enable the Department of Energy (DOE) to prepare a "legally sufficient" Final EIS which will satisfy the requirements of the National Environmental Policy Act and the NWPA. The results will be a document which more fully considers the environmental consequences of constructing and operating the Yucca Mountain repository system. Failure by DOE to adequately address these comments may render the Final EIS legally insufficient.

Response
DOE has responded to all comments received on the Draft EIS and the Supplement to the Draft EIS. Responses can be found in this Comment-Response Document by locating the commenter's name in the appropriate index table and then turning to the location listed.

3.5 (12809)
Comment - 010299 / 0002
Under the National Environmental Policy Act, the Draft Environmental Impact Statement (DEIS) for the proposed Yucca Mt. Repository must show a "Proposed Action," (in this case, "to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain for the disposal of spent nuclear fuel and high-level radioactive waste") as well as alternatives. This Supplement is insufficient because it does not provide specific design alternatives for the Proposed Action. Instead, it describes a range of design features and operational parameters that could be combined to arrive at two alternative designs - "above boiling drift wall temperature" or "below boiling waste container surface temperature." Page 2-20 shows proposed use of an area that hasn't even been investigated yet. It seems odd to be asked to comment on a design so unresearched. Am I supposed to go research and survey the land myself so I can give my comments? This seems so rushed.

The identified features and parameters in Table 2-1 are said to "bound" the design so the range of potential impacts could be analyzed. It does not identify specific alternatives for which these impacts could be compared. There is no reason to accept this "bounding" approach, since the 1999 DEIS made the same claim, and this Supplement has impacts that are outside THOSE bounds. What will happen with the Final EIS as the design continues to "evolve"?

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design whose central feature was areal mass loading.

Since issuing the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the flexible design that was evaluated in the Supplement to the Draft EIS and is evaluated in this Final EIS. This design focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected these lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts (DOE recognizes that many of the short-term impacts tended to increase over those discussed in the Draft EIS).

In this Final EIS, design parameters were varied to create seven scenarios to illustrate lower- and higher-temperature operating modes in such a way to provide the range of potential environmental impacts. To demonstrate the nature of this range, DOE has identified primary impact indicators for each environmental resource area. These indicators are the most important contributors to determining the specific impacts for an environmental resource area (short- and long-term impacts are presented in Chapters 4 and 5, respectively).

DOE is unsure as to the uncharacterized area referred to by this comment; however, all areas associated with the flexible design have been characterized. DOE acknowledges in the EIS that it could modify or refine the flexible design further during the License Application process, if the site was approved for development.

3.5 (12849)
Comment - 010262 / 0002
Under the National Environmental Policy Act, the Draft Environmental Impact Statement (DEIS) for the proposed Yucca Mt. Repository must show a "Proposed Action," (in this case, "to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain for the disposal of spent nuclear fuel and high-level radioactive waste") as well as alternatives. This Supplement is insufficient because it does not provide specific design alternatives for the Proposed Action. Instead, it describes a range of design features and operational parameters that could be combined to arrive at two alternative designs - "above boiling drift wall temperature" or

"below boiling waste container surface temperature." Page 2-20 shows proposed use of an area that hasn't even been investigated yet.

If the repository design is still changing why are we being asked to review it? These identified features and parameters (see Table 2-1) are said to "bound" the design so the range of potential impacts could be analyzed. It does not identify specific alternatives for which these impacts could be compared. There is no reason to accept this "bounding" approach, since the 1999 DEIS made the same claim, and this Supplement has impacts that are outside THOSE bounds. What will happen with the Final EIS as the design continues to "evolve"?

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design whose central feature was areal mass loading.

Since it issued the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the flexible design that was evaluated in the Supplement to the Draft EIS and is evaluated in this Final EIS. This design focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected these lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts (DOE recognizes that many of the short-term impacts tended to increase over those discussed in the Draft EIS).

In this Final EIS, design parameters were varied to create scenarios to illustrate lower- and higher-temperature operating modes in such a way to provide the range of potential environmental impacts. To demonstrate the nature of this range, DOE has identified primary impact indicators for each environmental resource area. These indicators are the most important contributors to determining the specific impacts for an environmental resource area (short- and long-term impacts are presented in Chapters 4 and 5, respectively).

DOE is unsure as to the uncharacterized area referred to by this comment; however, all areas associated with the flexible design have been characterized. DOE acknowledges in the EIS that it could modify or refine the flexible design further during the License Application process, if the site was approved for development. In that event, the Nuclear Regulatory Commission licensing and National Environmental Policy Act processes related to a repository at Yucca Mountain would provide a number of opportunities for the public to comment on DOE's application and possible updates.

3.5 (12899)
Comment - 010314 / 0007
I believe the DOE should prepare and release for public comment a Supplement to the DEIS that would compare an analysis of the transportation impacts of consolidating the wastes at Yucca Mountain with the impacts from "No Action" -- that is, from the alternative of storing the wastes at the sites where they have been generated, at least until the time when research will have yielded a technology that can vastly reduce or even eliminate the threats of these wastes to the human environments that lie (underline) en route (end underline) to the interim parking lot and permanent repository, wherever they may ultimately be located.

Response
A Supplement to the Draft EIS was issued for public comment in May 2001. The Supplement focused on the evolution of the repository design. Transportation was not a principal part of the discussion because the design revisions would not fundamentally alter the transportation scenarios presented in the Draft EIS. In the Draft EIS,

DOE did compare the potential impacts of transporting spent nuclear fuel and high-level radioactive waste to the proposed repository from each of the waste generator sites. DOE also provided, as a basis for comparison, the potential impacts of continued storage at the waste generator sites under Scenarios 1 and 2 of the No-Action Alternative.

3.5 (12956)
Comment - 010249 / 0010
Better explain the concept of primary impact indicators.

In the SDEIS, DOE discusses the primary impact indicators selected to evaluate those parameters used to determine the specific impacts in any environmental resources area. The discussion implies that these primary impact indicators are a new concept, when in fact, these are the parameters that DOE determined to be most important during its evaluation of impacts in the DEIS. In the FEIS, DOE should more clearly state that these primary impact indicators are the same parameters used to evaluate the environmental impacts in the DEIS and comprehensively assess the impacts of the Proposed Action.

Response
DOE selected primary impact indicators in each environmental resource area as the most important contributors or parameters used to determine the potential environmental impacts in a resource area. These indicators are directly proportional to the specific impact, and are generally determined during an intermediate step in the impact calculation or evaluation. DOE used the same primary impact indicators to estimate impacts reported in the Draft EIS, and uses them again in this Final EIS (environmental impacts, rather than indicators, are reported in Chapters 4 through 8, and 10).

3.5 (12957)
Comment - 010249 / 0011
Identify conservatisms.

NEI's [Nuclear Energy Institute] comments on the DEIS pointed out that, even though the DEIS found the impacts of the proposed repository to be small, it significantly overestimated these impacts in several areas (NEI DEIS comment V). Our review of the SDEIS indicates that this is still the case. While DOE may have a valid reason for doing this (such as helping to assure decision-makers that impacts are bounded), this approach needs to be more clearly explained. Work that DOE is currently performing on identifying and quantifying conservatisms and other uncertainties in its analysis in response to questions raised by the Nuclear Waste Technical Review Board could be included in this clarification.

Response
DOE's approach to impact analysis is to represent conservatively the reasonably foreseeable impacts that could occur under the Proposed Action (see Section 2.1.1.2 of the EIS). DOE has used widely accepted analytical tools, coupled with the best available information, and cautious but reasonable assumptions where information is incomplete or unavailable or where uncertainties exist to estimate potential environmental impacts.

3.5 (13033)
Comment - 010311 / 0005
The SDEIS and the Yucca Mountain Science and Engineering Report are written for a technical audience with too many references to other previous reports. Because of the complex nature of Nuclear Waste processing and storage, the DOE needs to determine what are the main concerns of the Nevadans and the General Public. And, then, write a Public Summary document addressed to the average citizen that includes all the key parameters, not just by reference. The existing reports are too difficult for the average citizen to read. The use of references, without a summary of values, leaves you to feel that the writers are hiding something and telling the public "*that the Federal government will take care of them.*"

I am still looking for the Seismic Design criteria, discussion on Capable Faults to name a few critical issues.

Response
DOE acknowledges that the subject matter of the EIS is very technical and might be difficult for some readers to understand. Because of this concern, DOE has taken steps to make the EIS as reader-friendly as possible. For example, the EIS includes explanatory text boxes, summary tables, many illustrations, and comparisons in table form that stress and highlight potential environmental impacts and important information. Furthermore, the Comment-Response Document, which accompanies this Final EIS, contains a discussion of key issues that have been raised by the public during the EIS process and DOE's responses to these issues. The Department hopes that these efforts have made the issues surrounding the repository program more understandable to broadest range of individuals as possible.

3.5 (13070)
Comment - 010248 / 0002
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° 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 [Science and Engineering Report] 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-emplacement; (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.

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design the central feature of which was areal mass loading.

Since DOE issued the Draft EIS, it has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the flexible design that was evaluated in the Supplement to the Draft EIS and is evaluated in this Final EIS. This design focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected these lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts (DOE recognizes that many of the short-term impacts tended to increase over those discussed in the Draft EIS).

In this Final EIS, DOE varied design parameters to create scenarios to illustrate lower- and higher-temperature operating modes in such a way as to provide the range of potential environmental impacts. Furthermore, to not underestimate the environmental impacts that could result from implementing any of the lower- or higher-temperature operating modes, DOE has relied on conservative, yet realistic, assumptions when uncertainties remain.

3.5 (13071)
Comment - 010248 / 0003
The S&ER [Science and Engineering Report] 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.

Response
In this Final EIS, DOE has updated and expanded the description of the flexible design and associated facilities, as well as performed a complete analysis to describe the range of potential environmental impacts that could occur under the Proposed Action. The tables in Section 2.4 of the Final EIS demonstrate the bounding nature of the flexible operating modes within the construct of a fixed design.

3.5 (13190)
Comment - 010243 / 0037
The SDEIS lacks sufficient verifiable data to be relied upon, properly analyzed, or even commented on in a comprehensive manner. The SDEIS lacks sufficient analysis and full consideration with respect to repository engineering/design, transportation impacts, environmental impacts, and public involvement and procedural considerations. There is serious doubt as to compliance with both NEPA [National Environmental Policy Act] and the NWPA with respect to the proposed "flexible" repository design. Clark County's position is that sufficient unanswered questions exist to call into question the accuracy, adequacy and appropriateness of the SDEIS.

Response
Although the comment lacks specificity, in general, DOE believes that the EIS is consistent with the requirements of the National Environmental Policy Act and the NWPA. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions to address incomplete or unavailable information or uncertainties provide a meaningful assessment of environmental impacts consistent with the applicable requirements.

The EIS, which DOE prepared using the best available data, analyzes a variety of implementing alternatives and scenarios. These alternatives and scenarios reflect potential repository design and operating modes, waste packaging approaches, and transportation options for shipping spent nuclear fuel and high-level radioactive waste to the Yucca Mountain site. DOE included a No-Action Alternative that analyzed two scenarios to provide a basis for comparison with the Proposed Action and to reflect the range of impacts that could occur.

For both the Proposed Action and the No-Action Alternative, the EIS evaluates the affected environment and estimates potential environmental impacts in regions of influence for each resource area. DOE used information from a broad range of studies to obtain or evaluate the information needed for the assessment of Yucca Mountain as a monitored geologic repository. These include, for example, reports and studies sponsored by DOE, other Federal agencies, the State of Nevada, universities, the National Academy of Sciences, and affected units of local government. In addition, DOE identified the use of incomplete information or the unavailability of information to identify uncertainties in the data or analytical approaches. DOE acknowledges that the results of analyses often have associated uncertainties, and has described such uncertainties throughout the EIS.

3.5 (13192)
Comment - 010246 / 0001
This SDEIS is not sufficient. It does not specify a final design alternative for the Proposed Action, to build, run, monitor, and close permanent burial site for dumping irradiated nuclear fuel and high-level radioactive waste.

Rather, the SDEIS lays out a spectrum of design options and repository operations criteria to be mixed and matched to yield two alternative design choices: the first, above-boiling point temperatures at the emplacement tunnel walls; the second, below-boiling point temperatures at the surface of the waste burial cask. The SDEIS claims that these options and criteria are bounding for the eventual final design, that the entire range of possible impacts to the environment and public health can be determined. But how can potential impacts be compared, when the SDEIS fails to identify which specific options will be employed in the actual final design? The original DEIS in the summer of 1999 also claimed to be bounding. However, this SDEIS contains impacts beyond the bounds of the DEIS.

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design whose central feature was areal mass loading.

Since it issued the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the flexible design that was evaluated in the Supplement to the Draft EIS and is evaluated in this Final EIS. This design focuses on controlling the temperature of the waste package surfaces and the rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected these lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts.

Many of the issues relating to how DOE would operate the repository can only be resolved in the context of developing the detailed design for a possible license application. DOE cannot predict with certainty how it would eventually resolve these issues. However, to ensure that the EIS provides the range of potential environmental impacts, DOE selected and varied design parameters to create seven scenarios to illustrate lower- and higher-temperature operating modes. To demonstrate the nature of this range, DOE has identified primary impact indicators for each environmental resource area. These indicators are the most important contributors to determining the specific impacts for an environmental resource area. The short- and long-term environmental impacts are presented in Chapters 4 and 5, respectively.

3.5 (13238)
Comment - 010244 / 0038
DOE has yet to perform a quantitative evaluation of the environmental impacts of variable drift spacing and the Supplement does not identify specific design alternatives or evaluate and compare their potential impacts.

Response
In this Final EIS, design parameters, such as the distances between waste packages and closure duration, were varied to create seven scenarios to illustrate lower- and higher-temperature operating modes. These scenarios were developed in such a way to provide the range of potential environmental impacts. The environmental impacts for each resource area for the seven scenarios are reported as a range (minimum and maximum) in Chapters 4 and 5.

In the development of these scenarios, drift spacing was considered a constant parameter [set to 81 meters (270 feet)]. Although drift spacing could be varied as a means in which to control the temperature of the rock walls (focus on the flexible design), other design parameters are considered equally effective in meeting lower-temperature operating mode goals. In the Supplement to the Draft EIS (Section 2.4) DOE acknowledges that drift spacing could vary and could influence the size of the emplacement area, length of drifts and excavated volume. Drift spacing versus waste package spacing is a design trade-off to achieve lower heat output per unit volume of a repository. DOE concluded that the effect of drift spacing on these related parameters would be less than the effect

of waste package spacing in the analytical scenarios. Therefore, DOE treated drift spacing as a constant in its development of the scenarios and consequent analysis in this Final EIS.

3.5 (13242)
Comment - 010266 / 0002
In addressing the proposed behavior of the repository, the DOE provides a range of impacts for the possible repository configurations. In general, however, most of the environmental impacts for the new operating design appear to be greater than the corresponding impacts from the DEIS.

Response
DOE recognizes that many of the short-term environmental impacts reported in the Supplement to the Draft EIS tended to increase over those reported in the Draft EIS. This Final EIS does not include thermal load scenarios from the Draft EIS, primarily because the design has evolved from one that focuses on areal mass loading (amount of spent nuclear fuel per unit area) to one that focuses on controlling the temperature of the rock (flexible design). To ensure that the EIS provides the range of potential environmental impacts under the flexible design, DOE selected and varied design parameters to create seven scenarios to illustrate lower- and higher-temperature operating modes. The short- and long-term environmental impacts are reported primarily in Chapters 4 and 5, respectively.

3.5 (13267)
Comment - 010231 / 0001
Because the Supplement is limited in scope, it does not address the comments EPA [Environmental Protection Agency] made on the draft EIS regarding the national transportation aspects of the project, nor does it provide most of the additional data we requested on the project's potential environmental impacts.

Response
The Final EIS includes this Comment-Response Document, which identifies and addresses each of the comments received on both the Draft EIS and the Supplement to the Draft EIS. In response to public comments, DOE modified the Final EIS in a variety of ways, including clarifications or changes to the text, updating information, and modifying analyses. The Department considered comments on the Draft EIS in preparation of the Supplement to the Draft EIS (which were appropriately carried forward to the Final EIS). In part, for example, the comments received on the Draft EIS influenced DOE's description of the Science and Engineering Report design elements presented in the Supplement. The Supplement was limited in scope to "aspects of the design that have changed since DOE issued the Draft EIS" (which did not include transportation).

Consistent with Council on Environmental Quality and DOE regulations, the Department did not release the Comment-Response Document before issuing this Final EIS or hold hearings on the Comment-Response Document or this Final EIS.

3.5 (13268)
Comment - 010231 / 0002
If ongoing scientific studies support the EIS's bounding information, then the NEPA [National Environmental Policy Act] requirement to disclose the environmental impacts of a project should be satisfied. However, EPA encourages DOE to provide public review of and comment on new information that affects the project's design and operation.

Response
In response to public comments, DOE modified the Final EIS in a variety of ways, including incorporation of the flexible design (introduced in the Yucca Mountain Science and Engineering Report and the Supplement to the Draft EIS), clarifications or changes to the text, updating information, and modifying analyses. DOE believes that the environmental impacts presented in the Final EIS for the flexible design (and its associated operating modes) bound reasonably foreseeable actions.

In June 2001, DOE conducted three public hearings on the Supplement to the Draft EIS to provide the public with opportunities to comment on the Project's latest plans for design and operation. In September and October 2001, the Project conducted hearings on key documents that were released in advance of a potential Site Recommendation

[*the Yucca Mountain Science and Engineering Report* (DIRS 153849-DOE 2001) and the *Preliminary Site Suitability Evaluation* (DIRS 155734-DOE 2001)].

Upon issuance of the Final EIS, the public will have the opportunity to examine the Comment-Response Document and the Department's response to the public's comments. This approach is consistent with regulations issued by the Council on Environmental Quality and DOE's implementation procedures at 10 CFR 1021.

Should the Secretary of Energy recommend Yucca Mountain to the President, however, the recommendation would be accompanied by several supporting documents including the Final EIS and its Comment-Response Document. In the event Yucca Mountain was authorized and the project moved forward, DOE would submit a License Application to the Nuclear Regulatory Commission. The Nuclear Regulatory Commission's licensing process would afford the public additional opportunities to review and comment on the specific design elements of the Yucca Mountain repository. In the event that DOE incorporated additional design modifications subsequent to the submittal of a License Application, the Nuclear Regulatory Commission's licensing process would provide additional opportunities for the public to comment on the repository.

3.5 (13271)
Comment - 010231 / 0005
Page 2-12, Section 2.3.2.1. In the final sentence of the first paragraph, it is unclear why the "basic facilities for personnel support, warehousing, security, a concrete plant for fabricating and curing precast components and supplying concrete for in-place casting, and transportation (motor pool)" are inside the radiation control area (RCA). If such facilities have radiation concerns, the reasons and impacts should be explained.

Response
The description in the Supplement to the Draft EIS should have read: Other support facilities planned for the North Portal Operations Area include basic facilities for personnel support, warehousing, security, and transportation (motor pool). Section 2.1.2.1.1 of the Final EIS reflects this clarification.

3.5 (13353)
Comment - 010182 / 0002
The SDEIS describes two general design options, one which would result in drift wall temperatures rising to above the boiling temperature (higher-temperature operational mode), and one which would keep the waste container surface temperature below 85° C (lower-temperature operational mode). Variable operational modes and design features are discussed that, in combination, could be arranged to meet either of the design options. The SDEIS asserts that the range of operational modes and design features described serves to bound the potential impacts of the repository. The DEIS made the same claim for the three general design options evaluated. However, the flexible design features and operational modes described in the SDEIS result in an increase, beyond the bounds evaluated in the DEIS, in nearly all impacts originally analyzed (extracted from the State of Nevada's Comments at [Amargosa] Valley, NV public comment meeting on 31 May 2001). Also, Table S-2 is not consistent in providing a range of impacts for many parameters.

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design whose central feature was areal mass loading.

Since issuing the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the Science and Engineering Report flexible design (called flexible design) that was evaluated in the Supplement to the Draft EIS and is evaluated in this Final EIS. This design focuses on controlling the temperature of the waste package surfaces and the rock between the waste

emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected these lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts (DOE recognizes that many of the short-term impacts tended to increase over those discussed in the Draft EIS).

In this Final EIS, design parameters were varied to create seven scenarios to illustrate lower- and higher-temperature operating modes in such a way to provide the range of potential environmental impacts. Furthermore, to not underestimate the environmental impacts that could result from implementing any of the lower- or higher-temperature operating modes, DOE has relied on conservative, yet realistic, assumptions when uncertainties remain.

The summary tables in Section 2.4 of the Final EIS provide a range of impacts for various resources where such an approach facilitates the summarization of information. A range of impacts also is presented for aspects of the Proposed Action for which options remain under consideration. For example, DOE has reported the range of impacts associated with the seven lower- and higher-temperature operating mode scenarios analyzed.

3.5 (13386)
Comment - 010182 / 0027
The Supplement to the Draft Environmental Impact Statement (SDEIS) as well as the DEIS are based on what if, analytical, theoretical scenarios.

An evaluation of impacts associated with specific design alternatives should be done.

Response
The flexible design evaluated in this Final EIS focuses on controlling the temperature of the rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages (see Section 2.1.1.2 of the EIS). Within this design framework of controlling the temperature of the rock, DOE selected lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes. Design parameters were varied to create seven scenarios to illustrate lower- and higher-temperature operating modes in such a way to provide the range of potential environmental impacts.

DOE has updated and expanded the description of the flexible design and facilities, as well as performed a complete analysis to describe the range of potential environmental impacts that could occur under the Proposed Action.

3.5 (13523)
Comment - 010392 / 0006
The continuing evolving design of the repository does not allow for the presentation of alternative repository design descriptions as required in the Secretary of Energy's basis for site recommendation. Instead, the Supplement describes a range of possible design features and operational modes that do not reflect the intent of the NWPA which is to describe actual alternative repository designs.

The DEIS Supplement is insufficient because it fails to provide a specific description of alternatives for how the Proposed Action "to construct, operate and monitor and eventually close a geologic repository at Yucca Mountain" could be accomplished. Instead the flexible design alternatives presented are so broad that they cannot be construed as specific descriptions of alternatives. This is equivalent to presenting a restaurant patron with a list of all ingredients in the kitchen and expecting them to know what dishes are on the menu.

Response
DOE is not aware of any requirement that the "Secretary of Energy's basis for site recommendation" requires a presentation of alternative repository design descriptions. DOE also believes that the Supplement to the Draft EIS is consistent with the requirements of the National Environmental Policy Act and the NWPA. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions to address incomplete or unavailable

information or uncertainties provide a meaningful assessment of environmental impacts consistent with the applicable requirements.

3.5 (13524)
Comment - 010392 / 0007
The Supplement states, "DOE invites comments on its intention not to address the Draft EIS design in the Final EIS." Certainly, even as the design is evolving, the design described in the DEIS is an alternative which should be considered as part of the full scope of bounding alternatives. It would be very helpful to the public to have the draft EIS design addressed in the Final EIS to understand why it is no longer being considered by DOE.

Response
DOE has decided to focus the discussion in the Final EIS on the flexible design. As such, DOE has estimated a range of operational scenarios that reflect the latest information available. In addition, DOE also included a discussion of how the flexible design evolved since the issue of the Draft EIS.

3.6 Supplement to the Draft EIS - Public Involvement

3.6 (245)
Comment - 6 comments summarized
Commenters believe that the Supplement to the Draft EIS is not a standalone document because it continually refers to the Science and Engineering Report; thus, readers must have the Science and Engineering Report to understand the Supplement. Several commenters stated that they had not received all of the relevant background documents or that the documents were not readily available. Commenters also expressed concerns about the overlapping public comment periods for the Supplement and the Science and Engineering Report. In the commenters' opinion this complicated the overall process, making it much more difficult for people to participate in hearings. Commenters indicated that the overlapping comment periods gave the impression that the site recommendation process for Yucca Mountain is not referencing the EIS process.

Response
Any Site Recommendation to the President would be accompanied by several supporting documents, including this Final EIS and the Science and Engineering Report (DIRS 153849-DOE 2001). DOE prepared each of these documents on a slightly different schedule, but both would be finalized before the Secretary's determination on site recommendation. Each document has a different perspective and purpose. DOE prepared the Science and Engineering Report to describe the results of scientific and engineering studies completed to date, the waste forms to be disposed of, the repository and waste package designs, and the results of the most recent assessments of the long-term performance of the proposed repository. The Science and Engineering Report provides detailed scientific and engineering information. The EIS, on the other hand, provides a reasonable range of potential environmental impacts associated with the engineering and scientific information provided in the Science and Engineering Report. The Science and Engineering Report provides the operational considerations or bases for estimating the potential impacts of the repository. DOE prepared the EIS consistent with the Council on Environmental Quality regulations, which encourage EISs to be as readable as possible by a broad range of the public and allows for the incorporation of detailed information by reference. The Science and Engineering Report is, therefore, a primary reference document for the EIS. However, DOE believes the Supplement to the Draft EIS does provide meaningful information to the public and has merit as a standalone document. DOE acknowledges the complexity of the Yucca Mountain Project and recognizes that if readers require more information than presented in the EIS, they might need to review other documents.

DOE distributed copies of the Supplement to the Draft EIS and the Science and Engineering Report to individuals on the Yucca Mountain Project mailing lists. These lists include individuals who have specifically requested DOE documents, submitted comments on DOE documents in the past, have corresponded with DOE regarding the Yucca Mountain Project, or have registered and participated in one of DOE's public meetings regarding Yucca Mountain. DOE has reviewed and updated its mailing lists. DOE apologizes for any oversights that might have occurred in document distribution. DOE attempts to widely announce the availability of its documents and any associated public comment period.

DOE believes that its approach to the public involvement process during the development of the EIS is consistent with the National Environmental Policy Act, Council on Environmental Quality and DOE implementing regulations, and DOE guidance on public involvement. DOE scheduled the public participation period for the Supplement and the Science and Engineering Report based on the respective schedules for those documents and what the Department believed would be an acceptable review period based on the documents' respective sizes and technical content. Rather than limiting public involvement, the Department believes that extending the comment period for the Science and Engineering Report beyond the closure date for the Supplement, and holding the public meetings for the Science and Engineering Report later than those for the Supplement, provides an increased opportunity to participate in the Yucca Mountain public comment process.

3.6 (257)
Comment - 118 comments summarized
Commenters requested a 3-month (90-day) extension of the public comment period for the Supplement to the Draft EIS. The commenters did not believe the original 45-day comment period was sufficient. Commenters offered the following reasons for the extension: the Department appears to not have taken into account the time required of the public to obtain the document, analyze its content, and compile comments; the technical nature of the document and the summer schedules of the public makes it difficult to comment on a short schedule; and the S&ER [Science and Engineering Report] is needed to understand the SDEIS. Commenters were troubled by DOE's decision to grant an extension to an exclusive group of stakeholders. The commenters believed this was inequitable. DOE should reopen the comment period to all members of the public with the same deadline.

Commenters stated that because Yucca Mountain is a national issue, public meetings should be held all over the country and include the entire public along the transportation routes. Similarly, commenters stated that those living in more remote areas of Nevada could not attend one of the meetings conducted and suggested more Nevada hearings at specific locations such as Caliente and Tonopah. Some commenters did not like meetings held in casinos and suggested alternative meeting times and formats, such as picnics on Sunday afternoons. Several commenters were concerned that scheduled DOE meetings conflicted with local events such as high school graduations or regularly scheduled town meetings.

Response
DOE believes that its approach to the public involvement process during the development of the Supplement to the Draft EIS is consistent with the National Environmental Policy Act, Council on Environmental Quality and DOE regulations, and DOE guidance on public participation during the preparation of EISs.

In May 2001, DOE issued the Supplement to the Draft Environmental Impact Statement, which it distributed to more than 4,000 stakeholders in Nevada and nationwide. These stakeholders were encouraged to submit comments during a 45-day comment period, which was later extended to 57 days (May 4 to July 6, 2001).
In June, during a review of its mailing records, the Department discovered that it had inadvertently not sent the Supplement to the Draft EIS to about 700 stakeholders who had requested and received a copy of the Draft EIS. DOE announced this oversight, sent the Supplement to the Draft EIS to these stakeholders, and provided them an opportunity to submit comments during a separate 45-day comment period (June 29 to August 13, 2001). Despite the respective deadlines, DOE has considered to the extent practicable all comments received in the development of this Final EIS.

Because the Supplement focused primarily on matters involving repository design, the Department held three public hearings in communities near the proposed repository (Amargosa Valley, Las Vegas, and Pahrump, Nevada) during the comment periods. Commenters throughout Nevada and nationwide were encouraged to submit comments at the public hearings and by mail, facsimile, and the Internet during the comment periods. DOE used means comparable to those used for the Draft EIS (advertisements, press releases, and public service announcements) to notify the public.

DOE attempts to hold public meetings at locations and times that are most convenient for the general public. Facilities and meeting room accommodations are selected based on a number of factors including accessibility, ample seating, lighting, handicap facilities, and parking. DOE also attempts to minimize conflicts with other meetings and activities in the areas where meetings are going to be held. However, this is not always possible and sometimes the more preferred meeting locations are unavailable and some conflicts are unavoidable. DOE

apologizes for any inconvenience or hardship the meeting schedules and locations might have posed for those interested parties who were unable to attend one of the meetings.

3.6 (2755)
Comment - 010174 / 0005
Because the new concept of fuel blending, mixing and re-packaging wastes has huge risks involved, the public needs to know more about the technology to be assured that the proposed plan is adequate for safety and health of workers and the general public. There was little description of this aspect of the plan. We need to be able to review these techniques as used elsewhere, and learn what risks are involved, and what safety measures need to be included in the plan.

Response
The processes planned for the blending of commercial spent nuclear fuel are the same that are currently being used successfully for fuel management at nuclear plants through out the United States. The considerations mentioned in the comment regarding adequate safety for workers and the general public are discussed in the Final EIS. Further information on the blending strategy and potential facilities associated with this activity can be found in Sections 2.2.1 and 2.2.2.2 of the Science and Engineering Report (DIRS 153849-DOE 2001). The interested public will have the opportunity for additional reviews and input on Yucca Mountain activities as part of the Nuclear Regulatory Commission licensing process should the repository receive authorization.

3.6 (11236)
Comment - 010400 / 0001
I am a citizen of the State of Nevada and have serious concerns about the Yucca Mountain area being used as a Waste Depository site. I also have grave concerns about the "process" of keeping the public informed about the dangers to them if the current plan is implemented.

I am asking for:

1. more hearings on the SDEIS. Hold hearings at all of the locations where the draft EIS hearings took place,
2. an increase in the comment period of the SDEIS to 90 days,
3. that site recommendation hearings be held after the release of the final EIS,
4. that the comment period for the site recommendation be a minimum of six months

Response
DOE believes that its approach to the public involvement process during the development of the Supplement to the Draft EIS is consistent with the National Environmental Policy Act, Council on Environmental Quality and DOE regulations, and DOE guidance on public participation during the preparation of EISs.

In May 2001, DOE issued the Supplement to the Draft Environmental Impact Statement, which it distributed to more than 4,000 stakeholders in Nevada and nationwide. These stakeholders were encouraged to submit comments during a 45-day comment period, which was later extended to 57 days (May 4 – July 6, 2001).

In June, during a review of its mailing records, the Department discovered that it had inadvertently not sent the Supplement to the Draft EIS to about 700 stakeholders who had requested and received a copy of the Draft EIS. DOE announced this oversight, sent the Supplement to the Draft EIS to these stakeholders, and provided them an opportunity to submit comments during a separate 45-day comment period (June 29 – August 13, 2001). Despite the respective deadlines, DOE has considered to the extent practicable all comments received in the development of this Final EIS.

Because the approximately 70-page Supplement focused primarily on matters involving repository design, the Department held three public hearings in communities near the proposed repository (Amargosa Valley, Las Vegas, and Pahrump, Nevada) during the comment periods. However, commenters throughout Nevada and nationwide were encouraged to submit comments at the public hearings and by mail, facsimile, and the Internet during the comment periods.

The requirements for public hearings associated with the Site Recommendation process can be found in Section 114(a) of the NWPA. The NWPA requires the Secretary of Energy to hold public hearings in the vicinity of the Yucca Mountain site, for the purposes of informing the residents and to receive comments regarding the possible recommendation of the site. Consistent with these requirements, DOE began a 168-day public comment period on May 4, 2001 (that ended on October 19, 2001). During this period, DOE held three public hearings (Las Vegas, Amargosa Valley, Pahrump, Nevada), and field hearing sessions (29 in all) in all counties in Nevada and Inyo County, California.

3.6 (11534)
Comment - 010133 / 0003
I compliment this country for giving the citizens an opportunity to get to the mike and talk about it. You know, in some countries they build a project and then tell the citizens why. In this country we're going to talk about the whys and then build the project. Maybe that's fair, but we got to get it done.

Response
Thank you for your comment.

3.6 (11536)
Comment - 010013 / 0002
I wonder how I got on your mailing list.

Response
DOE's mailing lists for the Yucca Mountain Project are based on past requests for information, past correspondence with the Department, or registration and participation at one of DOE's public hearings. An individual can contact the Department at the Yucca Mountain Site Characterization Office address shown on page iii of Volume I of this EIS and request that their name be removed from or added to the mailing list.

3.6 (11656)
Comment - 010245 / 0003
The comment period did not take into consideration peoples of learning dysfunctions. The DOE should make accommodations for these peoples. Holding publicized meetings to verbally distribute written information. This would be done by an unbiased outside source, not of DOE employment.

Response
The purpose of DOE public meetings is to provide a communications forum for the EIS and to answer any questions the public may have. DOE attempts to make accommodations for individuals with disabilities. Meeting facilities are selected in part on the availability of handicap friendly services, signers are often provided, and other requests will be considered on a case-by-case basis. For example, in the past DOE has provided audio tapes of public meetings. DOE often procures the services of an independent facilitator to conduct is public meetings.

3.6 (11922)
Comment - 010246 / 0015
The public process associated with this SDEIS has also been very poorly handled by DOE. On May 2nd, just two days before the SDEIS was released, I attended a meeting at DOE headquarters in Washington with officials of the DOE Office of Civilian Radioactive Waste Management. Despite being asked directly whether or not the Science and Engineering Report would be released on Friday, May 4th, the DOE officials denied any knowledge of the SER's release, which then occurred just two days later. In addition, they made no mention of the completely unexpected SDEIS, to be released just two days later. Is it any wonder that the public becomes so very confused by the DOE Yucca Mountain Project public participation process, when DOE officials fail to communicate basis information even to those members of the public most intimately following the developments?

Response
DOE apologizes for any inconvenience your experience may have caused.

3.6 (12346)
Comment - 010130 / 0004
Also the Department of Energy has a job to disseminate information to the public. If they don't have the budget for advertising, which is obvious since there's only about 200 people here tonight and I've been waiting for months for a public forum on this project.

I know that everybody in Las Vegas due to their concerns with real estate, due to concerns with the economy, due to their concerns about their children will want to know about this issue when they hear more about it.

So let's help the Department of Energy disseminate information. Please do everything you can to pass along what you've heard tonight and anything helpful to get more people involved.

Response
Thank you for your comments.

3.6 (12789)
Comment - 010331 / 0002
And because I know I've been bad-mouthing you all, all night, I do have to be the fair person that I try to be and hold up a copy. This is the size of the public hearing announcement that was in the Las Vegas RJ [Review Journal]. Thank you. Thank you. Thank you. Thank you. Thank you. Thank you. Thank you. We're used to all of this information or less being in a much smaller sized area somewhere around the obituary section.

So you're trying. I appreciate that very much. And I was going to come and rip you guys up one side and down the other because of not seeing it, until I saw this. And in all fairness, I would like to say good job, guys.

Response
Thank you for your comments.

3.6 (12826)
Comment - 010305 / 0002
I received the May 8-9 NWTRB [Nuclear Waste Technical Review Board] presentations from the Arlington, Va. Conference. Attended the (Unannounced or publicized) meeting of the NWTRB meetings June 20-21 & the peer review and NRC [Nuclear Regulatory Commission] meeting held simultaneously (also not publicized). Who is responsible for getting these invitations out? The results of these meetings is my overall evaluation and thus the title for this report.

Response
DOE cannot respond specifically about how other organizations announce or publicize their meetings. The commenter is encouraged to contact the Nuclear Waste Technical Review Board and the Nuclear Regulatory Commission with suggestions or concerns.

3.6 (13013)
Comment - 010334 / 0010
We also believe that the use of the proposed wind generation project as identified on page 3-18 [2-18 of the Supplement to the Draft EIS] under electric power section 12.3.4.4.4 [2.3.2.4.4] it identifies that the DOE is investigating another proposal for renewable energy of a wind generator project. And the tribes here have been or actually are familiar with that project and currently there's a lot of opposition to the sighting of that project. And understanding that it's not directly included in this Supplemental Draft EIS, it's indirectly related in that if there's consideration of getting power from a place that for a project that has been at this point in time not thoroughly assessed or had adequate Indian involvement. And so with that the tribes have become -- they have stated their opposition to the project until such time as the full determination can be made through systematic ethnographic interviews.

Response
Although a wind farm is not part of the Proposed Action for the Yucca Mountain Repository, DOE is preparing an EIS on a proposal to construct a wind farm to generate electric power at the Nevada Test Site. DOE expects to issue

a Draft EIS for that proposal in late 2001 or early 2002, and will consider public comments before making decisions. However, DOE is assessing potential alternative generation facilities that include 545 wind turbine generators on 3 acres of the Nevada Test Site. Chapter 8 of the EIS includes this potential action as part of the cumulative impact assessment. For more information, see the *Preapproval Draft Environmental Assessment for a Proposed Alternative Energy Generation Facility at the Nevada Site* (DIRS 154545-DOE 2001). DOE is in the process of preparing an environmental impact statement on the subject.

DOE recognizes the importance of preserving the integrity of Native American resources at any site its actions might affect. DOE would continue to consult with Native American tribes and organizations to ensure that any adverse effects would be minimized to the fullest extent possible.

3.6 (13309)
Comment - 010317 / 0005
Though I can understand the reasoning behind the S&ER [Science and Engineering Report] flexible design, which is the primary subject of the DEIS-S report, it appears to violate the President's Council on Environmental Quality (CEQ) NEPA [National Environmental Policy Act] regulations involving public involvement. The fact is that the option to operate the repository at a lower temperature than was proposed in the DEIS with numerous added expensive features, means that major changes are being proposed since the DEIS was issued. This has effectively disrupted the NEPA driven public evaluation processes. The effect of this is that the Yucca Mountain characterization science is being turned into a political tool that minimizes public input components. The DOE is effectively rushing the approval process along shortly after it came up with major design changes and while numerous scientific questions are still unanswered. On that basis alone, the approval milestone dates should be extended by at least a year or two.

Response
The action proposed in the Draft EIS and in the Supplement to the Draft EIS is the same—to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain. The Department acknowledged the evolution of the repository design by preparing the Supplement to the Draft EIS. The Department believes the actions it has taken are consistent with the Council on Environmental Quality Regulations and appropriately provides opportunities for public involvement.

With regard to unanswered scientific questions, the Department does acknowledge that it is not possible to predict with certainty what will occur hundreds or thousands of years in the future. The National Academy of Sciences, the Environmental Protection Agency, and the Nuclear Regulatory Commission also recognize the difficulty of understanding the behavior of complex systems over long time periods. In 10 CFR Part 63 the Nuclear Regulatory Commission acknowledges that "...proof that the geologic repository will conform with the objective for postclosure performance are not to be had in the ordinary sense of the word because of the uncertainties inherent in the geologic setting, biosphere and engineered barrier system. For such long-term performance, what is required is reasonable expectation." In 40 CFR Part 197, the Environmental Protection Agency establishes "reasonable expectation" as a test of compliance, with diminished "weight of evidence" with time. The Agency also recognizes the need for expert judgment in assigning scenario probabilities, selecting simulation models, and assigning parameter distributions. Consistent with the observations of the National Academy of Science, DOE has designed performance assessments on a combination of mathematical modeling, natural analogs, and the possibility of remedial action in the event of unforeseen events.

3.6 (13491)
Comment - 010288 / 0005
This Supplement is insufficient because it does not provide specific design alternatives for the Proposed Action. Instead, it describes a range of design features and operational parameters that could be combined to arrive at two alternative designs - above boiling drift wall temperature or below boiling waste container surface temperature. These identified features and parameters (Table 2-1) are said to bound the design so the range of potential impacts could be analyzed. The Supplement does not identify specific alternatives for which the impacts could be compared. There is no reason to accept this bounding approach, since the 1999 DEIS made the same claim, and the Supplement has impacts that are outside those bounds. What will happen with the Final EIS as the design continues to "evolve"? The Final EIS is supposed to reflect whatever design the Secretary describes as a comprehensive basis for Site

Recommendation. This Supplement assumes to use an area which hasn't even been investigated yet (2-20). Surface facilities as presented could not get a license to operate if this were at a reactor site.

Response
In the Draft EIS, DOE evaluated a preliminary design based on the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) that focused on the amount of spent nuclear fuel (and associated thermal output) that DOE would emplace per unit area of the repository (called areal mass loading). Areal mass loading was represented for analytical purposes in the Draft EIS by three thermal load scenarios: a high thermal load of 85 metric tons of heavy metal (MTHM) per acre, an intermediate thermal load of 60 MTHM per acre, and a low thermal load of 25 MTHM per acre. DOE selected these analytical scenarios to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts within the framework of a design whose central feature was areal mass loading.

Since it issued the Draft EIS, DOE has continued to evaluate design features and operating modes that would reduce uncertainties in or improve long-term repository performance, and improve operational safety and efficiency. The result of the design evolution process was the development of the flexible design that was evaluated in the Supplement to the Draft EIS and is evaluated in this Final EIS, and in the *Preliminary Site Suitability Evaluation* (DIRS 155734-DOE 2001). This design focuses on controlling the temperature of the waste package surfaces and the rock between the waste emplacement drifts (as opposed to areal mass loading) by varying other parameters such as the heat output per unit length of the emplacement drift and the distances between waste packages. Within this design framework of controlling the temperature of the rock, DOE selected these lower- and higher-temperature operating modes to represent the range of foreseeable design features and operating modes, and to ensure that it considered the associated range of potential environmental impacts.

Many of the issues related to how a repository would be operated would be resolved only in the context of developing the detailed design for a possible License Application, if the site was approved. For this reason, in this Final EIS design parameters were varied to create seven scenarios to illustrate lower- and higher-temperature operating modes in such a way to provide the range of potential environmental impacts. To demonstrate the nature of this range, DOE has identified primary impact indicators for each environmental resource area. These indicators are the most important contributors to determining the specific impacts for an environmental resource area (short- and long-term impacts are presented in Chapters 4 and 5, respectively).

DOE is unsure as to the uncharacterized area referred to by this comment; however, all areas associated with the flexible design have been characterized. DOE acknowledges in the EIS that it could modify or refine the flexible design further during the License Application process, if the site was approved for development.

3.7 Agency Coordination

3.7 (53)
Comment - 38 comments summarized
While some commenters noted the opportunity provided by National Environmental Policy Act to identify potential impacts of site-specific DOE actions such as the proposed Yucca Mountain Repository, others questioned DOE's commitment to the spirit and letter of the Act. They contend that DOE's coordination and interaction with local governments was inadequate—for example, that appropriate entities had not been granted "cooperating agency" status or recognized for their special status—and thus that inaccurate or incomplete information had been presented in the Draft EIS. Similarly, commenters stated that DOE was noncompliant with Council on Environmental Quality Regulations (40 CFR 1501.6), which require that Federal agencies having jurisdiction serve as "cooperating agencies," and assist the lead agency in the preparation of EIS documents. Others claimed that they had not even been informed of the availability of an EIS. It was recommended that DOE work more closely with all concerned citizens and local and tribal governments that are potentially affected by the Proposed Action to ensure that the Final EIS incorporates more-accurate local information. Several commenters expressed the need to involve the state, local, and tribal governments in the development of transportation plans, and to identify shipping modes, routes, and cask designs.

Response
Beginning with publication of the Notice of Intent to prepare an EIS on August 7, 1995, DOE has been consistent with the National Environmental Policy Act with regard to public involvement in and the preparation of an EIS on the proposed repository at Yucca Mountain. To ensure that stakeholders were made aware of the availability of the Draft EIS, DOE published a *Federal Register* notice announced the release of the Draft EIS and DOE mailed more than 2,400 copies to its stakeholders. After the release of the Draft EIS, DOE distributed more than 3,400 copies of the document. After DOE announced the initial list of hearing dates and locations, it mailed fliers to each recipient on the EIS distribution list. As DOE added more hearings, it sent three subsequent mailings to these stakeholders to notify them of the additional opportunities to provide comments. DOE made the Draft EIS, references, and other supporting materials available on the Yucca Mountain Project web site (www.ymp.gov) throughout the comment period. Section 1.5.1 of the EIS provides an account of Departmental efforts to encourage public participation as part of the EIS scoping process. This Comment-Response Document describes the public involvement process for the Draft EIS and the Supplement to the Draft EIS, and provides responses to comments DOE received during the public comment periods for those documents.

The Department has handled all requests for "cooperating agency" status in accordance with regulations of the Council on Environmental Quality. Section C.3 of the EIS discusses cooperating agency requests, and Section C.4 provides a brief history of those requests, including the DOE response and the rationale. DOE has held formal meetings twice a year with the affected units of local government and participated in various meetings with Native American tribes. These meetings have included discussions and status briefings on a range of issues of interest to concerned organizations.

As indicated in Sections C.2.1, C.2.3, and C.3 of the EIS, interaction between DOE and other Federal agencies and organizations in connection with preparation of the EIS on the Yucca Mountain project has been extensive. In accordance with regulations (40 CFR 1501.7), DOE invited local governments in Nevada to submit reference documents providing information on issues of concern (see Section C.4).

Because of these meetings and information supplied by units of local government, the State, and others during the public comment period for the Draft EIS and the Supplement to the Draft EIS, DOE has modified the EIS as appropriate. For example, DOE revised population estimates to reflect work performed by Nye County, the Nevada State Demographer and the University of Nevada, Las Vegas (see Section 3.1.7.1 of the EIS). DOE is most appreciative of local input about this significant national initiative, and will continue to engage, and work closely with, authorities to ensure that environmental information on the project is accurate and comprehensive. Consistent with current policy, DOE would consult with appropriate authorities and provide transportation mode, route, and engineering information 4 years before any materials would be shipped to the Yucca Mountain site.

3.7 (57)
Comment - 42 comments summarized
Commenters questioned both the validity and the adequacy of government-to-government consultations between DOE and Native American tribes on issues related to the proposed Yucca Mountain Repository. Prominent among their complaints were insufficient consultations with indigenous people living along the candidate transportation routes and in the vicinity of the Yucca Mountain site, the inadequacy of public hearings as a substitute for government-to-government consultation, the DOE tendency to deal with the Consolidated Group of Tribes and Organizations rather than specific tribal governments, and failure to grant "affected Indian tribe" status to tribes in the study area. Another concern involved the potential for conflict between tribal and neighboring local governments over differences in position about the proposed repository.

One commenter stated that Federal regulations nowhere define "Native American tribes" but deal with recognized "American Indian tribes." This comment relates to the DOE statement that part of the supporting information for the Site Recommendation would include views and comments of affected Native American tribes (see Section 1.4.3.3 of the EIS).

Response
Section C.2.1.4 of the EIS contains a clear expression of the DOE commitment to consultation with Native American tribal governments likely to be affected by DOE decisions, programs, and actions. That commitment is consistent with DOE Order 1230.2, "American Indian Tribal Government Policy," which recognizes the unique

relationship between the Federal Government and tribal governments. It is also consistent with a variety of laws and regulations, including the American Indian Religious Freedom Act; the Native American Graves Protection and Repatriation Act; Executive Order 13007, Sacred Sites; and the National Historic Preservation Act, all of which elaborate on that same unique relationship (see Chapter 11). DOE has consulted, and will continue to consult, with tribal governments as sovereign entities that possess authority and responsibility for Native American territory. A major objective of these consultations is to ensure that the EIS addresses the full range of Native American cultural and technical concerns related to the Proposed Action. Moreover, in these consultations DOE makes every effort to avoid compromising the interests of individual tribes and, thus, to minimize conflicts between tribes and tribal groups or other local (nontribal) government entities.

Beginning with the Native American Interaction Program in 1987, DOE has consulted with Native Americans on tribal concerns about the Yucca Mountain Project. Native Americans have expressed general concern about the impacts of the candidate rail corridors, heavy-haul truck routes, and intermodal transfer station locations. Consistent with its trust responsibilities, DOE does not intend to take action, make decisions, or implement programs without consulting affected tribal governments. In all cases, project decisions will incorporate input from affected tribes.

DOE prepared the EIS in accordance with Section 2 of the Nuclear Waste Policy Act of 1982, which defines affected Indian Tribes as "...any Indian Tribe—(A) within whose reservation boundaries a monitored retrievable storage facility, test and evaluation facility, or a repository for high-level waste or spent nuclear fuel is proposed to be located; and (B) whose federally defined possessory or usage rights to other lands outside the reservations boundaries arising out of congressionally ratified treaties may be substantially and adversely affected by locating such a facility: Provided that the Secretary of Interior finds, upon the petition of the appropriate government officials of the Tribe that such effects are both substantial and adverse to the tribe." For this EIS, "Native American" means "Indian" or "American Indian."

3.7 (58)

Comment - 14 comments summarized

Commenters asserted that DOE had not lived up to its trust and fiduciary responsibilities deriving from treaties signed between the United States and sovereign Native American nations. They claim that the United States has typically regarded the notice and consultation requirements of the tribal trust doctrine as unnecessarily burdensome to Federal initiatives affecting tribal governments and peoples. This tendency is seen as contributing to a subordination of tribal self-determination as well as tribal lands, assets, resources, and treaty rights to competing Federal interests. As evidence of that condition, commenters cited the lack of funding necessary for separate tribal assessment of EIS data and conclusions and oversight of repository activities. In addition, several commenters cited the Treaty of Ruby Valley of 1863 and various court decisions as an indication of the breadth of DOE trust responsibilities.

Response

As indicated in Section C.2.11 of the EIS, the Federal Government, through DOE as its agent, recognizes tribal governments as sovereign entities -- in effect, discrete governments -- and interacts with them accordingly on issues of mutual concern. DOE has interacted mainly with the Consolidated Group of Tribes and Organizations, which consists of representatives of the three tribes potentially most directly affected by the Proposed Action: Southern Paiute, Western Shoshone, and Owens Valley Paiute and Shoshone. As is proper for all interactions between separate governments, the representatives of this group were officially appointed by their respective tribal governments to present their tribal concerns and perspectives to DOE.

DOE also understands and takes seriously the Federal trust responsibility toward Native Americans and, thus, the fiduciary relationship that arises in connection with DOE programs or actions that could affect tribal rights and concerns. Consistent with its obligations, DOE has engaged local Native Americans in project-related activities since the initiation of its Native American Interaction Program in 1987. It also has met regularly with tribal representatives on a range of cultural and technical concerns, and has collaborated with them on specific site characterization tasks in various areas including ethnobotany, review of artifact collections, field archaeological studies, and the EIS process. DOE has encouraged the elaboration of Native American perspectives on the Proposed Action and has incorporated into the EIS the potential impacts to historic and other cultural resources identified by Native Americans as important to sustaining and preserving their cultures. DOE also has provided financial

assistance to tribes and tribal groups for various purposes. Protection of Native American interests has never been burdensome; it is in fact a benchmark of success in all Yucca Mountain Project initiatives.

DOE recognizes that Native American land claims in Nevada have been an issue of much concern among Native American tribes, especially the Western Shoshone. In addition, DOE acknowledges, for example in Section 3.1.1.4 of the EIS, Western Shoshone disagreement with the Federal Government position on this issue. It is not the role or function of this EIS to address or attempt to resolve disputes over such treaty rights.

3.7 (4744)
Comment - EIS001450 / 0005
Based on the LOC's [Local Oversight Committee's] experience in Oak Ridge with National Environmental Policy Act (NEPA) mitigation plans for local DOE environmental decisions, the CAP [Citizen's Advisory Panel] strongly recommends that local and tribal governments be consulted during mitigation planning and implementation. Although this is not required by NEPA, it would add an important element of public acceptance to the highly charged political environment surrounding this issue.

Response
As indicated in Section 4.1.13.4 of the EIS, DOE is committed to consultation with specific tribal governments and representatives of the Consolidated Group of Tribes and Organizations to address fully potential impacts of the Proposed Action on Native American cultural resources, sacred sites, and potential traditional cultural properties, and to ensure the implementation of appropriate mitigation measures.

3.7 (5976)
Comment - EIS001879 / 0048
The DOE informed Nye County, in correspondence noted in an EIS appendix, that it is "no different" than any other local government, state, or federal agency potentially affected by the transportation of waste. Nye County invites DOE to explain and clarify this conclusion, given that 14 billion curies of waste will be disposed of in Nye County.

Response
DOE cannot identify the correspondence referred to in this comment. The Department recognizes the unique status of Nye County in relation to the Yucca Mountain Project. For example, in correspondence referenced in Appendix C, DOE states that "The Department recognizes Nye County's unique status as the potential location for the nation's first high-level radioactive waste repository."

3.7 (6032)
Comment - EIS001898 / 0003
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.

Response
The Final EIS addresses the relevant technical issues DOE received in comments from the Nuclear Regulatory Commission relative to specific technical issues and the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998).

3.7 (6619)
Comment - EIS001632 / 0067
Page 9-22: This section refers to the Yucca Mountain Project Native American Interaction Program for promoting a government-to-government relationship with area tribes. Section C.2.5 also discuss DOE's interaction with tribal governments on the proposed project. Representatives from the "Consolidated Group of Tribes and Organization have met with DOE on a range of issues. The Consolidated Group includes Southern Paiute Tribes, Western Shoshone Tribes, Owens Valley Paiute and Shoshone Tribes, and the Las Vegas Indian Center. EPA commends

DOE's efforts to work with Tribes within Nevada and neighboring states, but we also encourage DOE to inform and reach out to other Tribes which may be affected by waste shipments.

Shipments of spent nuclear fuel and/or DOE high-level radioactive waste may cross Tribal lands in various parts of the country, and if DOE has not already done so, we encourage the Department to commence a government-to-government consultation process with such Federally-recognized Tribes. In order to facilitate public and agency disclosure under NEPA, the final EIS should identify those Tribes which may be affected by the transportation of waste across or close to Tribal land. This discussion should also include any potential effects on tribal resources.

Response
As noted by the EPA, DOE has consulted, and will continue to consult, with tribal governments as sovereign entities that possess authority and responsibility for Native American territory. A major objective of these consultations is to ensure that the EIS addresses the full range of Native American cultural and technical concerns related to the Proposed Action. Moreover, in these consultations DOE makes every effort to avoid compromising the interests of individual tribes and, thus, to minimize conflicts between tribes and tribal groups or other local (nontribal) government entities.

Native Americans have expressed general concern about the impacts of the candidate rail corridors, heavy-haul truck routes, and intermodal transfer station locations. Consistent with its trust responsibilities, DOE does not intend to take action, make decisions, or implement programs without consulting affected tribal governments. In all cases, project decisions will incorporate input from affected tribes.

DOE prepared the EIS in accordance with Section 2 of the Nuclear Waste Policy Act of 1982, which defines affected Indian Tribes as "...any Indian Tribe—(A) within whose reservation boundaries a monitored retrievable storage facility, test and evaluation facility, or a repository for high-level waste or spent nuclear fuel is proposed to be located; and (B) whose federally defined possessory or usage rights to other lands outside the reservations boundaries arising out of congressionally ratified treaties may be substantially and adversely affected by locating such a facility: Provided that the Secretary of Interior finds, upon the petition of the appropriate government officials of the Tribe that such effects are both substantial and adverse to the tribe." For this EIS, "Native American" means "Indian" or "American Indian."

3.7 (7165)
Comment - EIS001337 / 0056
DOE is encouraged to meet with representatives of affected units of local government to review proposed agency responses to comments to the DEIS. Such a meeting would help to ensure that local government comments are understood by the Department and if proposed responses are responsive to the comments. DOE is encouraged to provide individual responses to all comments provided so that commenters can easily ascertain what effect, if any, their comment had on the form of the FEIS.

Response
DOE has offered local governments the opportunity to submit documents providing perspectives of issues associated with the EIS and has held formal meetings twice a year with the affected units of local government. These meetings have included discussions and status briefings on a range of issues of interest to local governments. DOE has obtained additional useful information from cognizant Federal, state, and local agencies and members of the public as part of the public comment process. Feedback at this stage on analytical errors, gaps in the analysis, and alternative mitigation measures is particularly useful to the Department. DOE will continue to conduct meetings with representatives of affected units of local government to gain a better understanding of their issues. DOE determined that preparing summary comments and responses for specific issues avoids duplication of effort and repetitiveness in the comment-response process.

3.7 (7585)
Comment - EIS001969 / 0037
In summary, as DOE continues to further characterize the suitability of the proposed Yucca Mountain site in sufficiently isolating high-level radioactive waste and spent nuclear fuel, we look forward to continued coordination on protection of the Department's trust wildlife and other resources. The Service's Southern Nevada Field Office is interested and available to provide technical support in development and implementation of monitoring programs for

Yucca Mountain operations. The Service's technical support can be integrated with ongoing groundwater monitoring programs by several other agencies in the vicinity of Yucca Mountain. DOE and USGS [U.S. Geological Survey] have collaborated since 1989 on the Environmental Monitoring Program in order to better understand the hydrology of this area. Monitoring is essential in our view and will help to ensure that any changes in the environment are detected and investigated appropriately. We look forward to working with the DOE on this important national initiative.

Response
DOE acknowledges and appreciates the offer of technical support from the U.S. Department of the Interior and its individual bureaus on the Yucca Mountain Project monitoring programs. Such cooperation will inevitably increase the knowledge base on the local environment and help ensure minimal impacts of the Proposed Action on regional wildlife and other natural resources.

3.7 (8102)
Comment - EIS000406 / 0021
The following issues need to be addressed and thoroughly analyzed concerning direct impacts to Lander County in a detailed manner:

Military overflights and other Federal Agency interactions.

Response
DOE has considered activities of the Nellis Air Force Range in the analysis of cumulative impacts, Chapter 8, of the EIS. The *Renewal of the Nellis Air Force Range Land Withdrawal: Legislative Environmental Impact Statement* (DIRS 103472-USAF 1999) addresses the potential environmental consequences of the Air Force proposal to continue the Nellis Air Force Range land withdrawal for military use.

3.7 (8615)
Comment - EIS001837 / 0011
I have questioned the BLM [Bureau of Land Management] with regard to their role in the review of the subject DEIS. They claim to have no management authority over the railroad right-of-way. The DEIS needs to address this issue and to identify the roles of the agencies which manage the lands adjacent to and under the railroad tracks. These lands could be directly and indirectly impacted by the accidents, derailments, spills, crashes, mishaps, terrorists attacks, breaches in containers, etc.

Response
The Bureau of Land Management would be involved in land management activities such as approving rights-of-way through any BLM managed public lands that a rail line would traverse. The regulations governing rights-of-way on Federal lands are contained in 43 CFR Subparts 2800 to 2808. Relevant regulations are discussed in Chapter 11 of the EIS.

3.7 (9310)
Comment - EIS001888 / 0038
Such inaction by DOE during the scoping and DEIS process may be a violation of NWPA Section 117, that states that if Nevada [and AULGs--affected units of local government] or a tribe makes a written request for information, the Secretary of Energy has 30 days to answer. If not answered, the request would go to the President. If s/he does not reply in writing within 30 days, the process of site characterization must be suspended until a written answer is provided. This provision has not been implemented nor has it been followed by the Department of Energy.

Response
Section 117(a)(2) of the NWPA requires that upon written request for information concerning site characterization siting, development, design, licensing, construction, operation, regulation, or decommissioning of a repository by the Governor or legislature of such State, or by the governing body of any affected Native American tribe, the Secretary shall provide the requested information or the reasons that the requested information cannot be provided within 30 days. If the Secretary fails to respond in 30 days, the Governor or legislature, or governing body of the Native American tribe, may transmit a formal written objection to the failure to respond to the President. If the President or Secretary fails to respond to such written request in 30 days of the receipt by the President, the

Secretary is required to suspend all activities in the State and not renew the activities until the written response to the written request has been received.

The provision does not extend to information requests from affected units of local government. Further, it requires a written objection to the failure of the Secretary to respond to the President. No such written objection has been made to the President by the Governor or the Legislature of Nevada. There are no affected Native American tribes within the meaning of the NWPA [see Section 2.(2)].

The work suspension provision of the NWPA referenced in the comment has not been implemented because the conditions that would have triggered it have not been met.

3.7 (9940)
Comment - EIS001888 / 0468
[Clark County summary of comments it has received from the public.]

The HLW [high-level radioactive waste program] program may cause political conflict between various local government and economic development entities.

Response
The EIS analysis indicated little or no socioeconomic impact in the region of influence for the Proposed Action. It focused on published reports of socioeconomic baseline information, including characterizations of existing community environments, assessments of economic development, and baseline economic and demographic trends. In relation to this comment, the analysis found nothing that would indicate potential conflicts between local governments and economic development organizations.

3.7 (10089)
Comment - EIS001877 / 0014
The Governors strongly encourage the U.S. Department of Energy to work cooperatively with the states in implementing this policy [permanent, safe, geologic disposal]; to ensure the safe storage, transportation and disposal of spent nuclear fuel and high-level radioactive waste; and to comply with agreements which have been negotiated and entered into by a state's governor regarding the management, transportation and storage of spent nuclear fuel and high-level radioactive waste. Moreover, the federal government should not site such waste in a state for interim storage without written agreement from the affected states' governors.

Response
In carrying out its responsibilities under the NWPA, DOE would continue to comply with its terms, including requirements for consultation and cooperation with the concerned state governors and legislatures on implementation of the proposed Yucca Mountain Repository, and with all pertinent agreements thus far concluded with those governors and legislatures. Consistent with Section 117(a)(1) of the Act, such cooperation would extend to all arrangements for interim storage of spent nuclear fuel and high-level radioactive waste.

DOE does not believe that the siting limitations for interim storage facilities contained in the NWPA constrain the operational flexibility of the proposed repository or, ultimately, the long-term performance of the repository. Therefore, DOE believes that the surface aging facility option constitutes a potential operational element of the proposed repository.

3.7 (11435)
Comment - EIS000409 / 0014
DOT's [U.S. Department of Transportation] accident rate is wretched. Are their any coordinated plans from the DOE, NRC [Nuclear Regulatory Commission], DOT and the other agencies that are not dependent on some M & O [Management and Operating Contractor] doing the homework?

Response
If the Yucca Mountain site is approved, DOE would coordinate the development and preparation of its transportation plans including emergency response and preparedness with affected states, Indian tribes and appropriate Federal agencies (for example, the U.S. Department of Transportation and Nuclear Regulatory

Commission). Contracted services could be used in the development of such plans. At present, DOE anticipates that such planning would commence 4 years before the first shipments of spent nuclear fuel and high-level radioactive waste. Appendix M provides a description of transportation planning.

3.7 (11485)
Comment - EIS002253 / 0001
By the way, it was 1991 when I knew that these casks were going to be coming through this area. So it hasn't been hidden from anybody. I was never kicked out of a meeting. I never yelled at anybody. I have seen the casks. I [have] seen the films. I have never been prevented from seeing anything that I wanted about Yucca Mountain.

Response
Thank you for your comment.

3.7 (11486)
Comment - EIS002253 / 0002
Nye County has the unique position of having an oversight office. And the oversight office could go to the DOE and say: We don't believe what you are saying is scientifically valid. And we did that.

And they were very respectful of our wishes, and we showed them, and we came up with new drilling methods for Yucca Mountain. Now, they could have completely ignored us; they could have even said you can't even have oversight. If everything we have heard in this room by certain people is true, then that never would have occurred. I believe the DOE is on the right track. I don't swallow everything that they are saying. I don't think San Bernardino and California should swallow everything that they are saying.

I want to thank the DOE for all the cooperation I have ever had with them. Just keep going with Yucca Mountain; more cooperation with San Bernardino County. We should never have to hear San Bernardino County saying I didn't know about this. If they didn't know about it, it was because they ignored, because I know it was there ten years ago, because I was there.

Response
Thank you for your comment. Close cooperation with local jurisdictions is fundamental to DOE policy for the successful development of the agency's environmental impact analyses.

3.8 Regions of Influence

3.8 (65)
Comment - 19 comments summarized
Commenters said that the DOE-defined regions of influence where impacts could be expected from the Proposed Action were too small, not justified, and represent the viewpoint of a single Federal agency. DOE thereby avoided considering indirect and cumulative impacts that would occur outside these narrowly defined regions of influence. Additional information, particularly data and analyses from Nye County, should have been incorporated into the impact analyses. The end result, in the view of these commenters, is that DOE did not realistically describe the affected environment, and underestimated impacts.

With regard to the repository, commenters said that the analysis of land-use impacts did not consider impacts to non-Federal lands and to non-Federal entities outside the withdrawal area (such as the Town of Amargosa Valley), and that growth trends in Nye County were not accurately portrayed in the Draft EIS. Commenters also said that impacts to water resources should include the entire region of groundwater flow in Nevada and California, and that air-quality and radiological impacts should encompass a 160-kilometer (100-mile) radius [rather than a 80-kilometer (50-mile) radius) and should include Las Vegas, which is downwind of Yucca Mountain.

Similarly, commenters said that the region of influence for waste transport in Nevada and throughout the Nation was too narrowly defined. For example, the analysis of socioeconomic impacts should include the entire State of Nevada (for example, impacts to revenue base, state agencies, and major Nevada industries) and counties through which waste could be transported (particularly Elko County). Impacts to ranches and agricultural operations that be

divided by the rail line should be evaluated. Indirect impacts should be examined from waste transfer and transport in Nevada to biological resources, air quality, health and safety, cultural resources and religious sites, and Native American communities. Finally, impacts to all communities in all states along the various waste-transport corridors should be evaluated.

One commenter stated that the region of influence for the No-Action Alternative was grossly overestimated.

Response

Section 3.1 of the EIS defines the regions of influence associated with the proposed repository for the 13 environmental resource areas, such as land use, groundwater, and socioeconomics, for which impacts were described. DOE defined these regions in consideration of the sliding scale approach that recognizes that agency proposals can be characterized as falling somewhere on a continuum with respect to the significance of environmental impacts. Thus, elements of the Proposed Action with a greater potential for significant environmental impact require more analysis than those elements that are likely to generate small impacts. For this reason, DOE defined regions of influence based on geographic areas in which direct and indirect impacts could reasonably be expected to occur.

For example, for the repository-related impact analysis, the region of influence for land use includes all the land that DOE would have to control permanently to operate the repository. The Draft EIS did not identify any land-use impacts outside that area; private land would not be purchased, and access to and use of other Federal and state land outside the withdrawal area would not be restricted or otherwise modified in any way. The region of influence for potential groundwater impacts, on the other hand, extends far beyond the boundary of the withdrawal area because any long-term releases from the repository could affect aquifers in these more distant areas. Similarly, the region of influence for socioeconomics encompass the economies and people of Nye, Lincoln, and Clark Counties where the vast majority of the workforce would be expected to reside. Thus, these would be the counties, if any, that would experience the most socioeconomic impacts. With regard to the region of influence for potential impacts to air quality and potential exposure to radiation, no reasonable impact scenarios were developed to justify expanding the regions of influence beyond those defined in the Draft EIS. DOE believes the regions of influence defined in the Draft EIS are reasonable.

Regarding cumulative impacts, consistent with Council on Environmental Quality and DOE regulations, areas of past, present, and reasonably foreseeable future actions are identified that, together with the Proposed Action, could result in cumulative environmental impacts in the same geographic region or at the same time. So, for example, the environmental impacts of actions at the Nevada Test Site, the Beatty waste disposal area, and gold mining were considered in conjunction with the Proposed Action in determining cumulative impacts. In other words, the regions of influence for cumulative impacts extend beyond the regions of influence defined in Chapter 3 for the repository.

The beginning of Section 6.3 defines the regions of influence for environmental resource areas for which impacts of waste transport were described. DOE defined these regions based on where impacts could reasonably be expected to occur. With regard to socioeconomics, for example, impact analyses considered state expenditures, and counties other than Clark, Lincoln, and Nye were considered collectively. No impacts were identified to any of Nevada's major industries. The region of influence for land use and ownership considered not only direct impacts of land disturbance, but also potential changes to land ownership and use from waste transport in Nevada. Biological and cultural resources considered not only direct impacts from habitat disturbance, but also possible impacts to such things as regional game migration. Because impacts to resources such as air and water quality, health and safety, and cultural resources are not expected to be large from construction and operation of waste transportation facilities in Nevada, the regions of influence for these resources are correspondingly small.

The region of influence for the No-Action Alternative (Chapter 7) includes areas where reasonably expected impacts in the vicinity of Yucca Mountain would occur if a repository was constructed at Yucca Mountain, and impacts associated with leaving the wastes at their current storage sites for 10,000 years would occur. If the repository was not constructed, DOE believes that there would be reasonably predictable impacts in the Yucca Mountain region and at the existing waste sites throughout the country, as described in Chapter 7. DOE does not believe that this region of influence was overestimated.

With regard to the use of county-supplied data and analyses, DOE has modified sections in Chapters 3, 4, and 8 to reflect this information. For example, Section 3.1.1 has been modified to include the unincorporated Town of Amargosa Valley in the region of influence for land use. Sections 3.1.7 and 4.1.6 have been modified to reflect county-supplied population information. DOE has also modified Section 8.2 accordingly.

3.8 (13530)
Comment - 010392 / 0013
DOE must carefully reconsider the regions of influence and draw them broadly, to reflect the unique nature and vast risks of the proposed action. This should have been addressed in the Supplement.

Response
The regions of influence for the actions presented in the Supplement to the Draft EIS are the same as those described in the Draft EIS. For more information, see 3.8 (65) above.

3.9 Perceived Risk

3.9 (109)
Comment - 219 comments summarized
Many commenters, including the State of Nevada and other affected units of local government, stated that the Final EIS should analyze the impacts of stigma or risk perception and "special effects" on the State of Nevada. Commenters stated that people would avoid places and products associated with nuclear risk or stigma, resulting in decreased property values; less business expansion or new development; location of businesses away from the area; loss of tax revenues; reduced income for existing businesses; loss of new investments; inability to ensure adequate cleanup costs; higher insurance rates; decreased crop, product, and service prices, including effects on the marketability of local specialty agricultural products; decreased business diversification; inability to retain existing businesses; unused infrastructure or infrastructure of questionable value; migration of people from an area; increased population and activity in one county causing a subsequent decrease in neighboring counties; environmental justice impacts due to decreased property values; and an exodus of residents from a contaminated area. Commenters also stated that the perceived risk of serious harm from the proposed repository or transportation activities related to the proposed repository would affect people's health care systems, quality of life, and spiritual well-being.
In particular, commenters stated that the existence of a nuclear waste repository at Yucca Mountain, 145 kilometers (90 miles) from Las Vegas, would have a significantly adverse impact on the State's large tourism and gaming industry. Because much of the State's economy is based on the tourist and gaming industry, adverse impacts to the industry could have severe socioeconomic effects throughout the State.

Commenters cited studies, some of which were commissioned by the State of Nevada and prepared by recognized experts in their fields, as evidence of the negative effects of perceived risk. The commenters stated that these reports, and the 1986 DOE Environmental Assessment for site characterization activities at the Yucca Mountain site acknowledge the potential for impacts to Nevada's tourism-based economy and the need for additional research. However, commenters stated that DOE performed no subsequent work and did not analyze these potential impacts in the EIS.

Some commenters stated that, although DOE believes that it is not legally required to analyze perceived risk in a National Environmental Policy Act document, nevertheless DOE has an ethical responsibility to address risk perception, based on the methods and findings in this area that are well established in the peer-reviewed social science literature. According to some commenters, the Draft EIS did not explain why DOE did not perform a perceived risk analysis or why it discusses only socioeconomic impacts in terms of positive impacts such as jobs. Commenters stated that the Final EIS should acknowledge the possibility that stigma effects could occur and explain how DOE decided whether to include an analysis of such effects in the Final EIS.

Commenters also asked that the Final EIS address the psychological and social impacts to community residents, the direct effects on local communities, and the impact of having more strangers present. Further, they stated that the Final EIS should address mitigation measures (compensation for loss of tourism and business and decreasing property values, creation of insurance programs, compensation distribution plans, purchase of private property, business and personal relocation) to offset perceived risks, including the costs of government programs, the process

for development of the plans, government liability, the type of Federal facility or program to protect or provide compensation, development of a tourism marketing plan, communication and other response strategies to mitigate behavioral consequences of negative perceptions, and monitoring impacts to land values and development. Some commenters requested compensation for damages, but also noted compensation might not work. Others cited the 'brownfields" programs of the Environmental Protection Agency and other states that counteract perceived risks of hazardous sites, and stated DOE should look at risk perception work for hazardous wastes. One commenter noted, "[o]nly by undertaking the full range of public responses to high-level radioactive waste can you evaluate the potential socioeconomic impacts from a repository."

Response

During scoping for the EIS, DOE received comments on the need to address perception-based and stigma-related impacts. DOE considered these issues, guided by the results of its own research and that of the State of Nevada, and by relevant conclusions reached by reviews of this subject by the Nuclear Waste Technical Review Board (an independent board established by the Nuclear Waste Policy Act of 1982) in 1995 and other researchers through about 1997. For the Draft EIS, DOE concluded that analyses of perception-based and stigma-related impacts would, at best, be uncertain or speculative and not meaningful to any decisionmaker.

However, in light of the comments received on the Draft EIS concerning this subject, DOE reexamined the relevant literature and the state of research into perception-based impacts and stigma-related effects. DOE was most interested in those scientific and social studies that directly relate to either the Yucca Mountain Project or other DOE actions such as the transportation of foreign research reactor fuel through the State of South Carolina. A number of these studies have been cited in the comments received on both the Draft EIS and the Supplement to the Draft EIS. For this Final EIS, DOE has also reevaluated the independent reviews by the Nuclear Waste Technical Review Board and the State of Nevada, among others, and identified and assessed relevant studies published since DOE published the Draft EIS. Section 2.5.4 of the Final EIS summarizes the Department's reexamination of perceived risk and the stigmatization of communities. Appendix N contains the complete text of the report generated from DOE's reexamination: "Are Fear and Stigmatization Likely, and How Do They Matter: Lessons from Research on the Likelihood of Adverse Socioeconomic Impacts from Public Perceptions of the Proposed Yucca Mountain Repository."

DOE assessed qualitatively the likelihood that perceptions of danger and of stigma, regardless of whether they are based on accurate scientific assessments, might result in adverse socioeconomic impacts on Nevada, particularly the Las Vegas Area. DOE believes the research shows that there is a consensus among social scientists that a quantitative assessment is impossible at this time and probably unlikely even after extensive additional research. The implication is not that impacts would probably be large, but simply difficult to quantify. Social scientists do not know enough to identify what would be the level of concern during the operation of a repository. Similarly, the specific links between attitudes and individual decisions that would have socioeconomic impacts cannot be defined. Based on what is known from surveys and analogues, what outcomes seem most likely qualitatively is summarized below:

Effects from Perceptions of the Proposed Repository:

- Although, when asked, many people report that they think of nuclear things as dangerous, these attitudes are usually not salient in people's lives and therefore do not influence personal decisions.

- Yucca Mountain is not in Las Vegas, but 145 kilometers (90 miles) away in a remote area.

- Studies show few indications of adverse socioeconomic effects (and many positive socioeconomic effects) in places that safely store or dispose of radioactive waste.

- People who choose to vacation in Las Vegas are less likely to be concerned about the repository than people who choose to vacation elsewhere. Opening a repository, if there is any impact, would likely reinforce the preferences of people who do not intend to visit Las Vegas with or without an operating repository 145 kilometers (90 miles) away. People who like to visit Las Vegas would likely pay little attention.

- If the repository would be such a powerful disincentive to investors, businesses considering relocating to southern Nevada and retirees and others considering relocating to the area, some effects of those perceptions should already be apparent. It is widely known that Congress has directed DOE to characterize Yucca Mountain for consideration for a repository and that key program documents suggest that the site might be acceptable. If the proposed repository were such a powerful disincentive, prudent investors, facing a possible opening of the repository, would not be investing in southern Nevada. Similarly, there would be a decline in population in southern Nevada as businesses and people decided to settle elsewhere in anticipation of future risks and stigma. There is no evidence of this behavior.

The assessment that substantial adverse socioeconomic impacts from perceptions of the repository are quite unlikely assumes that operations at the facility will not have a major accident or periodic smaller accidents. These events would most likely raise fears about the repository, make the repository salient to people in southern Nevada, result in some social amplification of risk, and perhaps even stigmatize the region. Adverse socioeconomic effects from perceptions of an accident-prone repository might be substantial even with the repository 145 kilometers (90 miles) from Las Vegas. Without accidents, these effects are quite unlikely.

Effects from Transportation of Spent Nuclear Fuel and High-Level Radioactive Waste:

Absent accidents, two studies report that, at least a temporary decline in residential property values of approximately 3 percent can be expected in transportation corridors in urban areas. Data from other transportation experiences (such as transuranic waste to the Waste Isolation Pilot Plant), however, suggest that impacts on property values might be negligible or nonexistent. More research on whether property values have fluctuated with the transportation of radioactive materials would be more conclusive. The research, however, would not allow analysts to know with certainty whether there would be any impacts from perceptions of shipments of spent nuclear fuel and high-level radioactive waste to a Yucca Mountain Repository, or how long such impacts would persist.

While stigmatization and resulting adverse impacts can be envisioned under some scenarios, it is not inevitable or measurable, and any such stigmatization would likely be an aftereffect of unpredictable future events, such as a series of accidents. As a consequence, DOE did address but did not attempt to quantify potential impacts from risk perceptions or stigma in this Final EIS. DOE also did not address potential change in property values near waste-transport routes because of the reasons summarized above and discussed in Appendix N of the EIS. At present, definitive information is not available on specific tracts of land that could be required for a specific transportation mode or route. For land that would be required or materially affected, however, the Department would fairly compensate landowners pursuant to Federal procedures. Should DOE be required to exercise its right of eminent domain, it would do so pursuant to applicable laws and regulations.

With regard to mitigation, Section 116(c) of the NWPA, states that "the Secretary shall provide financial and technical assistance to [an affected unit of local government or the State of Nevada]...to mitigate the impact on such [an affected unit of local government or the State of Nevada] of the development of [a] repository and the characterization of [the Yucca Mountain] site." Such assistance can be given to mitigate likely "economic, social, public health and safety, and environmental impacts." Within that broad framework, neither Section 116 nor any other provision of the NWPA limits the impacts that are subject to assistance under Section 116 to the environmental impacts considered in this EIS.

As noted above, the impact assistance review process under Section 116(c) of the Act and under the EIS process are distinct from one another, and the implementation of one would not depend on the implementation of the other. Thus, the provision of assistance under Section 116 would not necessarily be limited either by the impacts identified in this EIS or by its findings on such impacts. Any decision to provide assistance under Section 116 would be based on an evaluation of requests for assistance submitted by an affected unit of local government or the State of Nevada pursuant to Section 116 that documented likely economic, social, public health and safety, and environmental impacts. If the proposed repository was to become operational, DOE would enter into discussions with potentially affected units of local government and consider appropriate support and mitigation measures. After a decision on the proposed repository and transportation modes and routes, local jurisdictions would be better able to identify the likely economic, social, public health and safety, and environmental impacts that would be the basis for a request for economic assistance.

Further, consistent with Section 180(c) of the NWPA, DOE would provide technical assistance and funds to states for training public safety officials of appropriate units of local government and Native American tribes through whose jurisdictions DOE would transport spent nuclear fuel and high-level radioactive waste. Training would cover procedures required for safe routine transportation of these materials, as well as procedures for dealing with emergency response situations. In addition, Sections 116(a) and 117(c)(5) of the NWPA set forth assistance guidelines covering a number of issues, including emergency preparedness and response, state liability arising from accidents, and necessary road upgrading.

3.9 (2495)
Comment - EIS001062 / 0001
In the time we have been living in Crescent Valley, we have learned to love this town for it's personal interests. We have become parents and made ourselves a permanent home here. Due to how old our trailer is, we cannot move it out of the county. However, if trucks come through here hauling nuclear waste we will feel forced to leave our quiet town for the safety and wellbeing of our child and family. I will feel less threatened personally by a railroad due to traffic accident possibilities. Our quiet, friendly and personal little town will no longer exist. Our school, church, grocery store will suddenly be filled with strangers. This poses another threat all by itself in my eyes. I trust my neighbors. I've made Crescent Valley my home for reasons of beauty, trusting friends and neighbors, and the simple little things like being free to let our children out in our yards without fear. Please, for the sake of our families, take the damages into strong consideration. We love our small town and don't want to lose it. Thank you.

Response
A relatively short section of the Carlin Corridor would pass through Crescent Valley. Definitive information is not available on specific tracts of land that could be affected. However, DOE estimates that the peak employment associated with the entire Carlin Corridor would total about 170 individuals.

3.9 (5577)
Comment - EIS001887 / 0204
Page 3-134; Section 3.2.2.2.6 - Socioeconomics

The Draft EIS states: "Section 3.1.7 contains socioeconomic background information on the three counties (Clark, Lincoln, and Nye) most involved in the heavy-haul routes." The section referenced contains very little information on the expected future population of these areas during the period of operations. To accurately predict the impact of heavy-haul operations, future population projections are necessary. These projections are required in order to forecast traffic volumes on the affected highways. Without these projections, the impact of operations on the level-of-service for the affected highways cannot be assessed. In the Las Vegas urban area, the area where growth is expected to occur given the proposed construction of urban area bypasses should also be projected. Highway improvements are known to affect growth patterns in urban areas. Without projecting the change in growth patterns associated with the urban bypasses, the projected traffic volumes on these roads cannot be predicted.

The Draft EIS inaccurately concludes that "[t]he candidate heavy-haul intermodal transfer station sites and routes would not appreciably affect counties other than those in which the facilities were located." This statement ignores the fact that heavy-haul transportation and the location of an intermodal transfer facility in Nevada would be primary impacts on public perceptions of risk and the stigmatizing effects of the Proposed Action. Impacts from heavy-haul transport and intermodal facility activities would be statewide. State-level impacts would accrue to State agencies required to respond to, or otherwise deal with, the shipments of waste and the operations of an intermodal transfer facility. The State's principal economic sector could also be affected, with resulting impacts to State revenues and, due to Nevada's unique taxation/revenue distribution system, to all seventeen of Nevada's counties.

See comments relative to Section 4 on the treatment of socioeconomic conditions and impacts in the Draft EIS.

Response
DOE has updated its population estimates in the region of influence to reflect the most recent state and local information, as well as Bureau of the Census 2000 population summary data for Nevada. The updated population baselines were then used to estimate populations for Clark, Nye, and Lincoln Counties and the "Rest of Nevada" through 2035. With regard to the stigmatizing effects of the Proposed Action, DOE recognizes that while in some instances risk perceptions could result in adverse impacts to portions of a local economy, there are no methods

whereby such impacts can be predicted with a reasonable degree of certainty. While stigmatization and resulting adverse impacts can be envisioned under some scenarios, it is not inevitable or measurable, and any such stigmatization would likely be an aftereffect of unpredictable future events, such as a serious accident. As a consequence, DOE addressed but did not attempt to quantify potential impacts from risk perceptions or stigma in this Final EIS. (See Section 2.5.4 and Appendix N.)

3.9 (9957)
Comment - EIS001888 / 0482
[Clark County summary of comments it has received from the public.]

Commenters indicated that the EIS analysis of potential socioeconomic impacts should examine impacts during construction (including necessary nationwide transportation infrastructure improvements), operation, closure, and post-closure of the repository (one commenter requested the analysis also be applied to impacts for recent layoffs from the Yucca Mountain Site Characterization Project). They recommended that the analysis include impacts under routine operations and following accidents. Analyses should include potential impacts to: employment, wages, income, population growth, procurement, limited infrastructures (including transportation and traffic), tourism, population growth (negative impacts not related to project employment), schools, business, insurance recovery, property values, local government finances and fiscal conditions, health care costs, loss of economic potential associated with the withdrawal of land for the repository, transportation corridors and any buffer zones, and local politics and intergovernmental relations. One commenter suggested the EIS should assess the technological assets the project might bring to Nevada including projections of supporting science and techno/scientific spin-off development. Others thought the EIS should consider the social impact from the repository project, which may increase public dissatisfaction with their government or alter community cooperation and/or conflict. One commenter suggested the EIS, in evaluating these impacts, should consider multiple construction scenarios, for example construction by a single crew or multiple crews.

Response
DOE estimated the socioeconomic impacts associated with the repository and associated transportation scenarios. In preparing these estimates DOE developed a list of assumptions to determine the estimated economic and demographic change in Nevada by construction and operation of the proposed repository. The REMI computer model used in the generation of these estimates allocated the impacts for four regions. Three of the regions are Clark, Nye, and Lincoln Counties. The fourth region is the Rest of Nevada, an aggregation of the other 14 counties in Nevada. Projections are made through 2035. The estimated costs of the northern portion of the Las Vegas Beltway are included in the estimates.

Although a relatively short section of the Carlin Corridor passes through Crescent Valley, definitive information is not available on specific tracts of land that could be impacted. DOE anticipates that the detailed impacts on grazing or other agricultural lands would be addressed as part of additional National Environmental Policy Act reviews for specific transportation alignment, to the extent necessary, DOE would attempt to reduce impacts by providing fencing, livestock crossings, and access to water supplies.

3.9 (11091)
Comment - EIS001515 / 0003
Competing in the global market place (in Ohio, at least) appears to require retraining of the workforce (through educational institutions) to meet foreign companies needs. One wonders, if such rhetoric is, in fact, government-speak for worker willingness to accept 1950s health and occupational exposure standards in exchange/trade for jobs and economic growth in high-unemployment/depressed regions of Ohio. See "Better Workers Needed to Capitalize on Trade," THE CINCINNATI ENQUIRER, Feb. 9, 2000, pg A-12. Do Japanese corporations consider "whistleblower" employee lawsuits poor etiquette and/or indication of unwillingness to work? It seems highly coincidental to me that days after announced lay off of 850 plant workers by United States Enrichment Corporation at its Portsmouth and Paducah uranium enrichment processing plants, Ohio's workers are being informed that they must adjust their thinking in order for Ohio to fit Japanese corporate workforce needs, and Ohio's schools are considered an appropriate forum to get the re-training job done!

DOE investigation at the Paducah plant site is, in my view, not the problem. Delay or investigation has left workers, in rural company towns at both Paducah and Piketon vulnerable to "transition" back to context conditions of the

1950s. DOE must consider the economic/social impacts upon residents and communities in close proximity to the Yucca Mountain site in decision-making. Appalachian regions in Ohio and Kentucky are, I believe, being nudged and conditioned to transition back to "context" of the 1950s, with "company towns and regions" run by private corporations, foreign and domestic.

Response
DOE cannot provide insight into the various retraining programs in the State of Ohio. However, with regard to the consideration of "economical/social" impacts on residents and communities in proximity to the Yucca Mountain site, the Department estimated the incremental socioeconomic impacts at the county level for Clark, Lincoln, and Nye Counties, and the rest of the 14 Nevada counties aggregately for the repository and the transportation corridors and intermodal transfer facilities. The Department used the REMI EDFS-53 Forecasting and Simulation Model. The model segments age, ethnicity, and gender based on 600 cohorts to predict population. The model also calculates births, deaths, and aging. Employment and fiscal change to the economy are derived from inter-industry relationships, labor markets, and national and worldwide economic variables.

3.9 (11179)
Comment - EIS000480 / 0009
You will ruin a beautiful state and more to the point you will ruin Crescent Valley, my home, CARICO LAKE RANCH and our range where we run cattle. We make our living on cattle and have since 1871! We don't have any other income and you would make our ranch worthless!

Response
A relatively short section of the Carlin Corridor passes through Crescent Valley. Definitive information is not available on specific tracts of land that could be impacted. DOE anticipates that the detailed impacts on grazing or other agricultural lands would be addressed as part of additional National Environmental Policy Act reviews for specific transportation alignments. To the extent necessary, DOE would attempt to reduce impacts by providing fencing, livestock crossings, and access to water supplies.

3.9 (11433)
Comment - EIS001888 / 0473
The DEIS ignores the rapid and substantial changes in Clark County's land use. The DEIS describes a program that potentially has enormous impacts on the economy of Clark County. In terms of likely land uses, the DEIS ignores substantial projects that should have been addressed. The City of Las Vegas' plans for growth hinge on development at the interchange of US 95 and the northern beltway. What will be the impact of heavy haul transportation being driven through the heart of the Las Vegas Town center project? Summerlin is the largest planned community in the world. Only one third of it has been constructed. Will land values remain high if heavy haul transportation takes place through this important retirement community? The intermodal sites proposed for Jean and Sloan are in full view of the Hotels located at Jean. The proposed intermodal sites near Apex may forestall any other land uses in the area.

Despite the intense regional growth, the DOE has failed to coordinate with or receive input from Clark County or any of its jurisdictions. Other major concerns that should have received attention in the DEIS are impacts on North Las Vegas due to the acquisition of 7,500 acres by the City of North Las Vegas and the rapid growth of Mesquite, Nevada.

Response
DOE agrees that transportation corridors can influence or potentially conflict with plans within the region. Chapter 8of the EIS acknowledge some of the present and reasonably foreseeable actions planned for the region. At present, definitive information is not available on specific corridor alignments or tracts of land that could be directly affected. DOE would provide detailed information on specific impacts as part of National Environmental Policy Act reviews on any future alignment proposals.

With regard to potential lost jobs, DOE estimated that about 4,700 jobs could be lost under the No-Action Alternative within the region of influence. Approximately 3,200 project-related jobs would be lost after a 1-year decommissioning and reclamation period. Section 7.1.6 of the EIS contains additional information.

From the national perspective, DOE did not analyze the potential socioeconomic impacts to transportation because all spent nuclear fuel and high-level radioactive waste shipments would be over existing highways and railroads. The shipments would represent a very small fraction of total national highway and railroad traffic (0.008 percent of truck kilometers and 0.007 percent of railroad kilometers).

With regard to the stigmatizing effects of the Proposed Action, DOE recognizes that while in some instances risk perceptions could result in adverse impacts to portions of a local economy, there are no methods whereby such impacts can be predicted with a reasonable degree of certainty. While stigmatization and resulting adverse impacts can be envisioned under some scenarios, it is not inevitable or measurable, and any such stigmatization would likely be an aftereffect of unpredictable future events, such as a serious accident. As a consequence, DOE did not attempt to quantify potential impacts from risk perceptions or stigma in the EIS. (See Appendix N.)

3.10 Miscellaneous National Environmental Policy Act Comments

3.10 (4)
Comment - 11 comments summarized
Some individuals, tribal representatives, and state clearing houses indicated that they had reviewed the Draft EIS and had no comments. Commenters noted that because of the location of Yucca Mountain in relation to their region, or because the state agencies reviewing the Draft EIS do not produce or regulate nuclear waste, or because the Proposed Action is consistent with their own plans and programs, they had no substantive comments or concerns.

Response
DOE appreciates these replies.

3.10 (610)
Comment - 010066 / 0001
Thank you for the opportunity to review the above-referenced supplement to the Draft Environmental Impact Statement (EIS) for the proposed radioactive waste repository at Yucca Mountain. At this time, this Office does not have the technical expertise to evaluate the nature of the environmental impacts that may be expected from the modified design compared to the Draft EIS.

Response
Thank you for your reply.

3.10 (2041)
Comment - EIS000570 / 0001
What I'd like to address is the illusion of democracy I see before me, the illusion that we're following the NEPA process. What I would just like to speak about right now is the smoke screen, the smoke screen that this is a democratic process.

Response
DOE believes that the EIS is consistent with the National Environmental Policy Act and the NWPA, and presents a balanced informative analysis of the Proposed Action, the hazards involved in the proposal, and efforts to minimize the potential risk from those hazards. In addition to presenting the results of the DOE analysis of the proposed repository, the EIS describes opposing views on analytical issues, uncertainties that might exist in some methodologies and results, and areas in which further studies are needed or are being conducted. As to the democratic nature of the process, Section 2.6 of the EIS indicates that the Secretary of Energy would consider not only potential environmental impacts and public comments on the EIS, but also other factors in the determination of whether to recommend the Yucca Mountain site to the President.

3.10 (6074)
Comment - EIS001580 / 0011
While you understand there is an extremely adversarial relationship between the State of Nevada and the Department of Energy over this project, there are many fine decent human beings who are very hard working and conscientious employees of the Department of Energy, as there are working for the State of Nevada. And I think it

is important that we all see that this process is part of a process, a larger process created under the National Environmental Policy Act that is to try and guide our country in making better technical decisions, evaluating the impacts of large facilities, and that it also provides an important forum for citizens like yourselves, effective stakeholders who may work for the utilities and transportation companies.

Response
Thank you for your comment.

3.10 (6503)
Comment - EIS001241 / 0011
The DEIS and EIS process, as well as the resultant recommendations and decisions are obligated by the NEPA to protect, restore, and enhance the environment, including the human environment.

1. How, in what specific ways, would the storage of nuclear waste at Yucca Mountain repository protect, restore, or enhance the site itself? The area immediately surrounding the site? The region of the site?

2. How, in what specific ways, would the transporting of nuclear waste enhance the environment (natural and human) along the transportation routes themselves, especially along those routes that at this time have no rail lines whatsoever (such as the proposed Carlin route through Crescent Valley)?

3. How, in what specific ways, would the process of construction of a rail line enhance the natural environment and the human environment of Crescent Valley and of my home (which is 1/10 to 7/10 miles from the track, depending on the route chosen)?

4. How, in what specific ways, would a completed rail track running through the valley of Crescent Valley enhance the natural environment? The human environment.

Response
When Congress proposed a geologic repository in the Nuclear Waste Policy Act of 1982, it clearly intended to address nationwide environmental issues associated with spent nuclear fuel and high-level radioactive waste. These long-lived highly radioactive materials are currently stored at 77 facilities around the country.

Congress directed DOE to evaluate the suitability of the Yucca Mountain site for a repository and, if appropriate, to prepare both a recommendation to the President on the site and an EIS to accompany the site recommendation. DOE's responsibility is to study and report on the potential consequences for areas that could be affected by the proposal (including areas mentioned in the comment) so that the public will be informed and decisionmakers would have this environmental information available when making determinations on the proposal.

3.10 (12699)
Comment - EIS001955 / 0001
New York offers no specific comments regarding the technical suitability of the proposed Yucca Mountain site or DOE's proposed facility design. The site and design must meet all applicable health and safety and environmental criteria established by the U.S. Nuclear Regulatory Commission and the U.S. Environmental Protection Agency. We note also the DOE has concluded that the analyses in the EIS did not identify any potential environmental impacts that would be a basis for not proceeding with the proposed repository at Yucca Mountain.

Response
DOE acknowledges the comment and that, to be approved, the site and design of a geologic repository at Yucca Mountain must meet all applicable health and safety and environmental criteria established by the Nuclear Regulatory Commission and the Environmental Protection Agency.

3.10 (12803)
Comment - 010378 / 0001
NOW THEREFORE BE IT RESOLVED, that the City of Ely does hereby concur and adopt as its own the comments to the Supplemental Draft Environmental Impact Statement for the Yucca Mountain Project submitted by White Pine County in a letter dated June 13, 2001 to the Department of Energy.

Response
Thank you for your comments. See DOE's responses to White Pine County's comments on the Supplement to the Draft EIS.

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4

Other Legal, Regulatory, and Policy Issues

4. OTHER LEGAL, REGULATORY, AND POLICY ISSUES

4.1 Legal Issues

4.1 (82)
Comment - 21 comments summarized
Commenters asked that information be provided in the Final EIS regarding indemnification under the Price-Anderson Act. Other commenters asked for general information regarding indemnification (that is, compensation for damage, loss, or injury suffered) for accidents that could occur, now and in the distant future, as a result of operations at the proposed Yucca Mountain Repository or during the transportation of spent nuclear fuel or high-level radioactive waste to the proposed repository. These questions include: who would be liable in case of an accident and, because of the potentially long time period between exposure and injury, what would be the time frame for claiming damages?

Response
In the event actions were to occur that compromised the integrity of the repository, mitigation activities would be funded under either the Nuclear Waste Fund or the Price-Anderson Act. The Price-Anderson Act, as amended, provides liability coverage for commercial activities operating under a license from the Nuclear Regulatory Commission and DOE activities. The Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that up to $9.43 billion is available to compensate for damages suffered by the public from a "nuclear incident," regardless of who causes the damage. Payment would be from Federal funds or, if public liability arose out of nuclear waste activities funded by the Nuclear Waste fund (for example, activities at a geologic repository), from that Fund. The liability of all responsible parties is limited to the amount of coverage provided by the Price-Anderson system. State and local governments cannot be required to provide any additional compensation. The EIS has been revised to include more details about indemnification under the Price-Anderson Act (see discussion in Section M.8).

Price-Anderson indemnification would apply to the operators of a nuclear waste repository at Yucca Mountain (which would also be licensed by the Nuclear Regulatory Commission pursuant to the NWPA) and to transporters of nuclear waste from commercial nuclear utilities and from DOE sites to the repository. Thus, Price-Anderson liability coverage extends to DOE contractors that manage and conduct nuclear activities in the DOE complex. In a general sense, the Federal Government acts as an insurer for these contractors against any findings of liability arising from the nuclear activities of the contractor within the scope of the contract. However, to ensure compliance with safety requirements and to minimize risk, DOE is required to undertake enforcement actions against indemnified contractors for violations of nuclear safety requirements.

In addition to Price-Anderson indemnification, all motor vehicles carrying spent nuclear fuel or high-level radioactive waste are required by the Motor Carrier Act of 1980 and its implementing regulations (49 CFR Part 387) to maintain financial responsibility of at least $5 million, which would be available to cover public liability from a non-nuclear incident and for environmental restoration. Federal law does not require rail, barge, or air carriers of radioactive materials to maintain liability coverage, although these carriers often voluntarily carry such insurance. Regardless of whether these carriers had insurance, a radioactive materials incident involving these carriers would be subject to state law applicable for any other type of accident.

It should be noted that the Price-Anderson Act requires DOE to enter into indemnity agreements with any of its contractors that conduct nuclear activities until August 1, 2002. As discussed in Section M.8 of the Final EIS, DOE has recommended renewal of the indemnification provisions of the Act. In particular, DOE recommended that (1) DOE indemnification should be continued without any substantial change; (2) the amount of the DOE indemnification should not be decreased; (3) DOE indemnification should continue to provide broad and mandatory coverage of activities conducted under contract for DOE; and (4) DOE should continue to have authority to impose civil penalties for violations of nuclear safety requirements by for-profit contractors, subcontractors, and suppliers.

4.1 (83)
Comment - 13 comments summarized
Commenters noted that the State of Nevada has passed a law "making it illegal to store radioactive waste," making it "a felony to contaminate groundwater," and "forbidding the transportation of nuclear material" within the State. Given DOE's proposal to construct and operate a nuclear waste repository at Yucca Mountain, Nevada, commenters questioned how DOE would resolve this conflict with State law. Commenters stated that there is a "double standard" because citizens must obey the law but the Federal Government does not and that this would result in "continuous conflict and litigation."

Response
DOE recognizes that the State of Nevada has enacted legislation making it unlawful to discharge any radiological agent or high-level radioactive waste into any waters of the state (Nevada Revised Statutes 445A.575). The State has also made it unlawful for any person or government entity to store high-level radioactive waste in Nevada (Nevada Revised Statutes at 459.910). "High-level radioactive waste" in this context includes irradiated reactor fuel.

In a 1990 lawsuit, a Federal court ruled that laws passed by the State of Nevada that stood "as an obstacle to the accomplishment of the full purposes and objectives of Congress" as expressed in the NWPA were pre-empted and could not be enforced [Nevada v. Watkins, 914 F. 2d 1545 (9th Cir. 1990)]. For this reason, the court held that Nevada's law regarding the storage of high-level radioactive waste in the State was pre-empted to the extent it prevented DOE from carrying out site characterization activities as required by the NWPA. DOE believes that a legal challenge to the construction and operation of a geologic repository at Yucca Mountain would fail on the same grounds.

With regard to the transportation of radioactive material and high-level radioactive waste, State law requires the Nevada Department of Transportation to develop and enforce a plan for the routing of shipments and to cooperate with the U.S. Department of Transportation to develop plans for interstate routing of shipments (Nevada Revised Statutes 459.125). There does not appear to be any ban on the transportation of nuclear material in the State.

4.1 (490)
Comment - EIS000120 / 0007
It is against the law in the State of Nevada to contaminate groundwater. And Nevada did pass a law against having a nuclear repository in the state.

I know that they passed their own laws not to study any other alternatives. That's a fact that bothers me.

Response
DOE recognizes that the State of Nevada has enacted legislation making it unlawful to discharge any radiological agent or high-level radioactive waste into any waters of the State (Nevada Revised Statutes, Section 475A.575). "High-level radioactive waste" in this context includes spent nuclear fuel.

In a 1990 lawsuit, a Federal court ruled that laws passed by the State of Nevada that stood "as an obstacle to the accomplishment of the full purposes and objectives of Congress" as expressed in the Nuclear Waste Policy Act, as amended (NWPA) are pre-empted and could not be enforced [Nevada v. Watkins, 914 F. 2d 1545 (9th Cir. 1990)]. For this reason, the court held that Nevada's law regarding the storage of high-level radioactive waste in the State was pre-empted to the extent it prevented DOE from carrying out site characterization activities as required by the NWPA. DOE believes that a court would make a similar finding with respect to the construction and operation of a geologic repository at Yucca Mountain if a similar statute prevented DOE from accomplishing the objectives of the NWPA.

In passing the Nuclear Waste Policy Act of 1982 and amendments to the Act in 1987, Congress determined that decades of research had been sufficient to conclude that a geologic repository would be the safest alternative for waste disposal (see Section 1.3 of the EIS for additional information). For this reason, as discussed in Section 1.5, the Act specifically exempts DOE from considering in the EIS (1) the need for a repository, (2) alternative sites to Yucca Mountain, (3) alternative methods to geologic disposal, and (4) the time at which a repository could become available.

4.1 (2223)
Comment - EIS000622 / 0005
It's also a felony to contaminate ground water in the State of Nevada. There's already [proof] and is even mentioned in this document [that there is] serious contamination at the Nevada Test Site already, and no prosecutions are taking place for that. This is clearly something that needs to be addressed.

Response
DOE recognizes that the State of Nevada has enacted legislation making it unlawful to discharge any radiological agent or high-level radioactive waste into any waters of the state (Nevada Revised Statutes, Section 475A.575). "High-level radioactive waste" in this context includes irradiated reactor fuel.

With respect to existing contamination at the Nevada Test Site, Chapter 8 of this EIS includes the cumulative impacts of past DOE activities at the Site (nuclear weapons testing, etc.). While DOE recognizes that there could be cumulative environmental impacts, the application of the Nevada state law to the past activities at the Nevada Test Site is outside the scope of this EIS.

4.1 (3361)
Comment - EIS001242 / 0010
Will all of the private properties along the track be condemned?

Response
DOE will make no transportation decisions unless the site is approved. At that time and based on more thorough reviews of current land ownership along the selected rail alignment (if rail is selected) DOE would then determine how each tract of land held in private ownership would be obtained in compliance with all applicable laws.

4.1 (5473)
Comment - EIS001888 / 0518
[Clark County summary of comments it has received from the public.]

Impacts. EIS should address potential liability of local government to citizen suits related to transportation routes for HLW [high-level radioactive waste] decreasing property values. Example: WIPP [Waste Isolation Pilot Plant] lawsuit success.

Response
The EIS addresses potential risks to human health and the environment from waste transport. However, the manner in which particular individuals might perceive these risks and modify their behavior is speculative and subject to debate. As Section 2.5.4 of the EIS notes, there is no valid method to translate perceptions into quantitative economic impacts. For this reason, DOE addressed but did not attempt to quantify potential for impacts from risk perceptions or stigma in the EIS. Should Yucca Mountain be selected as the site for a monitored geologic repository, DOE would continue to provide clear, accurate information to the public regarding potential risks of a repository at the site and of transporting waste to the site. Thus, members of the public can understand the level of risk that actually exists and act accordingly.

4.1 (8738)
Comment - EIS001317 / 0002
I've always considered the response of the nuclear industry to risk management to be "emotional" when the cap for total liability was put in place. Their emotional response says we can't handle the risk versus benefit analysis beyond this point and we don't want to think about it. The problem is, the insurance cap for power reactors has been standing for decades without a Government Accounting Office review being made public, or to my knowledge, not made at all. Inflation and aging of reactors should be of actuarial concern. Before we allow this run away fait accompli let's stop and reevaluate, request GAO audit, and make public the liability/insurance considerations and who will pay for them.

Response
This comment seems to be about an actuarial review of the nuclear industry's insurance cap. The purpose of the EIS, however, is to describe the potential beneficial and adverse environmental effects of the disposal of spent

nuclear fuel and high-level radioactive waste in a repository at Yucca Mountain. The requested analysis is outside the scope of the EIS.

4.1 (8962)
Comment - EIS001040 / 0011
If there is No Price-Anderson coverage on theft or sabotage if a planned transport is diverted - who pays for it?

Response
The Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that up to $9.43 billion is available to compensate for damages suffered by the public in a nuclear accident or incident, regardless of who causes the damages. Price-Anderson indemnification would be provided for damages that occurred as a result of sabotage or terrorism.

In addition to Price-Anderson indemnification, all motor vehicles carrying spent nuclear fuel or high-level radioactive waste are required by the Motor Carrier Act of 1980, and its implementing regulations (49 CFR Part 387), to maintain financial responsibility of at least $5 million. Such financial responsibility would be available to cover public liability from a non-nuclear incident and for environmental restoration. Federal law does not require rail, barge, or air carriers of radioactive materials to maintain liability coverage, although these carriers often voluntarily carry such insurance. Regardless of whether these carriers had insurance, a radioactive materials incident involving these carriers would be subject to state law that is applicable for any other type of accident.

4.1 (8982)
Comment - EIS001040 / 0015
What are the specific liabilities of Union Pacific, Burlington Northern/Santa Fe, and Tri-State Trucking Companies and others including state and local governments?

Response
The Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that up to $9.43 billion is available to compensate for damages suffered by the public in a nuclear accident or incident, regardless of who causes the damages. The liability of all responsible parties is limited to the amount of coverage provided by the Price-Anderson system. State and local governments cannot be required to provide any additional compensation.

In addition to Price-Anderson indemnification, all motor vehicles carrying spent nuclear fuel or high-level radioactive waste are required by the Motor Carrier Act of 1980, and its implementing regulations (49 CFR Part 387), to maintain financial responsibility of at least $5 million. Such financial responsibility would be available to cover public liability from a non-nuclear incident and for environmental restoration. Federal law does not require rail, barge, or air carriers of radioactive materials to maintain liability coverage, although these carriers often voluntarily carry such insurance. Regardless of whether these carriers had insurance, a radioactive materials incident involving these carriers would be subject to state law that is applicable for any other type of accident.

4.1 (8988)
Comment - EIS001040 / 0023
Is $500 million from Price Anderson enough to cover a major accident?

Response
The Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that as much as $9.43 billion is available to compensate for damages suffered by the public in a nuclear accident or incident, regardless of who causes the damages.

4.1 (9276)
Comment - EIS001971 / 0015
NO ACTION ALTERNATIVE VIOLATES FUNDAMENTAL PRINCIPLES IN FEDERAL LAW, THAT PRESENT ACTIONS NOT CREATE DISPROPORTIONATE COSTS FOR FUTURE GENERATIONS. I believe that this principle is specifically addressed in both federal environmental and nuclear waste management acts.

Response
Neither the National Environmental Policy Act nor the Nuclear Waste Policy Act specifically addresses the imposition of disproportionate costs for future generations. However, implementation of the No-Action Alternative would impose upon future generations the obligation to store spent nuclear fuel and high-level radioactive waste continually in a safe configuration at the 77 sites where it is currently located.

4.1 (9280)
Comment - EIS001971 / 0016
PERMITS AND GUIDELINES BASED UPON TERM-OF-STORAGE BECOME MEANINGLESS; NO-ACTION ALTERNATIVES THREATEN STATE LAW AND REGULATION

As a major feature of this conundrum, we are now looking at ad hoc divestment strategies on the part of utilities in which taking advantage of ISFSI [Independent Spent Fuel Storage Installation] standards (and deregulation) may play a central role. Waste management deadlines and timelines continue to be manipulated in both legislative and regulatory contexts year after year, scenario after scenario, and to the detriment of the general welfare that the original Act was charged to protect. The establishment of the no-action alternative in the D.E.I.S. signals that "term-of-storage" which once was a central factor in NRC guidelines, a pivot point in law and rule-making ----- has become meaningless.* With it, a large number of state laws and regulations, falter and threaten to fail. Minnesota is only one, if an ever-exceptional, example. The balance of state and federal rights and responsibilities under a no-action scenario are an additional uncertainty with a variety of potential repercussions.

*The D.E.I.S. no-action alternative effectively undermines a fundamental distinction between a permanent federal repository and other sites for nuclear waste (formerly called temporary and interim) which was term-of-storage. Hence, again, the relevant status of affected governmental units for states; tribes and communities proximate to the 72 commercial and 5 DOE sites (at least).

Response
DOE recognizes that implementation of the No-Action Alternative would require spent nuclear fuel and high-level radioactive waste to be stored in a safe configuration at the 77 sites where it is currently located. This is contrary to the Nuclear Waste Policy Act, which requires the permanent disposal of spent nuclear fuel and high-level radioactive waste. For this reason, DOE's preferred alternative is the Proposed Action to construct and operate a geologic repository at Yucca Mountain. The EIS did not identify any potential environmental impacts that would be a basis for not proceeding with the Proposed Action.

4.1 (9286)
Comment - EIS002164 / 0002
Worthiness of the AEC/DOE changed greatly in the years following World War II. June 1989, the FBI raided Rocky Flats, the DOE weapons producing plant managed by Rockwell. Rockwell was charged with illegal dumping of hazardous substances and the knowing contamination of nearby streams. Rockwell plea-bargained criminal charges.

President Clinton appointed Hazel O'Leary Energy Secretary in May 1993. She ordered DOE offices to declassify Cold War documents. For Scientific American, May 1996, the DOE now admits that enormous amounts of the highly radioactive liquids and solids were pumped and dumped into the ground and estimates that throughout all the weapons complexes, billions of cubic meters of soil, groundwater and surface water are contaminated radioactively.

Charges for criminal violations should be brought against the DOE/AEC for past, present and planned future damage of the highest order to the United States and its injured citizens, damage that has been deadly and that may last for thousands of years.

Response
The NWPA requires DOE to prepare a Final EIS to accompany any site recommendation from the Secretary of Energy to the President. In compliance, DOE developed this EIS, which analyzes potential environmental impacts of constructing, operating and monitoring, and eventually closing a repository for the disposal of spent nuclear fuel and high-level radioactive waste.

4.1 (9533)
Comment - EIS001888 / 0194
[Summary of comments noted by Clark County Nuclear Waste Division staff at various citizens' meetings.]

Wondered if the City Council could legally create a "nuclear free zone."

Response
Courts have determined that local or state governmental legislation to restrict the shipment of nuclear materials through particular areas is pre-empted by Federal law because such legislation would impose an unconstitutional burden on the congressional power to regulate interstate commerce.

4.1 (9754)
Comment - EIS001888 / 0338
[Clark County summary of comment it received from a member of the public.]

One commenter called for the EIS to address liabilities in the absence of the Price-Anderson Act.

Response
Price-Anderson indemnification applies in the event of a nuclear accident or incident. If, for example, a truck carrying nuclear waste was involved in a traffic accident with no radiological consequences, the terms of the Price-Anderson Act would not apply. However, all motor vehicles carrying spent nuclear fuel or high-level radioactive waste are required by the Motor Carrier Act of1980 and its implementing regulations (49 CFR Part 387), to maintain financial responsibility of at least $5 million. Such financial responsibility would be available to cover public liability from a non-nuclear incident and for environmental restoration. Federal law does not require rail, barge, or air carriers of radioactive materials to maintain liability coverage, although these carriers often voluntarily carry such insurance. Regardless of whether these carriers had insurance, a radioactive materials incident involving these carriers would be subject to state law applicable for any other type of accident.

4.1 (9912)
Comment - EIS001888 / 0458
[Clark County summary of comments it has received from the public.]

Several commenters requested that the EIS discuss the Constitutional basis for a federal agency to: (1) take title to nuclear waste generated by private industry, (2) commandeer the natural and governmental resources of the State of Nevada, and (3) affect Nevada's socioeconomic well-being. In addition, commenters wanted the EIS to: justify the selection of Yucca Mountain against the wishes of the State of Nevada; discuss how the DOE intends to acquire exclusive jurisdiction of the Yucca Mountain site considering the Constitutional requirement that exclusive jurisdiction can be acquired only in the manner set forth in Article 1, Section 8, Clause 17, of the U.S. Constitution; and discuss how the DOE will acquire the required consent of the Nevada Legislature for exclusive jurisdiction of this land.

Response
The proposal to construct and operate a geologic repository at Yucca Mountain for the disposal of spent nuclear fuel and high-level radioactive waste is based on the requirements of the NWPA, which was enacted by Congress to address the national problem of disposing of nuclear waste generated by commercial nuclear powerplants. The Act directs DOE to take title to commercial spent nuclear fuel and take responsibility for its ultimate disposition. Congress was acting pursuant to its constitutional authority to enact laws affecting interstate commerce. The purpose of the EIS is not to address legal issues concerning the constitutional basis for the legislation, including the decision to study only the Yucca Mountain site. Thus, the constitutional basis for taking title to privately owned waste and for any effect on the natural and socioeconomic environment in Nevada should a repository be approved is outside the scope of this EIS.

DOE will be required to obtain exclusive jurisdiction over the Yucca Mountain site, should it be approved as the site for a repository. The requirements for the area of land to be used for the proposed repository are established in 10 CFR 63.121(a), "Requirements for ownership and control of interests in land," which states "Both the geologic repository operations area and the site shall be located in and on lands that are either acquired lands under the

jurisdiction and control of DOE, or lands permanently withdrawn and reserved for its use...." As stated in Section 4.1.1.1 of the EIS, Congress would have to withdraw land for the repository to meet the permanency requirements of 10 CFR Part 63.121.

The land required for the proposed repository is Federally owned land; therefore, the approval of the Nevada legislature would not be necessary for the Department to obtain exclusive jurisdiction over the land.

4.1 (9953)
Comment - EIS001888 / 0478
[Clark County summary of comments it has received from the public.]

Several commenters requested that the EIS clarify the extent and longevity of responsibility and liability for impacts associated with the disposal of nuclear waste, and for accidents along transport routes from points of origin to Yucca Mountain. Another requested the name of all elected and appointed individuals that have responsibilities and liabilities with regard to the Yucca Mountain Project, as well as agencies involved in the decisionmaking process.

Response
The Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that up to $9.43 billion is available to compensate for damages suffered by the public in a nuclear accident or incident, regardless of who causes the damages. Damages that occur as a result of a nuclear accident or incident at the Yucca Mountain site or during the transportation campaign would be subject to the Price-Anderson indemnification. The Federal Government would be responsible for the repository site (if constructed) in perpetuity.

The Secretary of Energy will recommend to the President whether to proceed with the development of the Yucca Mountain site as a repository. Such a site recommendation would included the Final EIS along with comments of the Secretary of the Interior, the Administrator of the Environmental Protection Agency, and the Nuclear Regulatory Commission, as required by Section 114 of the NWPA. The President must decide whether to recommend the site to Congress. If the President recommends the site to Congress, the Governor or the legislature of the State of Nevada would have 60 days from the President's action to submit a notice of disapproval (if not, the site is approved). Assuming that a notice of disapproval is received, the site would be disapproved unless, during the first 90 days of continuous session of Congress after the notice of disapproval, Congress passed a joint resolution of repository sitting approval and the President signed it into law.

Agency and elected officials are not permanent positions and are subject to change with regularity. For this reason, the requested information is not provided.

4.1 (10119)
Comment - EIS002090 / 0001
Search words for accident liability did not give any opinions by Nevada Attorney General or others. The comments at the Georgia public hearings indicated some information about liability by the states. Please forward my request for some references for some specific legal opinions.

Search words under Yucca Mountain accident liability did not give specific opinions.

The legal description and legal history of the project is not on internet or in the EIS and was not available from the project office under FOIA request. Please update your information to include the area and geographic location of the project

Response
The Internet site for the Nevada Attorney General is *http://ag.state.nv.us*. A search of that site did not reveal any opinions by the Attorney General of Nevada on the subject of accident liability associated with Yucca Mountain.

The EIS contains a description of the project, the site location, and the history of the project. Section 1.3 of the EIS provides a history of the national effort to manage spent nuclear fuel and a short history of the Nuclear Waste Policy Act. In addition, the Yucca Mountain Site Characterization Project Internet site (*http://www.ymp.gov*) and the

Office of Civilian Radioactive Waste Management Internet site (*http://www.rw.doe.gov*) provide more information on the project and its legal basis. Both sites contain links to the NWPA.

Chapters 1, 2, and 3 of the EIS contain information on the location of Yucca Mountain.

4.1 (10402)
Comment - EIS002192 / 0008
The closure statements are true blue sky, and I use that in the stock market sense. As you know, I reported that the SEC had secret meetings. I gave the tapes for the information to Dr. Cohone and to Dr. Itkin and I'm waiting to get them back because this entire project, if anything goes up, and I'm talking about Price-Andersen [Anderson] with the 500 million, 60 million for the attorneys, it would build half a casino in Las Vegas, and so this is totally inadequate.

Response
The Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that up to $9.43 billion is available to compensate for damages suffered by the public in a nuclear accident or incident, regardless of who causes the damages.

4.1 (10519)
Comment - EIS002121 / 0002
If the safety is so great, why has the nuclear industry been granted a liability limit? No other industry has that limitation.

Response
Price-Anderson indemnification was originally enacted in the 1950s to promote the peaceful use of nuclear power. At that time, the Federal Government agreed to establish a system of financial protection for persons who may be injured by a nuclear accident or incident or liable for injuries sustained from a nuclear accident or incident.

Nuclear waste and nuclear materials have been transported safely across the Nation for many years. Although traffic accidents have occurred, there has never been a release of nuclear material. By continuing to reauthorize Price-Anderson indemnification, however, Congress recognizes that while the nuclear safety record is excellent, the consequences of a nuclear accident or incident could be quite large.

4.1 (10552)
Comment - EIS001897 / 0005
We note that the Energy Information Administration suggests that nuclear power is a crucial factor in helping the United States achieve the carbon emission targets set forth in the Kyoto Protocol in its "Annual Energy Outlook 2000" report and its October 1998 "Impacts of the Kyoto Protocol" report for the U.S. House of Representatives Committee on Science. Additionally, in testimony before the U.S. House Appropriations Committee on March 11, 1999, William D. Magwood, IV, Director of DOE's Office of Nuclear Energy, Science and Technology, noted the importance of our existing nuclear plants in "...meeting international commitments on climate change." Finally, in its April 1998 "Comprehensive National Energy Strategy" report, DOE states, "...the continued operation and optimization of existing nuclear powerplants through advanced technologies may be an important contributor to meeting greenhouse gas emission-reduction goals if issues such as nuclear waste disposal and nonproliferation are resolved satisfactorily." (9) Thus, the Administration's points indicate that delaying the nuclear waste disposal program (which may result in the loss of some nuclear power generation) would hamper efforts to achieve the carbon emission reductions proposed in the Kyoto Protocol.

Response
The extent to which the operation of a nuclear waste repository would encourage the use of nuclear power as an energy source, and the environmental risks and benefits of nuclear power as an energy source, are outside the scope of this EIS. The NWPA requires DOE to prepare a Final EIS to accompany any site recommendation from the Secretary of Energy to the President. In compliance, DOE developed this EIS, which analyzes potential environmental impacts of constructing, operating and monitoring, and eventually closing a repository for the disposal of spent nuclear fuel and high-level radioactive waste.

4.1 (11434)
Comment - EIS000409 / 0013
Price Anderson liability, $560 million dollars is hardly enough to build half a casino in Las Vegas much less cover a major predicted catastrophe in any major city.

Response
The Price-Anderson Act establishes a system of private insurance and Federal indemnification that generally ensures that as much as $9.43 billion is available to compensate for damages suffered by the public in a nuclear accident or incident, regardless of who causes the damages.

4.1 (12232)
Comment - 010028 / 0010
This nation will need more than one repository, so why not start now to find the other suitable locations.

Response
When Congress passed the Nuclear Waste Policy Act of 1982, it affirmed that the Federal Government is responsible for the permanent disposal of spent nuclear fuel and high-level radioactive waste. To accomplish this goal, Congress envisioned more than one repository, but prohibited the Nuclear Regulatory Commission from approving a license for the emplacement of more than 70,000 metric tons of heavy metal (MTHM) in the first repository until a second repository was in operation [Section 114(d)]. The total projected inventory of spent nuclear fuel and high-level radioactive waste is more than 70,000 MTHM. Emplacement of more than 70,000 MTHM at Yucca Mountain would require legislative action by Congress unless a second repository was in operation. It is reasonably foreseeable that Congress would take such a legislative action, or would approve a repository at Yucca Mountain for disposal of more than 70,000 MTHM when a second repository was in operation.

4.2 Regulations

4.2 (86)
Comment - 3 comments summarized
Commenters addressed the fact that the repository is not going to be permitted to accept hazardous wastes regulated under the Resource Conservation and Recovery Act (RCRA), its implementing regulations at 40 CFR Part 261, and corresponding State laws and regulations. Some commenters noted that this might preclude the acceptance of high-level radioactive waste from the Idaho National Engineering and Environmental Laboratory. One commenter asked the Department to explain why the high-level radioactive waste to be disposed of at Yucca Mountain will not be RCRA-regulated.

Response
Under the *Waste Acceptance System Requirements Document* (DIRS 110306-DOE 1999), RCRA-regulated high-level radioactive waste would not be accepted for disposal at the Yucca Mountain repository. DOE is aware that the high-level radioactive waste at both the Idaho National Engineering and Environmental Laboratory and the Hanford Site contains listed hazardous wastes that would have to be "delisted" by the Environmental Protection Agency and the appropriate States before the waste could be disposed of at the proposed Yucca Mountain Repository. The Department would have to petition the Environmental Protection Agency to delist the waste. Petitions to the relevant states could also be required. DOE would work with the states and the Environmental Protection Agency to ensure they have the information they need to evaluate the delisting petitions.

DOE high-level radioactive waste also exhibits certain characteristics of hazardous waste (specifically corrosivity and toxicity) prior to treatment. The treated waste would not exhibit any of the characteristics of a hazardous waste. Characteristic hazardous wastes do not require a petition and rulemaking by the Environmental Protection Agency to exit the hazardous waste system, although the Department would need to have supporting data and information to demonstrate that the characteristics have been removed from the treated waste form.

DOE has revised the discussion in Chapter 11 of the Final EIS to clarify these questions.

4.2 (1872)
Comment - EIS000443 / 0002
It was clear Yucca Mountain would fail to meet current standards as set by the EPA [Environmental Protection Agency].

Response
As required by the Energy Policy Act of 1992, the Environmental Protection Agency has established site-specific health and safety standards at 40 CFR Part 197. The relevant portions of the standards limit radiation doses to individual members of the public to annual committed effective dose equivalent of 15 millirem for preclosure activities and for up to 10,000 years post-closure via all pathways. In addition there is a post-closure standard of 4 millirem per year from direct ingestion of 2 liters per day of drinking water for 10,000 years after disposal.

Based on the results presented in Chapters 4 and 5 of the EIS, DOE would not expect the repository to exceed the prescribed radiation exposure limits. Section 4.1.7.5.3 of the EIS discusses the calculated doses to the maximally exposed individual for construction, operation and monitoring, and closure of the repository. That individual would receive 100 millirem over an estimated 70-year lifetime, or about 1.5 millirem per year compared to the individual protection standard of 15 millirem per year. Section 5.4 of the EIS describes waterborne radiological consequences for all pathways. The 10,000-year peak annual committed effective dose equivalent at 18 kilometers (11 miles) for the reasonably maximally exposed individual would be thousands of times less than the standard for all pathways and the ingestion dose would be a few hundred thousand times lower than the 4-millirem standard.

4.2 (2029)
Comment - EIS000773 / 0001
Your Public Hearing is not even asking us if the repository at Yucca Mountain (a geological repository for the disposal of spent nuclear fuel rods and high-level radioactive waste) is safe for human beings for thousands of years, but rather if it meets EPA standards for "safety."

Who knows if these standards make burying the humongous amount of "hot" radioactive waste and spent nuclear fuel rods are safe for human beings. We have never had such a "hot" product nor have we tried to bury it all together.

Response
As with all its standards for protection of the public, the Environmental Protection Agency (EPA) has evaluated the current scientific knowledge, considered related standards set in existing rules, and proposed standards that, if met, would adequately protect the public from releases of radionuclides from a geologic repository (deep burial) at Yucca Mountain. The Department's responsibility is to comply with the EPA radiation protection standards as implemented by the Nuclear Regulatory Commission (NRC) in its licensing criteria. If the Department cannot demonstrate compliance with these standards, the NRC would not authorize construction of the proposed repository.

It should be recognized that this EIS is not intended to be a compliance document for use in licensing. Rather it is intended to satisfy the requirements of the National Environmental Policy Act and the NWPA for an evaluation of the potential impacts associated with the development, operation and monitoring, and closure of a geologic repository at Yucca Mountain. For this reason, an analysis of the potential impacts on public health and safety as a result of releases of radioactive materials from a repository is presented in this EIS.

4.2 (2502)
Comment - 010294 / 0012
Define the NRC's [Nuclear Regulatory Commission] licensing process. When will the NRC make a determination on the [Scientific] and Engineering suitability for a geologic repository? Before or after the DOE's recommendation.

Response
The Nuclear Regulatory Commission's licensing process and criteria specific to the proposed Yucca Mountain Repository are set forth in 10 CFR Part 63. This process is outlined in Section 11.1 of the EIS. DOE would not submit an application to the Commission until the site had been recommended to the President and the President, along with Congress in the event the State of Nevada objected to any site recommendation, approves the site.

Although the Commission has periodically provided input and comments during the development of site recommendation materials and this EIS, the Commission would not make a regulatory determination until DOE submitted a license application.

4.2 (2639)
Comment - EIS000409 / 0001
Can NRC [the Nuclear Regulatory Commission] ask the congress in all good conscience to change the law so that Y.M. [Yucca Mountain] project is allowed to kill 500 people per year out of a city the size of Las Vegas?

The current Congressional law (EPA [Environmental Protection Agency]) allows 1 person out of 1 million to die of radionuclide poisoning, (cancer) under the Safe Drinking Water Act. (4 mrems [millirem]) (Acceptable if you're not the 1 person.)

OCRWM [the Office of Civilian Radioactive Waste Management], EPA, NRC, are aware the "Contaminates (like high-level radionuclides) in groundwater, unlike those in other media, such as air or surface water, can with relative little mixing or dispersion so concentrates can be relatively high" (p47001/F.R./Vol 64/No 162/8/27/99). [There is] No mention of colloids or their movement in the [Draft] EIS.

Response
As required by the Energy Policy Act of 1992, the Environmental Protection Agency has established the *Public Health and Environmental Radiation Protection Standard for Yucca Mountain, Nevada* at 40 CFR Part 197, and the Nuclear Regulatory Commission has published criteria for Disposal of High-Level Radioactive Wastes in a Proposed Geological Repository at Yucca Mountain, Nevada, at 10 CFR Part 63 for licensing the construction and operation of the proposed repository that are consistent with the Environmental Protection Agency standards.

The Nuclear Regulatory Commission did not ask Congress to change the law. The Commission exercised its authority under existing law and licensing criteria for the proposed geologic repository at Yucca Mountain. The Environmental Protection Agency, exercising its authority, proposed an all-pathways individual protection standard for Yucca Mountain of 15 millirem per year, with an additional standard of 4 millirem per year for exposure via the drinking water pathway. Section 11.1 of the EIS discusses the Energy Policy Act of 1992, which requires the final Nuclear Regulatory Commission rule (10 CFR Part 63) to be consistent with the radiation protection standards promulgated by the Environmental Protection Agency. DOE would have to demonstrate compliance with the final licensing criteria (and by extension, with the final Agency standards) as part of a License Application to construct and operate a geologic repository at Yucca Mountain.

The Environmental Protection Agency's public health and environmental standards were designed to protection the public and the environment from radioactive waste that would be placed in the proposed repository.

Chapter 5 and Appendix I in the EIS address colloid transport as a mechanism for radionuclide movement and as a potential contributor to dose rates.

4.2 (3547)
Comment - EIS001020 / 0001
In the Code of Federal Regulations, (10 CFR 960.4-2-1) it states that a site shall be disqualified if the pre-waste emplacement groundwater travel time from the disturbed zone to the accessible environment is expected to be less than one thousand years along ANY pathway of likely and significant radionuclide travel.

Travel time can be determined in many ways. At the Yucca Mountain site, Department of Energy scientists have been using bomb pulse water testing. Bomb-pulse water is water with high ratios of chlorine-36 to chlorine-35. Chlorine-36 is not that common in nature and high ratios are indicative of nuclear weapons testing that occurred approximately fifty years ago. Some water from rock samples along the exploratory tunnel at Yucca Mountain was found to have high ratios of chlorine-36 even at depths of 800 feet. And, according to the Draft Environmental Impact Statement, this is indicative of "very young water" (DEIS p. 3-46).

If water has already seeped 800 feet down through faults, fractures and breccias, which are rock fragments that have been melded together, in the past fifty years, then it is possible that it will reach the underlying water table within

1000 years. After reaching the water table, the contamination could become accessible to people, cattle and crops. According to the Department of Energy guidelines, this potential contamination is a reason for disqualification.

I expect many people will say that although the water travels fast, there isn't much precipitation in the Yucca Mountain area. However, according to what I have read in the Draft Environmental Impact Statement, an average of one-third inch per year actually reaches the repository area. And, in my opinion, any amount of water reaching the area and possibly transporting any amount of radionuclides demonstrates the need for more research before such an important decision is made.

If we have learned anything from our past experiences with nuclear waste, it is that we need to be 100 percent sure of what we are doing BEFORE we do it. It is bad enough that my generation has to deal with the question of how to store it. I do not want to make my grandchildren have to think about how to clean it up. I am not saying that there is no solution. However, I am saying, or rather asking that this time around we look before we leap.

Response
DOE's original 1984 site suitability guidelines (10 CFR Part 960) have been superseded by Yucca Mountain-specific guidelines (10 CFR Part 963). Even though 10 CFR Part 960 no longer applies to Yucca Mountain, information and analyses do not support a finding that the site would have been disqualified under the groundwater travel time disqualifying condition at 10 CFR 960.4-2-1(d). Under that condition, a site would be disqualified if the expected groundwater travel time from the disturbed zone (the area in which properties would change from construction or heat) to the accessible environment would be less than 1,000 years along any pathway of likely and significant radionuclide travel. The definition of groundwater travel time in 10 CFR 960.2 specifies that the calculation of travel time is to be based on the average groundwater flux (rate of groundwater flow) as a summation of travel times for groundwater flow in discrete segments of the system. As part of its site characterization activities, DOE has undertaken various studies to identify and consider characteristics of the unsaturated (above water table) and saturated (water table) zones, such as the flow and transport of water and radionuclides, that are relevant to analyzing groundwater travel times. DOE has considered physical evidence such as the chemistries and ages of water samples from these zones. Based on numerical models, which incorporate the results of these studies and available physical evidence, DOE estimates that the median groundwater travel times would be about 8,000 years, and average groundwater travel times would be longer. Given this, DOE believes that the site would not have been disqualified under the groundwater travel condition at 10 CFR 960.4-2-1.

More data and improved models will enhance confidence in DOE's assessments of travel times along pathways of likely and significant radionuclide travel in both the unsaturated and saturated zones. Additional data collection and analyses are currently underway, including the Nye County drilling program and confirmation and refinement of the observations that have been made to date based on the chlorine-36 data and other isotopic analyses. These efforts are expected to reduce some of the uncertainties associated with the current models that have been developed and enhance confidence in the understanding of the processes that affect water movement.

Based on the analyses of system performance conducted to date, which include consideration of information about groundwater flow and transport characteristics, DOE would not expect the repository to exceed the prescribed radiation exposure limits during the 10,000-year period after closure (see Chapter 5).

4.2 (4332)
Comment - EIS001209 / 0003
The Department of Environmental Quality [DEQ] regulates the transport of mixed waste. If radioactive waste is mixed with hazardous waste, a company that is permitted to transport hazardous wastes in Virginia must transport the wastes. DEQ does not currently regulate high- or low-level radioactive wastes. The transportation of hazardous waste must be managed in accordance with all applicable federal, state, and local environmental regulations.

Response
The transportation of spent nuclear fuel and high-level radioactive waste to the proposed repository would be in accordance with all applicable Nuclear Regulatory Commission and U.S. Department of Transportation regulations. DOE would not accept hazardous or mixed hazardous and radioactive wastes at the repository and, therefore, would not be transporting such wastes to the proposed repository.

4.2 (5136)
Comment - EIS001441 / 0112
In Vol. I-Impact Analysis, Chapters 1-15, at 3.1.1.3 the DOE misrepresents the facts of the Nuclear Regulatory Commission licensing criteria for a repository (10 CFR Part 60).

The Nuclear Regulatory Commission requires site ownership and control, not ownership, or permanent control which is represented by the DOE [in] DEIS 7, Affected Environment, page 3-7.

Response
Nuclear Regulatory Commission initial license conditions for a monitored geologic repository (10 CFR Part 60) have been modified under 10 CFR Part 63 to include risk-informed, performance-based, environmental regulations. DOE has modified Section 3.1.1.3 of the EIS to clarify the comparable requirement as found in the final Nuclear Regulatory Commission rule for Disposal of High-Level Radioactive Wastes in a Proposed Geological Repository at Yucca Mountain, Nevada, at 10 CFR Part 63.

4.2 (5761)
Comment - EIS001887 / 0370
Page 11-6; Section 11.2.2 - Water Quality
This section fails to discuss requirements under NRS [Nevada Revised Statute] 445A (Water Pollution Control) for the protection of the waters of the State of Nevada as it applies to the long-term operation and life of the repository. The Draft EIS discusses only requirements for support facilities and ignores long-term repository performance.

Response
Nevada water-quality regulations (Nevada Administrative Code 445A.119-225), discussed in Section 11.2.2 of the EIS, are not applicable to the long-term performance of the repository. These regulations specify water quality standards that the Environmental Protection Agency and the State regulate by issuing permits for point-source discharges and runoff to maintain water quality. There would be no point-source discharges or runoff associated with the long-term performance of the repository.

Chapter 5 and Appendix I of the EIS describe environmental consequences from the long-term performance of the repository. Final regulations established by both the Environmental Protection Agency (40 CFR Part 197) and the Nuclear Regulatory Commission require DOE to demonstrate that releases from the repository would not exceed limits specified in those regulations over a 10,000-year period. DOE recognizes that some radionuclides and potentially toxic chemicals would, after long periods, eventually enter the environment outside the repository. Nevertheless, modeling of long-term repository performance indicates that the combination of natural and engineered barriers would keep such releases within the regulatory limits established by 40 CFR Part 197 and 10 CFR Part 63.

4.2 (5763)
Comment - EIS001887 / 0366
Page 11-1; Section 11 - Statutory and Other Applicable Requirements
This section describes the Department of Energy Orders and Potentially Applicable Federal Regulations. However, there is only a cursory effort at discussing applicable State of Nevada Regulations. This section should be expanded to discuss these regulations in more detail, especially those dealing with the operations of a repository.

Response
The Council on Environmental Quality regulations [40 CFR 1502.25(b)] requires an EIS to list all Federal permits, licenses, and other entitlements which must be obtained in implementing the proposal. The EIS also is to identify if there are uncertainties about whether a particular permit, license, or entitlement would apply to the proposal. Based on these requirements, the introduction to Chapter 11 states that the EIS identifies major requirements that could be applicable to the Proposed Action. DOE believes that the EIS presents the State of Nevada regulations at an appropriate level of detail, similar to the presentation for Federal laws and regulations and DOE Orders.

4.2 (5765)
Comment - EIS001887 / 0371
Page 11-11; Section 11.2.4 - Control of Pollution

The discussion of the Resource Conservation and Recovery Act (RCRA) in this section of the Draft EIS states that DOE does not expect to need a RCRA permit for Yucca Mountain. However, the table in Appendix I (Table I-10) lists elements that are to be part of defense high-level waste stored in the repository. These elements include barium, cadmium, lead, mercury, and selenium. These elements are controlled under RCRA with set regulatory levels. The Draft EIS should indicate how these RCRA-controlled elements are exempt from permit requirements. The Draft EIS should include a discussion of the permitting process that will be used or an in-depth explanation of why a permit would not be required.

Other DOE documents that discuss the composition of high-level nuclear waste show that toxic heavy metals, organic solvents, and hazardous chemicals are usually contained in high-level defense waste. The Draft EIS should show the breakdown between RCRA-controlled high-level waste and non-RCRA-controlled high-level waste. The Draft EIS should also provide an analysis of how these two waste categories will be handled for Yucca Mountain.

The waste stored at Hanford, WA is currently regulated according to RCRA. The proposed BFNL [British Nuclear Fuel Laboratory] vitrification plant will be RCRA-permitted, and the INEEL vitrification plant will also be permitted. The statement that DOE will not need a RCRA permit for Yucca Mountain is inconsistent with these facts, and the Draft EIS should clarify this statement.

DOE should also be required to comply with the Toxic Substances Control Act, if applicable. There is no discussion in the Draft EIS about DOE waste that is contaminated by such substances as PCBs. Currently, DOE manages approximately 22,000 cubic meters of radioactive PCBs. DOE currently manages about 14,000 cubic meters of radioactive asbestos. The Draft EIS should contain a discussion of whether or not these waste types will be disposed of at Yucca Mountain.

Response
The "RCRA controlled elements" referred to in the comment would cause the high-level radioactive waste to be "characteristic" hazardous waste only if the waste form leaches greater than specified amounts when subjected to the Toxicity Characteristic Leaching Procedure per the requirements of 40 CFR Part 261, Subpart C. The high-level radioactive waste would be treated by vitrification or other process that would result in a waste form that would not fail the Toxicity Characteristic Leaching Procedure test prior to shipment to the proposed repository. As a result, the treated waste would not be a Resource Conservation and Recovery Act-characteristic hazardous waste.

The wastes at the Hanford Site and Idaho National Engineering and Environmental Laboratory are both characteristic and listed hazardous waste. When a characteristic waste is treated so that it no longer exhibits any characteristic of a hazardous waste, it is no longer a hazardous waste unless it is also a listed hazardous waste. Listed hazardous wastes remain hazardous wastes regardless of treatment. However, if treatment has removed the hazardous properties of the waste, the organization treating the waste can petition the Environmental Protection Agency and authorized states to "delist" the waste. This is a well-established process, with several delisting petitions processed by the Environmental Protection Agency each year. DOE recognizes (see Section 11.2.4) that such a petition would be necessary and that this waste would have to be delisted prior to disposal at the proposed repository.

Polychlorinated biphenyls (PCBs) are not used in the manufacture of nuclear fuel. While some high-level radioactive wastes are contaminated with PCBs, detectable levels of PCBs are unlikely to remain in the vitrified high-level radioactive waste forms that are destined for disposal at Yucca Mountain, and certainly no levels of regulatory concern will remain. Therefore, the Toxic Substances Control Act and its implementing regulations would not be applicable to the proposed repository.

4.2 (5769)
Comment - EIS001887 / 0368
Page 11-1; Section 11 - Statutory and Other Applicable Requirements
A new Executive Order (Executive Order 13132 - Federalism) has been issued since the preparation of this Draft EIS. This order should be added to this section and fully incorporated, where applicable, into the Draft EIS.

Response
DOE has reviewed Executive Order 13132 on Federalism and listed it in Table 11-4 of the EIS as potentially applicable. No other revisions to the EIS related to Executive Order 13132 are necessary.

4.2 (5771)
Comment - EIS001887 / 0369
Page 11-1; Section 11 - Statutory and Other Applicable Requirements
Because the Draft EIS considers transportation, DOE should identify the regulatory requirements for the storage, shipment, and transportation for all States affected by the transportation of nuclear waste.

Response
The Council on Environmental Quality regulations [40 CFR 1502.25(b)] require an EIS to list all Federal permits, licenses, and other entitlements that DOE must obtain in implementing the proposal. The EIS also must identify uncertainties about to whether a particular permit, license, or entitlement would apply to the proposal. For these reasons, DOE has focused the discussion of statutory and other applicable requirements in Section 11.1 to those major requirements that could be applicable to the development of a repository; Section 11.2.3 discusses relevant Federal and State of Nevada packaging and transportation regulations. In addition, DOE has added Appendix M, which provides a more detailed discussion of transportation requirements, to the Final EIS.

The EIS analyses assumed compliance with regulations. The addition of a more detailed discussion of transportation regulations would not affect the analysis of environmental impacts.

4.2 (6453)
Comment - EIS001632 / 0018
Page 2-80, Section 2.4.4.1, last paragraph: Please explain the conclusions that short-term impacts would be less than a factor of 2 for thermal-load scenarios and that the impacts would be highest for the low thermal load and lowest for the high thermal load scenario.

Response
The statement is correct, and the information in Section 4.1 of the Draft EIS supports the conclusions. However, the paragraph in question was out of place in the Draft EIS. Potential impacts of the transportation of spent nuclear fuel would not be related to thermal load scenarios of the Draft EIS or to the flexible design analyzed in the Final EIS. The paragraph in question has been deleted.

4.2 (6635)
Comment - EIS001632 / 0071
It is unclear whether the draft EIS has fully analyzed potential water quality impacts of the proposed project (especially the environmental consequences of long-term repository performance) per Nevada water quality standards. The final EIS should provide this analysis and discuss any needed mitigation.

Response
Chapter 5 and Appendix I of the EIS describe environmental consequences (primarily potential groundwater impacts) from the long-term performance of the repository. Section 5.4 of the EIS contains information on the radiological impacts on human health, and Section 5.6 examines the consequences from chemically toxic materials during the first 10,000 years after closure. Environmental Protection Agency regulations (40 CFR Part 197) and Nuclear Regulatory Commission regulations (10 CFR Part 63) require that DOE demonstrate that releases from the repository would not exceed limits specified in those regulations over a 10,000-year period. DOE recognizes that some radionuclides and potentially toxic chemicals would, after long periods, eventually enter the environment outside the repository. Nevertheless, modeling of long-term repository performance indicates that the combination

of natural and engineered barriers would keep doses resulting from such releases below the regulatory limits established by 40 CFR Part 197 and 10 CFR Part 63.

Nevada water-quality regulations (Nevada Administrative Code 445A.119-225), discussed in Section 11.2.2 of the EIS, are not applicable to the long-term performance of the repository. These regulations specify water-quality standards that the Environmental Protection Agency and the State regulate by issuing permits for point-source discharges and runoff to maintain water quality. Section 4.1.3 of the EIS discusses the impacts to surface-water and groundwater hydrology during construction, operation and monitoring, and closure of the proposed repository. DOE does not anticipate any point-source discharges, but has concluded that repository operations would result in minor changes to runoff and infiltration. DOE would comply with all applicable permit conditions.

4.2 (6651)
Comment - EIS001632 / 0073
Pages 11-6 and 11-7 of the Draft EIS highlight several important requirements of the Federal Clean Water Act (CWA) and Nevada's Revised Statutes which were passed to carry out the legislative requirements of the CWA and EPA's regulatory programs. The draft EIS recognizes the CWA Section 313 requirement that any project or activity by a Federal department or agency resulting (or which may result) in the discharge or runoff of pollutants comply with Federal, State, local and interstate water pollution requirements. Water Quality Standards are designed to protect both existing and designated beneficial uses of a water body. The Water Quality Standards adopted by the State of Nevada and approved by U.S. EPA require that:

- The water must be suitable for the watering of livestock without treatment.
- The water must be suitable as habitat for fish and other aquatic life existing in a body of water.
- The water must be suitable for propagation of wildlife and water fowl without treatment.
- The unique ecological or aesthetic value of the water must be maintained.
- The water must support natural enhancement or improvement of water quality in any water which is downstream (see NAC 445A.122, approved by U.S. EPA under authority of the Federal CWA).

Page 3-31 describes the hydrologic system of the Yucca Mountain region, noting that the Amargosa River system drains Yucca Mountain and surrounding areas. The Yucca Mountain regional groundwater system includes "discharge points," defined as "locations where groundwater reaches the surface." The draft EIS notes that groundwater discharges to channels near Beatty, Nevada, south of Tecopa, California, and in southern Death Valley, California. (See also EPA's question about the Beatty discharge point under Section 3 issues.)

Because the Amargosa River flows into Death Valley, California (p. 3-31), it is presumably an interstate water regulated by Nevada water quality standards [NAC 445A.213(5)]. These standards provide that "Radioactive materials attributable to municipal, industrial or other controllable sources must be at the minimum concentrations which are physically and economically feasible to achieve. In no case must materials exceed 1/10 of the 168-hour values for other radioactive substances specified in National Bureau of Standards Handbook 69." Regarding radioactive materials, the Water Quality Standards stipulate that "...concentrations in water must not result in accumulation of radioactivity in plants or animals that result in a hazard to humans or harm to aquatic life" (NAC 445A.121(6)).

Response
Chapter 5 and Appendix I of the EIS describe environmental consequences (primarily potential groundwater impacts) from the long-term performance of the repository. Section 5.4 of the EIS contains information on the radiological impacts on human health, and Section 5.6 examines the consequences from chemically toxic materials during the first 10,000 years after closure. Regulations established by the Environmental Protection Agency (40 CFR Part 197) and the Nuclear Regulatory Commission (10 CFR Part 63) require that DOE demonstrate that doses resulting from releases of radionuclides from the repository would not exceed limits specified in those regulations over a 10,000-year period. DOE recognizes that some radionuclides and potentially toxic chemicals would, after long periods, eventually enter the environment outside the repository. Nevertheless, modeling of

long-term repository performance indicates that the combination of natural and engineered barriers would keep such releases below the regulatory limits established by 40 CFR Part 197 and 10 CFR Part 63.

Nevada water quality regulations (Nevada Administrative Code 445A.119-225), discussed in Section 11.2.2 of the EIS, are not applicable to the long-term performance of the repository. These regulations specify water quality standards that the Environmental Protection Agency and the State regulates by issuing permits for point-source discharges and runoff to maintain water quality. Section 4.1.3 of the EIS discusses the impacts to surface water and groundwater hydrology during construction, operation and monitoring, and closure of the proposed repository. DOE does not anticipate any point-source discharges, but has concluded that repository operations would result in minor changes to runoff and infiltration. However, DOE does not anticipate any impacts from the repository on watering of livestock without treatment, habitat for fish and other aquatic life existing in a body of water, the suitability of the water for propagation of wildlife and waterfowl without treatment, or any unique ecological or aesthetic value of the water. DOE would comply with all applicable permit conditions.

4.2 (6656)
Comment - EIS001632 / 0074
Page 3-31 states that ground water reaches the surface at three locations, including one in southern Death Valley, California. However, the draft EIS does not discuss whether any potential migration and subsequent discharge of contaminated groundwater from the project (from repository construction, operation, closure, or long-term performance) would be consistent with the State of California's Water Quality Standards for this geographic area. The final EIS should provide this analysis and discuss any needed mitigation.

Response
Chapter 5 and Appendix I of the EIS describe environmental consequences from the long-term performance of the repository. Regulations established by both the Environmental Protection (40 CFR Part 197) and the Nuclear Regulatory Commission (10 CFR Part 63) require that DOE demonstrate that doses resulting from releases of radionuclides from the repository would not exceed limits specified in those regulations over a 10,000-year period. DOE recognizes that some radionuclides and potentially toxic chemicals would, after long periods, eventually enter the environment outside the repository. Nevertheless, modeling of long-term repository performance indicates that the combination of natural and engineered barriers would keep such releases well below the regulatory limits established by 40 CFR Part 197 and 10 CFR Part 63.

The State of California Water Quality Standards are not directly applicable to discharges of groundwater to the surface. Water quality standards established by the Environmental Protection Agency and the states are regulated by the issuance of permits for point-source discharges and runoff to maintain water quality. Section 4.1.3 discusses impacts to surface-water and groundwater hydrology during construction, operation and monitoring, and closure of the proposed repository. DOE does not anticipate any point-source discharges, but has concluded that repository operations would result in minor changes to runoff and infiltration. DOE would comply with all applicable permit conditions.

4.2 (6658)
Comment - EIS001632 / 0075
The relevant California standards are in the Water Quality Control Plan for the Lahontan Region, developed by the California Regional Water Quality Control Board, approved by EPA and last updated in October 1994. This Plan identifies water quality objectives for surface waters; specifically, page 3-6 of the Plan specifies "Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life." The Plan further provides that waters with a designated beneficial use of "MUN" (waters used for community, military or individual water supply systems) shall not contain a concentration of radionuclides in excess of the limits specified in Table 4, Section 64443 (radioactivity) of Title 22 of the California Code of Regulations.

The Plan identifies larger hydrologic units (such as the Amargosa Hydrologic Unit and the Death Valley Hydrologic Area), and geographically smaller subunits (such as the Tecopa Wetlands, and minor surface waters and minor wetlands in the Death Valley Hydrologic Area), and lists specific beneficial uses that must be protected. Beneficial uses for the Tecopa Wetlands include municipal and domestic water supply, freshwater habitat, wildlife habitat, preservation of biological habitats of special significance, habitat for rare, threatened and endangered species,

migration of aquatic organisms, and water quality enhancement. Many of these same beneficial uses also apply to the minor surface waters and minor wetlands of Death Valley, which in addition are designated beneficial uses of ground water and fresh water replenishment.

Response
The cited regulations are not directly applicable to the long-term performance of the proposed Yucca Mountain Repository. Regulations established by both the Environmental Protection Agency (40 CFR Part 197) and the Nuclear Regulatory Commission (10 CFR Part 63) require that DOE demonstrate that releases from the repository would not exceed limits specified in those regulations over a 10,000-year period. DOE recognizes that some radionuclides and potentially toxic chemicals would, after long periods, eventually enter the environment outside the repository. Nevertheless, modeling of long-term repository performance indicates that the combination of natural and engineered barriers would keep doses resulting from such releases well within the regulatory limits established by 40 CFR Part 197 and 10 CFR Part 63.

The concentration of radionuclides at the chief discharge point (Franklin Lake Playa) after 10,000 years would not be deleterious to human heath (see Section 5.4) or to the health of plants or animals (see Section 5.9). Concentrations of radionuclides downgradient from Franklin Lake Playa (farther away from Yucca Mountain) after 10,000 years would be even lower.

4.2 (6661)
Comment - EIS001632 / 0076
Mixed radioactive and hazardous waste is subject to RCRA [Resource Conservation and Recovery Act] requirements, including applicable permitting requirements. The draft EIS states that DOE will not accept hazardous waste for disposal at Yucca Mountain and that any hazardous or mixed waste which is generated will not be treated or disposed on-site, nor will it be stored for more than 90 days. Accordingly, "DOE does not expect to need a Resource Conservation and Recovery Act permit for its activities at the proposed repository."

Page 1-7 of the draft EIS indicates that high-level wastes from DOE sites would be immobilized through vitrification before shipment to Yucca Mountain. Vitrification meets the RCRA Land Disposal Restriction treatment standard for these wastes. Various DOE documents indicate that organic solvents and hazardous chemicals, in addition to toxic heavy metals, are typically contained in high-level radioactive waste. The final EIS should explain why the high-level waste was to be disposed of at Yucca Mountain will not be RCRA regulated.

Response
Under *Waste Acceptance System Requirements Document* (DIRS 110306-DOE 1999), RCRA-regulated high-level radioactive waste would not be accepted for disposal at the Yucca Mountain repository. DOE is aware that the high-level radioactive waste at both the Idaho National Engineering and Environmental Laboratory and the Hanford Site contains listed hazardous wastes that would have to be "delisted" by the Environmental Protection Agency and the appropriate States. The Department would have to petition the Environmental Protection Agency to delist the waste. Petitions to the relevant states could also be required. DOE would work with the states and the Environmental Protection Agency to ensure they have the information they need to evaluate the delisting petitions.

DOE high-level radioactive waste also exhibits certain characteristics of hazardous waste (specifically corrosivity and toxicity) prior to treatment. The treated waste would not exhibit any of the characteristics of a hazardous waste. Characteristic hazardous wastes do not require a petition and rulemaking by the Environmental Protection Agency to exit the hazardous waste system, although the Department would need to have supporting data and information to demonstrate that the characteristics have been removed from the treated waste form.

DOE has revised the discussion in Chapter 11 of the Final EIS to clarify these questions.

4.2 (6666)
Comment - EIS001632 / 0077
The final EIS should also clarify the applicability of RCRA [Resource Conservation Recovery Act] to the data presented in Table I-10 (page I-15) in Volume II, "Inventory [kilograms] of Chemical Materials Placed in the Repository under the Proposed Action." Under "high-level radioactive waste" the table lists 19,000 kilograms of barium, 43,000 kilograms of cadmium, 2,000 kilograms of lead, 200 kilograms of mercury, and 300 kilograms of

selenium. Pursuant to RCRA, EPA has established regulatory levels (mg/L)[milligrams per liter] for barium (100.0 mg/L), cadmium (1.0 mg/L), lead (5.0 mg/L), mercury (0.2 mg/L), and selenium (1.0 mg/L). (See 40 CFR 261.24, Toxicity Characteristics.)

Response
The table in question appears in Section I.3.2 of the Final EIS. A footnote has been added to the table to show that the high-level waste form that would be disposed of in the proposed repository would not exhibit the Characteristic of Toxicity as measured by the Toxicity Characteristic Leaching Procedure. Section 11.2.4 discusses listed waste that would have to be delisted prior to emplacement in the repository. Waste shipped to the repository would not be regulated as hazardous waste under the Resource Conservation and Recovery Act.

4.2 (6668)
Comment - EIS001632 / 0078
Section 11 of the draft EIS does not discuss the applicability of the Toxic Substances Control Act or of regulations governing asbestos disposal. The final EIS should clarify whether any waste proposed for disposal at Yucca Mountain is or may be contaminated with PCBs (polychlorinated biphenyls), or whether any radioactive asbestos waste is destined for disposal at Yucca Mountain, and, if so, the regulatory implications of such.

Response
Asbestos is not used in the manufacture of nuclear fuel, nor is it contained in high-level radioactive waste. Polychlorinated biphenyls (PCBs) are not used in the manufacture of nuclear fuel. While some high-level radioactive wastes are contaminated with PCBs, detectable levels of PCBs are unlikely to remain in the vitrified high-level radioactive waste forms. Therefore, the Toxic Substances Control Act, its implementing regulations, and regulations governing disposal of asbestos (or PCBs) are not applicable to the proposed repository.

4.2 (6672)
Comment - EIS001632 / 0079
Page 11-18, Table 11-2 [Section 11.3]: The table should include DOE Order 435.1 which applies to this action unless the requirements of the order "overlap or duplicate" requirements of the Nuclear Regulatory Commission (NRC).

Response
DOE approved Order 435.1 after it issued the Draft EIS. As a result, it has included DOE Order 435.1 in the Final EIS table (Section 11.3), and has deleted the reference to DOE Order 5820.2A.

4.2 (6674)
Comment - EIS001632 / 0080
Page 11 -20, Table 11-3 [Section 11.4]; The table should list 40 CFR Part 191, Subpart A (Environmental Standards for Management and Storage) which applies to certain areas in the vicinity of the proposed Yucca Mountain repository.

Response
DOE has revised Table 11-1 of the EIS to include a discussion of the Yucca Mountain-specific radiation standards at 40 CFR Part 197 that would govern surface and subsurface operational activities at the repository. These new standards implement the general requirements of 40 CFR Part 191 for the proposed Yucca Mountain Repository.

4.2 (6777)
Comment - EIS001878 / 0083
The DEIS fails to adequately disclose the federal permits, licenses, and entitlements that must be obtained to implement the transportation elements of the proposed action, as required in 40 CFR 1502.25. From the discussion in Chapter 11, it is not clear whether construction and operation of proposed rail corridors (and their associated access roads, fences, and other features) would require:

- Air quality permits under the federal Clean Air Act, as administered by the USEPA [Environmental Protection Agency] and Nevada's Division of Environmental Protection (NDEP);

- Permanent (by Congress) or temporary (under the Federal Land Policy and Management Act of 1976) land withdrawals;
- Approval by the Surface Transportation Board regarding labor protection, car interchange, competitive access, line construction, line crossing, public use of rights-of-way, feeder line development, ratemaking, or other factors;
- Water supply permits for construction camps and activities under the federal Safe Drinking Water Act as implemented by UESPA and Nevada's Health Division;
- Stormwater permits under the Federal Clean Water Act, as administered by NDEP;
- Solid waste management permits under the federal Resource Conservation and Recovery Act, as implemented by USEPA and NDEP;
- Stipulations to minimize or mitigate potential adverse impacts to a historic resource under the National Historic Preservation Act;
- Permits for excavation or removal or archeological or historical resources under the federal Archeological Resources Protection Act or the Antiquities Act;
- A biological opinion from the U.S. Fish and Wildlife Service regarding compliance with the federal Endangered Species Act; or
- Use permits issued by the USFS [Forest Service] under the National Forest Management Act.

It is also unclear from the discussion in the DEIS whether the transportation aspects of the proposed action, specifically including the construction of a railroad line and associated facilities, would constitute a take or harvest of migratory birds under the Migratory Bird Treaty Act, or would avoid wildlife refuges, wildlife ranges, game ranges, and wildlife management areas, as required by the DOE policy administering the National Wildlife Refuge System Administration Act.

Finally, despite the statement on p. 11-17 that the DEIS "assesses the potential construction of a rail line, new roads, or an intermodal transfer station in Nevada to determine if that construction could affect [farmlands]," the DEIS fails to make any such assessment, beyond the broadest of generalities. As noted in the DEIS, the U.S. Natural Resource Conservation Service must determine that the proposed action does not affect farmlands.

Since the discussion is so unclear as to whether rail corridors and other transportation aspects would require federal permits, licenses, or entitlements, the DEIS--in effect--conceals from Eureka County and all other persons important procedural aspects related to the proposed repository and its transportation systems. The inadequate, incomplete disclosure fails to provide Eureka County with essential information regarding administrative remedies. Coupled with the numerous other inadequacies of the [DEIS], this failure violates the purpose of NEPA and the principle of due process.

Regarding the transportation elements of the proposed action, the DEIS must specifically disclose: (1) the identity of all federal approvals that DOE or its agents must obtain to construct and operate those elements, as required by 40 CFR 1502.25(b), (2) all steps the DOE will follow to satisfy the requirements of NEPA, and (3) the procedural requirements Eureka County must satisfy to protect its legal rights to appeal each required federal approval and each action of the DOE under NEPA.

Response

Chapter 11 of the EIS identifies major requirements that could be applicable to the Proposed Action, which is to construct, operate and monitor, and eventually close a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain. The Proposed Action includes the transportation of spent nuclear fuel and high-level radioactive waste to the repository site, and the requirements applicable to transportation are

included in Chapter 11 to the extent they are known at this time. However, the specific routes that could be used in a national transportation campaign are not currently known and thus any applicable state requirements cannot be ascertained. DOE would obtain all necessary permits, licenses, and approvals and would comply with all statutory and regulatory requirements in the implementation of the Proposed Action, should that alternative be selected.

4.2 (7586)
Comment - EIS001909 / 0005
Section 11.2.6The DEIS cites Executive Order 12898, Environmental Justice, but omits the statutory basis for Tribal government participation in the DEIS process, i.e., Treaties with the U.S. government. A description of the legal standing and statutory basis of Tribal government involvement should be provided in the foreword to Section 11.

Response
DOE has amended the introductory text to Chapter 11 of the EIS to reflect the legal basis for tribal government involvement.

4.2 (7667)
Comment - EIS001928 / 0017
We propose that the final EIS include an alternative where the waste acceptance criteria at Yucca Mountain provides for the acceptance of all the high-level waste from DOE's inventory at INEEL [Idaho National Engineering and Environmental Laboratory], including mixed waste if, for any reason, the high-level waste cannot be treated to remove the hazardous constituents.

Response
Under the *Waste Acceptance System Requirements Document* (DIRS 110306-DOE 1999), high-level radioactive waste that is subject to the Resource Conservation and Recovery Act would not be accepted for disposal at the proposed Yucca Mountain repository. DOE is aware that the high-level radioactive waste at the Idaho National Engineering and Environmental Laboratory contains listed hazardous wastes that would have to be "delisted" by the Environmental Protection Agency and the appropriate States before the waste could be disposed of. The Department would have to petition the Environmental Protection Agency and the states to delist the waste. DOE would work with the states and the Environmental Protection Agency to ensure they have the information they need to evaluate the delisting petitions.

The EIS, however, does analyze the disposal of all high-level radioactive waste that could become available for disposal from the Idaho National Engineering and Environmental Laboratory.

4.2 (8140)
Comment - EIS001840 / 0005
If you even begin to say that the public is in favor of Yucca Mountain, then you are going to be violating international laws as well as local, state and federal.

Response
DOE acknowledges that there is a range of opinions about the proposed repository. The public comments on the Draft EIS reflect this range. Although it is unclear as to what laws are referred to by this comment, DOE would comply with all applicable laws during the construction, operation and monitoring, and eventual closure of the proposed repository at Yucca Mountain.

4.2 (8538)
Comment - EIS000817 / 0165
P. 8-69. Molybdenum needs more study evidently. When will EPA [the Environmental Protection Agency] establish a Maximum Contaminant Level Goal for it?

Response
As recognized by this comment, the Environmental Protection Agency is responsible for establishing Maximum Contaminant Level Goals. Therefore, DOE cannot provide a specific answer to this question. However, the Department is aware that the Environmental Protection Agency has evaluated toxicity data for molybdenum and has

established a reference dose for oral exposure, which is part of its Integrated Risk Information System (DIRS 148228-EPA 1999). Section 5.6 of the EIS discusses human health impacts from molybdenum.

4.2 (8611)
Comment - EIS001256 / 0008
A superfund site should not be placed next to an already existing Superfund site. Section 8.3 (page 8-73) needs to address the impact of siting a federal CERCLA [Comprehensive Environmental Response, Compensation, and Liability Act] type (Superfund) site (Yucca Mountain) down gradient of an existing Superfund site (the NTS, particularly Pahute Mesa).

The NTS Federal Facility Agreement and Consent Order (FFACO, 1996) was negotiated and signed to be a CERCLA-like cleanup agreement for the NTS. Although the NTS more than qualifies as a CERCLA site, it was deliberately not put on the national priority list (NPL) CERCLA program. This DEIS should do an analysis of this federal action as it pertains to the cumulative impact of the repository program because it too someday will be a CERCLA site. The Yucca Mountain repository is basically a very sophisticated and highly engineered form of underground injection of waste. It too will qualify for the NPL at some time in the future, 1,000 years from now, or 10,000 years from now.

DOE modeling certainly shows that the Yucca Mountain repository will contaminate at least one square mile of the subsurface and eventually the groundwater system beneath and down gradient of the repository. What is the cumulative impact of siting one Superfund site down gradient of an existing Superfund site.

Response
The Nevada Test Site is not a Superfund site. In addition, under the Environmental Protection Agency's standards at 40 CFR Part 197, geologic disposal of spent nuclear fuel and high-level radioactive waste does not constitute underground injection and is regulated separately from such activities. However, the commenter specifically asks about the cumulative impacts of placing a large amount of spent nuclear fuel downgradient of the existing contamination associated with the nuclear weapons testing program at the Nevada Test Site. Chapter 8 of the EIS addresses cumulative impacts of the Proposed Action, and past, present, and reasonably foreseeable future activities. In particular, Sections 8.2 and 8.3 of the EIS address the cumulative impacts of repository activities and past nuclear weapons testing and past and potential future waste disposal activities at the Nevada Test Site.

4.2 (8810)
Comment - EIS001907 / 0030
The DOE is conspiring to violate Nevada Revised Statue 445A.465, which expressly prohibits intentional contamination of the groundwater by radioactive substances. The DEIS didn't mention that DOE would be breaking countless state, tribal, and county laws by going forward with this proposed action.

Response
The cited section of the Nevada Revised Statutes (NRS 445A.465) prohibits the injection of fluids through wells or discharge of pollutants from a point source without a permit. In "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV" (40 CFR Part 197), the Environmental Protection Agency addressed the issue of storage or disposal of radioactive material in the proposed repository by underground injection. The Agency's conclusion was that disposal of containerized radioactive waste in geologic repositories would not constitute underground injection within the meaning of the Safe Drinking Water Act or Environmental Protection Agency regulations governing underground injection.

Yucca Mountain is not a point source discharge as defined at Nevada Administrative Code 445A.395.

DOE would comply with all applicable laws and regulations in implementing the statutory mandates of the NWPA.

4.2 (8931)
Comment - EIS001922 / 0005
EPA's Standards vs. Congressional Standards
If Yucca Mountain was required to meet the Environmental Protection Agency's (EPA) waste repository release limits that were established in 1985, Yucca Mountain would have long ago been dismissed as a possible repository.

This is a clear example of defining away a problem, rather than seeking a safer solution. The EIS does not discuss this and should be more forthright about the failures of Yucca Mountain as a repository site, rather than altering the facts to support the preferred alternative. Yucca Mountain should be held to the original standards set by the EPA and at a minimum should abide by the EPA standards proposed for [the] Waste Isolation Pilot Plant (WIPP), which would mean a reduction from 25 millirem/year to 15 millirem/year. Nevada's citizens deserve at least the same protections as New Mexicans.

Response
The Environmental Protection Agency promulgated standards at 40 CFR Part 191 that are generally applicable to the disposal of spent nuclear fuel and high-level radioactive waste. However, Section 801 of the Energy Policy Act of 1992 requires the Agency to set environmental radiation protection standards for Yucca Mountain. This Act also requires the Nuclear Regulatory Commission to modify its licensing criteria as necessary to be consistent with the Environmental Protection Agency rules. DOE would have to demonstrate compliance with those standards or the Nuclear Regulatory Commission would not grant a license to construct or operate the proposed repository.

The Environmental Protection Agency has promulgated radiological protection standards specific to Yucca Mountain (40 CFR Part 197). The radiation standard is 15 millirem per year, with an additional requirement that no more than 4 millirem can come from the groundwater pathway. This is the same as the radiation protection standard in the Agency's rules at 40 CFR Part 191, for which DOE has demonstrated compliance for the disposal of transuranic waste at the Waste Isolation Pilot Plant.

4.2 (9201)
Comment - EIS002111 / 0002
I'd just like to read that with the risk of transportation, they failed to address the effect of this complex mixture. There is lack of toxicological data of heavy metals, radionuclides alone and both interaction. There is a need for more research. YMP [Yucca Mountain Project] did not comply with Rule and Regulation 40 CFR hazardous wastes part B with guidelines for complex mixture.

Response
DOE is not clear about which applicable regulations the commenter believes DOE has not complied with. Title 40 of the Code of Federal Regulations consists of many parts. Parts 260 to 272 contain hazardous waste regulations. The commenter might be referring to Resource Conservation and Recovery Act regulations that pertain to permitting of treatment, storage, and disposal facilities for hazardous waste, which are not applicable to Yucca Mountain. The Environmental Protection Agency has promulgated environmental protection standards specifically for Yucca Mountain (40 CFR Part 197, *Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada*).

4.2 (9298)
Comment - EIS001888 / 0023
In view of the disposal of chemically toxic materials considered for the repository, RCRA regulations should apply.

Response
DOE would not dispose of chemically hazardous wastes regulated by the State of Nevada and the Environmental Protection Agency in the proposed repository. As discussed in Section 11.2.4, before shipping to Yucca Mountain, DOE would treat materials that contained hazardous components to eliminate the hazardous characteristics. DOE also would process any necessary delisting petitions with the appropriate regulatory authorities prior to shipping waste having hazardous components.

4.2 (9798)
Comment - EIS001888 / 0384
[Clark County summary of comments it has received from the public.]

One commenter stated that the EIS should describe the relevant state of Nevada water rights regulations and whether DOE is in compliance.

Response
Nevada water rights laws and regulations are found in Nevada Revised Statutes, Chapters 533 and 534, and Nevada Administrative Code, Chapters 533 and 534, respectively. Because it is the policy of the United States to apply for water in accordance with state laws, DOE has applied for water in accordance with Nevada Revised Statutes and Nevada Administrative Code Chapters 533. The State Engineer denied the Project's July 22, 1997, water appropriation applications. That denial is being litigated. Section 11.2.2 has been updated to include information on Nevada Revised Statue 533 and Nevada Administrative Code 533.

4.2 (11453)
Comment - 010316 / 0005
The DOE must have a final design choice to recommend the site to the President and Congress, as well as to apply for a license to the NRC. What is it? According to the Nuclear Regulatory Commission (NRC), DOE must have a final design for the license application. The site recommendation is more important than the license application, because it is what the President will make his determination on whether or not to recommend Yucca Mt. to congress. The Final EIS must be as clear as the NRC license application, and must indicate a final design choice. This Supplement does nothing to achieve that.

Response
DOE agrees that the site recommendation, if the Secretary of Energy recommends approval of Yucca Mountain to the President, is an important part of the site qualification and authorization process. Only after the President determines the site is qualified, and Congress approves it in the event the State of Nevada objects to the site recommendation, would DOE submit a license application to the Nuclear Regulatory Commission. The site qualification and authorization process is described in Section 1.3.2.3 of the EIS.

Regulations at 10 CFR 63.21(a) require that "The application must be as complete as possible in light of information that is reasonably available at the time of docketing." 10 CFR 63.24(a), which addresses updating of the application and the environmental impact statement, reiterates the concept of being as complete as possible in light of information reasonable available. 10 CFR 63.24 (b)(3) further provides a possible reason for needing to update the application by stating "Results of research programs carried out to confirm the adequacy of designs, conceptual models, parameter values, and estimates of performance of the geologic repository."

The Final EIS addresses all aspects of the Proposed Action, including the flexible design. DOE acknowledges in the EIS that the flexible design could be further modified or refined during the License Application process, consistent with the provisions set forth in 10 CFR Part 63.24. In this event, DOE would evaluate design revisions in accordance with the regulations and would also determine whether additional National Environmental Policy Act reviews would be required. In addition, Section 114 of the NWPA requires the Nuclear Regulatory Commission to adopt this Final EIS, to the extent practicable. With regard to the Final EIS, which will accompany any site recommendation and license application, DOE believes that the EIS complies with all applicable requirements. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of a range of assumptions addressing incomplete or unavailable information or uncertainties, provide a meaningful assessment of environmental impacts consistent with the applicable requirements.

4.2 (12289)
Comment - EIS000475 / 0014
What[ever] agency is in charge would apparently now be in [a] state of confusion as well. DOE has historically had oversight of both civilian and nuclear power with requirements to comply with regulations of both U.S. EPA and the Nuclear Regulatory Commission (NRC). Has NRC recently, as of 12/9/99 promoted both its licensees and itself, as indicated in [a copy of a newspaper article provided by the commenter]. Before long time critics of DOE conclude any change from DOE is preferable, it is instructive to document public disinformation apparently from official or unofficial NRC channels to the public as published in local news media. [A newspaper article] is included herein as example of accuracy of information/NRC agency PR officially or unofficially distributed through the local news media. The Nuclear Regulatory Commission has been identified as the NATIONAL REGULATORY COMMISSION (NRC) by local news correspondent who obviously received that information from some source. Note that [a newspaper article] provides rather strong, specific, and NRC self-serving praise. NRC Meritorious Service Award recipient is described in [a newspaper article] as inspector at both the Paducah, Kentucky and

Portsmouth (Piketon), Ohio Gaseous Diffusion/Uranium enrichment/processing plants. The exact wording of the award received is quoted by media columnist as:

'In recognition of his exceptional contributions in identification of safety issue and his strong dedication to the safety goals of the NRC (defined in [a newspaper article] as the National Regulatory Commission which either premature or inaccurate, notation in parenthesis added). His actions have provided significant benefits to the Paducah Gaseous Diffusion Plant inspection team and the Region III fuel cycle inspection program...'
Three conclusions are obvious: 1) specific information was provided from some source as basis for this news column, as evidenced by the author's quotation, 2) the media spin presents NRC more than somewhat favorably, "fireworks and heat" generated at local patriotic Fourth of July celebrations are somehow propagandized as appropriate description of DOE/NRC, and 3) either premature announcement of NRC considerable increase in regulatory authority has been made or the public has been [misled]. Apparently the public's skepticism and adverse reaction to nuclear materials has been relieved by removal of the word "nuclear."

Details of the significant benefits to the Paducah Plant inspection team are not provided. Neither is explanation of near-criticality event at the Portsmouth Plant in [the] fall of 1999 which resulted in [a] [public] meeting to reassure the local population held by NRC in February of 1999. According to NRC as reported in October of 1999, with headline "NRC: Radiation not a problem at Ohio plant." According to NRC findings, the [Portsmouth] Plant does a good job with radiation control, even though NRC found inadequacies in United States Enrichment Corporation worker training procedures. NRCs separation of radiation control (from operations minus human/worker error due to lack of training) defies logic as well as history.

Response
DOE has no authority over the operation of the Nation's commercial nuclear powerplants. As mandated by the Atomic Energy Act of 1954, as amended the Nuclear Regulatory Commission has jurisdictional authority for commercial uses of nuclear materials, including the operation of reactors to produce electricity.

DOE and the Nuclear Regulatory Commission are obligated to comply with Federal law. If the Yucca Mountain site is approved, the NWPA requires that the Secretary of Energy submit an application to the Nuclear Regulatory Commission for construction authorization, and requires that the Nuclear Regulatory Commission consider such an application and issue a final decision approving or disapproving the issuance of a construction authorization not later than 3 years after the date of submission of the application.

Further, the Energy Policy Act of 1992 requires the Environmental Protection Agency to set generally applicable standards for the Yucca Mountain site for the protection of the public from releases of radioactive materials. The Agency has established these regulations at 40 CFR Part 197. The Act also requires the Nuclear Regulatory Commission to modify its technical requirements for repository licensing to be consistent with the requirements promulgated by the Environmental Protection Agency.

4.2 (12366)
Comment - 010139 / 0002
It's really important, and to echo what Judy said and what a lot of other people said tonight that we do have a strong, safe publicly acceptable guideline in place for nuclear waste, I can't say solution, we don't know a solution, but a method for dealing with the nuclear waste we have right now on our planet, and to have strong publicly acceptable guidelines for how to deal with that in place before we go ahead and select and build and eventually whatever we decide to build.

Response
DOE presumes the commenter is referring to 40 CFR Part 197. In 40 CFR Part 197, the Environmental Protection Agency (EPA) issued site-specific radiation protection standards. Congress, in the Energy Policy Act of 1992, directed EPA to develop public health and safety standards for the protection of the public from releases of radioactive materials stored or disposed of in a repository at the Yucca Mountain site. Congress also directed the Nuclear Regulatory Commission (NRC) to publish criteria for licensing the repository that would be consistent with the radiation protection standards established by the EPA. The NRC criteria are found in 10 CFR Part 63. These standards and criteria prescribe radiation exposure limits that the repository, based on a performance assessment, cannot exceed during a 10,000-year period after closure.

4.2 (12727)
Comment - EIS001903 / 0001
The Draft EIS states it is DOE's policy that the proposed repository will not accept RCRA [Resource Conservation and Recovery Act] waste. The State of Idaho is highly critical of this policy, which would virtually prevent the proposed repository from accepting most of DOE's high-level waste, including INEEL [Idaho National Engineering and Environmental Laboratory] waste and the thousands of canisters at Hanford with RCRA codes.

The Nuclear Waste Policy Act clearly directs DOE to determine if Yucca Mountain can safely and permanently isolate high-level waste from the biological environment. There is no directive in this Act that allows DOE to exclude candidate high-level waste streams from being accepted in a suitable repository. Although the Nuclear Waste Policy Act may have originally contemplated a second repository to accommodate quantities of high-level waste and spent nuclear fuel in excess of the 70,000 metric tons of heavy metal allocated to Yucca Mountain, a second repository is no longer a realistic expectation.

Given the difficulties and costs of evaluating Yucca Mountain, it is irresponsible for DOE to exclude all RCRA waste streams from consideration in this EIS. DOE must take steps to allow acceptance of certain hazardous constituents at the proposed Yucca Mountain repository.

The EIS must evaluate an option where Yucca Mountain meets legal requirements for receiving RCRA waste, either under current or future laws. DOE may seek a RCRA part B permit for RCRA waste disposal or pursue legislative relief of these requirements. Notably, based on its experience with the WIPP [Waste Isolation Pilot Plant] facility, DOE could accept non-RCRA spent nuclear fuel at the repository until it met legal requirements for RCRA waste disposal.

Under the stated DOE policy, the high-level waste not stored at INEEL will not be eligible for disposal unless the listed RCRA codes associated with this waste are removed through delisting. However, many delisting petitions have not been successful, and the State of Nevada's policy concerning Yucca Mountain makes it unlikely to cooperate with any delisting efforts. Even though DOE has indicated it will pursue a delisting process to allow acceptance of INEEL and other DOE high-level waste, the delisting approach does not appear to be a viable one. Therefore, the Final EIS must consider other reasonable alternatives that include receiving RCRA waste at Yucca Mountain.

Response
DOE plans to treat the high-level radioactive waste to remove the organic constituents and to immobilize the hazardous constituents before it is shipped to the proposed repository. DOE believes that the waste can be treated and subsequently delisted. High-level radioactive wastes at the Savannah River Site and West Valley Demonstration Project do not contain listed hazardous wastes, and would not need to be delisted.

Because Idaho National Engineering and Environmental Laboratory and Hanford Site plans to treat the waste to meet delisting criteria, DOE does not believe under the current Office of Civilian Radioactive Waste Management requirements of not accepting high-level radioactive waste that is also hazardous would prevent it from accepting waste that is currently classified as mixed waste at the proposed Yucca Mountain Repository. DOE plans to work closely with the states and the Environmental Protection Agency to ensure they receive the information they need to process the delisting petitions.

4.2 (12810)
Comment - 010299 / 0003
According to the Nuclear Regulatory Commission (NRC) the DOE must have a final design for the license application. The site recommendation is more important than the license application, because it is what the President will make his determination on whether or not to recommend Yucca Mt. to congress. The Final EIS must be as clear as the NRC license application, and must indicate a final design choice. This Supplement does nothing to achieve that.

Response
DOE agrees that the site recommendation, if the Secretary of Energy recommends approval of Yucca Mountain to the President, is an important part of the site qualification and authorization process. Only after the President

determines the site is qualified, and Congress approves it in the event the State of Nevada objects to the site recommendation, would DOE submit a license application to the Nuclear Regulatory Commission. The site qualification and authorization process is described in Section 1.3.2.3 of the EIS.

Regulations at 10 CFR 63.21(a) require that "The application must be as complete as possible in light of information that is reasonably available at the time of docketing." 10 CFR 63.24(a), which addresses updating of the application and the environmental impact statement, reiterates the concept of being as complete as possible in light of information reasonable available. 10 CFR 63.24 (b)(3) further provides a possible reason for needing to update the application by stating "Results of research programs carried out to confirm the adequacy of designs, conceptual models, parameter values, and estimates of performance of the geologic repository."

The Final EIS addresses all aspects of the Proposed Action, including the flexible design. DOE acknowledges in the EIS that the flexible design could be further modified or refined during the License Application process, consistent with the provisions set forth in 10 CFR Part 63.24. In this event, DOE would evaluate design revisions in accordance with the regulations and would also determine whether additional National Environmental Policy Act reviews would be required. In addition, Section 114 of the NWPA requires the Nuclear Regulatory Commission to adopt this Final EIS, to the extent practicable. With regard to the Final EIS, which will accompany any site recommendation and license application, DOE believes that the EIS is consistent with the requirements of National Environmental Policy Act and NWPA. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of a range of assumptions addressing incomplete or unavailable information or uncertainties, provide a meaningful assessment of environmental impacts consistent with the applicable requirements.

4.2 (12850)
Comment - 010262 / 0003
According to the Nuclear Regulatory Commission (NRC) the DOE must have a final design for the license application. The site recommendation is more important than the license application, because it is what the President will make his determination on whether or not to recommend Yucca Mt. to congress. The Final EIS must be as clear as the NRC license application, and must indicate a final design choice. This Supplement does nothing to achieve that.

Response
DOE agrees that the site recommendation, if the Secretary of Energy recommends approval of Yucca Mountain to the President, is an important part of the site qualification and authorization process. Only after the President determines the site is qualified, and Congress approves it in the event the State of Nevada objects to the site recommendation, would DOE submit a license application to the Nuclear Regulatory Commission. The site qualification and authorization process is described in Section 1.3.2.3 of the EIS.

Regulations at 10 CFR 63.21(a) require that "The application must be as complete as possible in light of information that is reasonably available at the time of docketing." 10 CFR 63.24(a), which addresses updating of the application and the environmental impact statement, reiterates the concept of being as complete as possible in light of information reasonable available. Regulations at 10 CFR 63.24 (b)(3) further provide a possible reason for needing to update the application by stating "Results of research programs carried out to confirm the adequacy of designs, conceptual models, parameter values, and estimates of performance of the geologic repository."

The Final EIS addresses all aspects of the Proposed Action, including the flexible design. DOE acknowledges in the EIS that the flexible design could be further modified or refined during the License Application process, consistent with the provisions set forth in 10 CFR Part 63.24. In this event, DOE would evaluate design revisions in accordance with the regulations and would also determine whether additional National Environmental Policy Act reviews would be required. In addition, Section 114 of the NWPA requires the Nuclear Regulatory Commission to adopt this Final EIS, to the extent practicable. With regard to the Final EIS, which will accompany any site recommendation and license application, DOE believes that the EIS complies with all applicable requirements. The level of information and analyses, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of a range of assumptions addressing incomplete or unavailable information or uncertainties, provide a meaningful assessment of environmental impacts consistent with the applicable requirements.

4.2 (13046)
Comment - 010311 / 0017
The current siting and licensing process is ill advised. It is a political fabrication that only gives an appearance of fairness. When Yucca Mountain is recommended, Nevada's governor will object. Will the President not want to proceed to allow Nuclear Power to be considered in the solution to this Nation Energy crisis? Will Congress stop their Political process? If not, then the pressure is on the Nuclear Regulatory Commission (NRC)! This will be unreasonable political pressure on the NRC's staff to OK Yucca Mountain. Under this process can the NRC reasonably and appropriately independently review the SAFETY of Yucca Mountain regarding the site suitability issues of: Seismic Design Criteria, Capable Faults, faulting and differential ground displacement from all causes, volcanism, security, Terrorism, (to name of few important issues).

Who will review the [SAFETY] of the Transportation part of the Project? When will this happen? Provide Detail and Schedules.

This Nation should not allow the Site Safety Issues to be deferred until after the President and Congress in their wisdom say Yucca Mountain is suitable. There is a very great difference between an Environmental Impact Statement review of key site safety issues and the Nuclear Regulatory Commissions staffs' review of safety. I propose that the process be modified and that all the Site Safety Issues not involved with the subsurface repository design be addressed now using the Nuclear Power Plant Early Site Review Process. This process was legislated in the late 1970s to allow that determination of a proposed nuclear plant site prior to submitting a complete Construction Permit Application. The Early Site Review Process leads to a Letter from the Atomic Committee on Reactor Safety (ACRS). This process was successfully used for the proposed San Joaquin Nuclear Generating Station (Four 1200 MWe units) that was located in northwestern Kern County, California. However, after an informational vote of the citizens of Kern County against this San Joaquin Nuclear Generating Station, which was a joint project of all the major California Utilities, the project was cancelled in favor of Large Coal-Fired Generating units in Utah.

Response
DOE cannot comment on the potential political ramifications of a Site Recommendation or how the Administration might view Yucca Mountain in the context of a national energy policy. In the NWPA, Congress established a process that requires ultimate approval from the Nation's highest elected officials and specifically solicits the opinion of the State of Nevada. Should the Yucca Mountain Repository be determined qualified and receive authorization, the Department feels confident that the Nuclear Regulatory Commission would fulfill its responsibilities fairly and impartially pursuant to the requirements of the NWPA and in accordance with the Code of Federal Regulations.

With regard to transportation safety, Appendix M of the EIS presents information regarding how safety in transporting spent nuclear fuel and high-level radioactive waste is regulated by the Nuclear Regulatory Commission and the U.S. Department of Transportation. Appendix M also discusses how shipping casks would be designed, tested, manufactured, and maintained. In addition, the appendix presents a discussion of "Operational Protocols" that DOE would implement to help ensure the safety of transporting spent nuclear fuel and high-level radioactive waste to Yucca Mountain. Because the Yucca Mountain site has not yet been qualified for construction and operation as a nuclear waste repository, DOE has not developed specific operations plans for transportation. However, a draft request for proposals (see Appendix M of the EIS) for Acquisition of Waste Acceptance and Transportation Services for the Office of Radioactive Waste Management (DIRS 153487-DOE 1998) describes the Department's schedules and plans for acquiring services to transport spent nuclear fuel and high-level radioactive waste to a Yucca Mountain Repository.

DOE understands the potential merits associated with a process similar to that of the "nuclear power plant early site review process." DOE is following the mandates put forth by the NWPA and would comply with the provisions set forth at 10 CFR Part 63 and 40 CFR Part 197. The commenter is encouraged to provide specific recommendations on the licensing process to the Nuclear Regulatory Commission.

4.3 Proposed Environmental Protection Agency and Nuclear Regulatory Commission Rules

4.3 (70)
Comment - 19 comments summarized
Commenters expressed concerns that Congress was inappropriately planning to modify the NWPA, in such a way as to weaken the public health and safety and environmental standards. Raising radiation protection limits, providing exemptions from current local, state, or Federal oversight, establishing an interim storage facility at Yucca Mountain, and charging the Nuclear Regulatory Commission with developing the standards (rather than the Environmental Protection Agency) are examples cited by the commenters as weakening the public health and safety and environmental standards.

Response
The legislative amendments cited by the commenters were not enacted. Thus, as required by the Energy Policy Act of 1992 the Environmental Protection Agency has established "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV" (40 CFR Part 197), and the Nuclear Regulatory Commission has published regulations entitled "Disposal of High-Level Radioactive Wastes in a Proposed Geologic Repository at Yucca Mountain, Nevada" (10 CFR Part 63) governing licensing the construction and operation of the repository that are consistent with the Environmental Protection Agency's radiation protection standards. DOE continues to be obligated to comply with the provisions of the NWPA, and the resulting regulations of the Environmental Protection Agency and Nuclear Regulatory Commission.

4.3 (128)
Comment - 15 comments summarized
Commenters were concerned about the differences in the radiation protection standards proposed by the Environmental Protection Agency (EPA) and the Nuclear Regulatory Commission (NRC). Most of the commenters favored the more stringent EPA rules over the NRC rules, specifically supporting the more restrictive groundwater and all-pathways limits proposed by the EPA. Some commenters suggested that these more restrictive limits should be lowered further. In contrast, one commenter suggested that the NRC was the better-prepared agency to develop radiation protection standards.

Response
Section 801 of the Energy Policy Act of 1992 requires the Environmental Protection Agency to set standards for the protection of public health and safety from releases from radioactive materials stored or disposed of at Yucca Mountain. The Agency issued the final rule, 40 CFR Part 197, "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV," on June 13, 2001.

In addition, the Energy Policy Act of 1992 requires the Nuclear Regulatory Commission to publish final criteria for licensing consistent with the radiation protection standards set by the Environmental Protection Agency no more than 1 year after the Agency publishes its final rule. As noted by the commenters, the Nuclear Regulatory Commission published a proposed rule (64 *FR* 8640, February 22, 1999) that was less stringent in some ways than the Environmental Protection Agency standards. However, in conformance with the Energy Policy Act of 1992, the Nuclear Regulatory Commission has issued a final rule at 10 CFR Part 63 that establishes licensing criteria for the proposed geologic repository at Yucca Mountain, including radiation protection standards, that are consistent with the radiation protection standards in the final Environmental Protection Agency rule.

DOE has modified Chapter 11 of the EIS to reflect the final Environmental Protection Agency and Nuclear Regulatory Commission rules.

4.3 (129)
Comment - 24 comments summarized
Commenters questioned the use of 10,000 years as the compliance period for the repository. More specifically, commenters stated that consideration of 10,000 years was inappropriate, given the potential for societal and technological change, the hazards and potential need for human intervention given radioactive materials having half-lives much greater than 10,000 years, and the inability of science to predict repository performance over long

periods. Commenters also were concerned with the ability to design a disposal facility that would endure for this period.

Response
DOE recognizes that some components of spent nuclear fuel and high-level radioactive waste will pose a hazard after 10,000 years. As directed by Congress in the Energy Policy Act of 1992, the Environmental Protection Agency (EPA) is responsible for establishing the radiation protection standards for the proposed Yucca Mountain Repository, and the Nuclear Regulatory Commission (NRC) is responsible for developing criteria for licensing the repository that are consistent with the radiation protection standards.

Thus, the projections of impacts out to 10,000 years and beyond in the EIS, which were based on a design comprising various engineered barriers and the natural barrier system, were developed in consideration of the EPA and NRC rules that specified 10,000 years as the period of performance to be evaluated for licensing purposes. The EPA final rules establishing radiation protection standards for Yucca Mountain (40 CFR Part 197) require that DOE demonstrate that there is a reasonable expectation of compliance with the standards specified in the rule for 10,000 years following disposal. If the Department cannot make this demonstration, then the NRC cannot issue a license pursuant to its regulations governing "Disposal of High-Level Radioactive Wastes in a Proposed Geological Repository at Yucca Mountain, Nevada" (10 CFR Part 63).

In the preamble to its rule (66 *FR* 32073, June 13, 2001), the EPA noted that the standards are to be "based upon and consistent with" the findings of the National Academy of Sciences. On August 1, 1995, the Academy released its report titled *Technical Bases for Yucca Mountain Standards* (DIRS 100018-National Research Council 1995). While there is no scientific basis for limiting the period of the individual risk standard to 10,000 years or any other period, there is considerable uncertainty that current modeling will provide meaningful projections for tens of thousands to hundreds of thousands of years. As a result, EPA established a 10,000-year compliance period with a quantitative limit and a requirement to calculate the peak dose to the reasonably maximally exposed individual for the post-10,000-year period, out to the period of geologic stability (1 million years). The results of this performance analysis must be reported in this EIS (see Section 5.4).

4.3 (249)
Comment - 6 comments summarized
Commenters expressed concern about plans to change the Departmental regulations for determining the suitability of the Yucca Mountain site. Commenters believe that DOE was proposing to change the rules to facilitate siting of a repository at Yucca Mountain or because the Yucca Mountain site cannot meet the existing siting guidelines specified in 10 CFR Part 960. One commenter asked about the impacts of the changed rules on the environmental analysis.

Response
DOE has not proposed to amend its general guidelines (10 CFR Part 960) to avoid the elimination of the Yucca Mountain site from consideration. Rather, the purpose of the new Yucca Mountain-specific guidelines (10 CFR Part 963) is to implement the 1987 amendments to the NWPA, given the regulations and criteria for the Environmental Protection Agency (40 CFR 197) and the Nuclear Regulatory Commission (10 CFR Part 63), and to provide a technical basis to assess the ability (or performance) of a geologic repository at Yucca Mountain to isolate spent nuclear fuel and high-level radioactive waste from the environment.

The Nuclear Waste Policy Act [Section 112(a)] directs the Secretary of Energy (and by extension, DOE) to issue general guidelines for the recommendation of sites for characterization, in consultation with certain Federal agencies and interested Governors, and with the concurrence of the Nuclear Regulatory Commission. These guidelines (issued in 1984 at 10 CFR Part 960) were to include factors related to the comparative advantages among candidate sites located in various geologic media, and other considerations such as the proximity to storage locations of spent nuclear fuel and high-level radioactive waste, and population density and distribution.

In 1987, amendments to the NWPA specified Yucca Mountain as the only site DOE was to characterize. For this reason and given advancements in site characterization, DOE proposed in 1996 to clarify and focus its 10 CFR Part 960 guidelines to apply only to the Yucca Mountain site (to be codified at 10 CFR Part 963), but never issued these

guidelines as final. In 1999, DOE proposed further revisions to the still draft Part 963 guidelines for three primary reasons:

1. To address comments that criticized the omission of essential details of the criteria and methodology for evaluating the suitability of the Yucca Mountain site

2. To update the criteria and methodology for assessing site suitability based on the most current technical and scientific understanding of the performance of a potential repository at the Yucca Mountain site, as reflected in the DOE report, *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998)

3. To be consistent with the then-proposed site-specific licensing criteria for the Yucca Mountain site issued by the Nuclear Regulatory Commission (the Commission has since promulgated these criteria at 10 CFR Part 63), and the then-proposed site-specific radiation protection standards issued by the Environmental Protection Agency (the EPA has since promulgated these standards at 40 CFR Part 197).

In 2001, DOE promulgated its final 10 CFR Part 963 guidelines to establish the methods and criteria for determining the suitability of the Yucca Mountain site for the location of geologic repository. These final guidelines are principally the same as those proposed in 1999. DOE has modified Chapter 11 of the EIS to reflect the current status and content of the Department's site suitability guidelines.

4.3 (1631)
Comment - EIS000523 / 0001
I have done some research on Yucca Mountain and was disappointed to learn that in 1983 the government requested the DOE to research nine cities in six states. Only to tell the DOE to just research Nevada in 1987. Why was that? Is it because Nevada is a smaller state with less money and political power? Then in the Review Journal last week they said all safety standards had been dropped for Yucca Mt. Is it not true that there is all fault by Yucca Mt? Hasn't Nevada had earthquakes? What about the water table that is under Yucca Mt?

Response
Congress made the decision to focus on the Yucca Mountain site as a potential geologic repository when it amended the Nuclear Waste Policy Act in 1987. The Nuclear Waste Policy Act of 1982 began a process for selecting sites for technical study as potential geologic repository locations. In accordance with this process, DOE identified nine candidate sites, the Secretary of Energy nominated five of the nine sites for further consideration, and DOE issued environmental assessments for the five sites. DOE recommended three of the five sites, of which Yucca Mountain was one, for possible study as repository site candidates. In 1987, Congress amended the Nuclear Waste Policy Act of 1982, directing the Secretary of Energy to perform site characterization activities only at the Yucca Mountain site, and, if the site is found suitable, make a recommendation to the President on whether to approve the site for development of a repository. Congress' decision to further investigate geologic disposal only at Yucca Mountain came after many years of scientific, engineering, and technical studies and activities at Yucca Mountain.

DOE is not aware of any efforts to lift safety standards for Yucca Mountain. To the contrary, as directed by Congress in 1992, the Environmental Protection Agency and the Nuclear Regulatory Commission recently promulgated final Yucca Mountain environmental standards and licensing criteria at 40 CFR Part 197 and 10 CFR Part 63, respectively. Additionally, DOE finalized its guidelines at 10 CFR Part 963 to be consistent with the adopted Environmental Protection Agency environmental standards and the Nuclear Regulatory Commission licensing criteria. The referenced standards and guidelines, among other things, prescribe the radiation exposure limits that the repository, based on performance, cannot exceed during a 10,000-year period after closure.

With regard to the occurrence of faults and groundwater in the vicinity of Yucca Mountain, DOE has conducted extensive geohydrologic characterizations at Yucca Mountain. Sections 3.1.3 and 3.1.4 of the EIS describe the geologic and hydrologic setting of Yucca Mountain and the surrounding region, including faults, seismicity, and the volcanic history of the region. Chapter 5 of the EIS provides the results of DOE's estimates of long-term performance including earthquake and volcanic eruptions. DOE believes that a repository at Yucca Mountain would operate safely and in compliance with the applicable Environmental Protection Agency and Nuclear Regulatory Commission standards should an earthquake or volcanic event occur.

DOE recognizes that some radionuclides and potentially toxic chemicals would eventually enter the environment outside the repository primarily through the groundwater pathway. Nevertheless, modeling of the long-term performance of the repository shows that the combination of natural and engineered barriers at Yucca Mountain would preclude any releases from the repository during the first 10,000 years after closure. Estimated releases to the accessible environment after 10,000 years would be limited geographically to the groundwater flow system described in Section 3.1.4.2 of the EIS.

4.3 (1633)
Comment - EIS000521 / 0001
I was very disappointed to learn that Nevada is the only site being considered for a nuclear waste dump site. Is this because Nevada is a small state with less man and political power? Also in the Review Journal an article stated that all safety standards were to be lifted for Yucca Mountain. Since we now know that Yucca Mountain is sitting on a fault line and groundwater runs under it, how can Yucca Mountain be a safe site for nuclear waste?

Response
Congress made the decision to focus on the Yucca Mountain site as a geologic repository when it amended the Nuclear Waste Policy Act in 1987. Congress' decision to focus investigations of geologic disposal at Yucca Mountain came after many years of scientific, engineering, and technical studies, and activities at Yucca Mountain.

DOE is not aware of any efforts to lift safety standards for Yucca Mountain. To the contrary, as directed by Congress in 1992, the Environmental Protection Agency and the Nuclear Regulatory Commission recently promulgated final Yucca Mountain environmental standards and licensing criteria at 40 CFR Part 197 and 10 CFR Part 63, respectively. Additionally, DOE finalized its guidelines at 10 CFR Part 963 to be consistent with the adopted Environmental Protection Agency environmental standards and the Nuclear Regulatory Commission licensing criteria. The referenced standards and guidelines, among other things, prescribe the radiation exposure limits that the repository, based on performance, could exceed during a 10,000-year period after closure.

With regard to the occurrence of faults and groundwater in the vicinity of Yucca Mountain, DOE has conducted extensive geohydrologic characterizations at Yucca Mountain. Sections 3.1.3 and 3.1.4 of the EIS describe the geologic and hydrologic setting of Yucca Mountain and the surrounding region, including faults, seismicity, and the volcanic history of the region. Chapter 5 of the EIS provides the results of DOE's estimates of long-term performance, including earthquake and volcanic eruptions. DOE believes that a repository at Yucca Mountain would operate safely and in compliance with the applicable Environmental Protection Agency and Nuclear Regulatory Commission standards should an earthquake or volcanic event occur.

DOE recognizes that some radionuclides and potentially toxic chemicals would eventually enter the environment outside the repository primarily through the groundwater pathway. Nevertheless, modeling of the long-term performance of the repository shows that with the combination of natural and engineered barriers at Yucca Mountain, DOE would not expect the repository to exceed the prescribed radiation exposure limits during the 10,000-year period after closure. Estimated releases to the accessible environment after 10,000 years would be limited geographically to the groundwater flow system described in Section 3.1.4.2 of the EIS.

4.3 (1959)
Comment - EIS000493 / 0002
I am also confident that the public should be reassured that you can count on the Nuclear Regulatory Commission and the EPA to provide procedure and fairly careful oversight of this program.

Response
Thank you for your comment.

4.3 (2395)
Comment - EIS000763 / 0003
The estimated doses comply with proposed U.S. Nuclear Regulatory Commission standard of 25 mrem [millirem] per year, which I support as being reasonable. Even the conservatively high dose estimates in the Draft EIS appear to indicate compliance with the conservatively low U.S. EPA [Environmental Protection Agency] proposed HLW

[high-level radioactive waste] regulations (August 27, 1999), which contain both a dose criterion of 15 mrem (EDE [effective dose equivalent]) and a separate groundwater criterion.

Response
Thank you for your comment.

4.3 (2707)
Comment - EIS000956 / 0008
Nevadans living near the proposed Yucca Mountain repository need to be more protected from radioactive contamination of their water supply than New Mexicans living near WIPP [Waste Isolation Pilot Plant] because for one reason, Nevadans are also exposed to radioactivity from two other sources: the Nevada Test Site, and the Beatty "low level" radioactive waste dump. The NRC [Nuclear Regulatory Commission] rule proposes a lesser standard of protection for Yucca Mountain releases than for those of WIPP, and this fact is entirely unacceptable. This NRC proposed rule does not assure adequate protection for future generations of people who would be exposed to radionuclide release from the proposed Yucca Mountain repository.

Response
Section 801 of the Energy Policy Act of 1992 requires the Environmental Protection Agency (not DOE) to set standards for the protection of public health and safety from releases from radioactive materials stored or disposed of at Yucca Mountain. The Environmental Protection Agency issued a final rule, "Public Health and Environmental Radiation Protection Standard for Yucca Mountain, NV," at 40 CFR Part 197.

The Energy Policy Act of 1992 also gives the Nuclear Regulatory Commission 1 year after the Environmental Protection Agency publishes its final rule to publish final criteria for licensing that are consistent with the radiation protection standards set by the Environmental Protection Agency. To meet this deadline, the Commission published a final rule establishing a new 10 CFR Part 63, "Disposal of High-Level Radioactive Wastes at Yucca Mountain, Nevada." In conformance with the requirements of the Energy Policy Act of 1992, the Commission's final rule establishes licensing criteria for the proposed geologic repository consistent with the radiation protection standards in the final Environmental Protection Agency rule.

Section 8.3 of the EIS discusses cumulative impacts of past activities at the Nevada Test Site and the Beatty Low-Level Radioactive Waste Disposal Facility. The analysis shows that even considering the Nevada Test Site and the Beatty Facility in addition to the proposed repository, the cumulative dose impacts would not exceed the Environmental Protection Agency standards for environmental radiation protection.

4.3 (5454)
Comment - EIS001660 / 0011
The disclosure of the DEIS is seriously flawed because it does not address the U.S. Environmental Protection Agency's (USEPA's) pending standards for protecting public health and safety in relation to a repository at Yucca Mountain. The disclosure also fails to address the DOE's decision to amend its repository siting guidelines during the comment period on the DEIS. Both of these flaws present the public with a moving target and contradict the concept of due process.

Response
At the time DOE published the Draft EIS, the Environmental Protection Agency (EPA) had not proposed radiation protection standards for Yucca Mountain. The requirements for the Agency to develop such standards are in the Energy Policy Act of 1992, as discussed in Sections 1.3.2.4 and 11.1 of the EIS. EPA's "Public Health and Environmental Radiation Standards for Yucca Mountain, NV" (40 CFR Part 197) was issued in June 2001.

As discussed in Section 11.1, in 1996 DOE proposed amendments to the general guidelines (10 CFR Part 960) to establish a site-specific standard (codified at 10 CFR Part 963) for evaluating the suitability of the Yucca Mountain site for possible recommendation for development as a repository. In 1999, DOE proposed further revisions to the draft Part 963 guidelines for three primary reasons:

1. To address comments that criticized the omission of essential details of the criteria and methodology for evaluating the suitability of the Yucca Mountain site.

2. To update the criteria and methodology for assessing site suitability based on the most current technical and scientific understanding of the performance of a potential repository, as reflected in the DOE report, *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998).

3. To be consistent with the then-proposed site-specific licensing criteria for the Yucca Mountain site issued by the NRC (the Commission has since promulgated these criteria at 10 CFR Part 63), and the then-proposed site-specific radiation protection standards issued by the Environmental Protection Agency (EPA has since promulgated these standards at 40 CFR Part 197).

In 2001, DOE promulgated its final 10 CRF Part 963 guidelines to establish the methods and criteria for determining the suitability of the Yucca Mountain site for the location of a geologic repository. These final guidelines are principally the same as those proposed in 1999.

Chapter 5 of the EIS discusses the environmental consequences of long-term repository performance. The calculations in that chapter indicate that DOE would comply with the EPA radiation protection standards for Yucca Mountain.

The processes that EPA and the Nuclear Regulatory Commission have used to develop environmental protection standards for the repository have been progressed in a logical, progressive manner over time. Each agency first implemented general regulations for geologic repositories, and then specific environmental protection standards for the proposed Yucca Mountain Repository. In a similar manner, DOE developed implementing guidelines in a complimentary fashion. In each of these cases, there has been extensive public participation in the processes. The public has had opportunities to comment on the scope of the standards and guidelines and then on the proposed draft comments. While the process might appear to have been a "moving target," it was in fact a logical, evolving process with full public participation.

4.3 (6108)
Comment - EIS001654 / 0051
The presentation of long-term waterborne radiological consequences in section 5.4 is difficult for the layperson to follow. Despite careful review we were unable to find reference to radiation standards. We realize that the proposed radiation standard (Environmental Radiation Standards for Yucca Mountain, Nevada 40 CFR Part 197) was issued by EPA subsequent to the publishing of the DEIS. The data displays in Table 5-4 indicate that dose rates for the maximally exposed individual (MEI) would be less than the 15 millirem/year standard in the EPA proposed rule (15 mrem/year) throughout the 10,000 year performance period according to model simulations. That data is for just one of the three repository design thermal load options. As a consequence, it is easy for the non-expert to get confused with "too much data" and too little understanding.

Response
Section 1.3.2.4 of the EIS contains a revised discussion of the environmental radiation protection standards. In addition, DOE has added a discussion of the standards to Chapter 11, which includes references to the standards for comparison to the Chapter 5 discussion of radiological impacts. Finally, DOE has added a footnote to the tables giving the relevant regulatory standard.

Section 5.4 of the EIS was completely rewritten to clarify the information cited in this comment and the results. The data in Section 5.4 of the EIS indicate that the dose rates to the reasonably maximally exposed individual during the 10,000-year compliance period would be less than the standard.

Tables 5-8 and 5-12 in the Draft EIS list information on the waterborne radiological consequences of the other two thermal load scenarios.

4.3 (6799)
Comment - EIS001888 / 0460
[Clark County summary of a comment it received from a member of the public.]

A commenter questioned the use of the release standards, noting that assurance of long-term isolation of radionuclides from the human environment is not achievable, because existing and proposed radiation-release standards allow for some radiation to escape from the repository.

Response
The legal standard for repository performance has never been total isolation. The "Findings" section of NWPA of 1982 states that a purpose of the Act is to:

"...establish a schedule for the siting, construction, and operation of repositories that will provide a reasonable expectation that the public and the environment will be adequately protected from the hazards posed by high-level radioactive waste and such spent nuclear fuel as may be disposed of in a repository."

Section 801 of the Energy Policy Act of 1992 requires the Environmental Protection Agency to set standards for the protection of public health and safety from releases from radioactive materials stored or disposed of at Yucca Mountain. The Agency has issued a final rule, "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV," at 40 CFR Part 197. DOE would have to demonstrate compliance with the final standards set by the Environmental Protection Agency, or the Nuclear Regulatory Commission will not grant a license to construct and operate the repository.

4.3 (8258)
Comment - EIS001950 / 0002
The continuation of loosening the standards of how much Yucca Mountain Project will be "allowed" to contaminate the environment only shows the lack of scientific evidence used in evaluating this project and total disregard to the health and safety of Nevadans.

Response
DOE is obligated to comply with the radiation protection standards, which are established by the Environmental Protection Agency.

Section 801 of the Energy Policy Act of 1992 requires the Environmental Protection Agency to set standards for the protection of public health and safety from radioactive releases from materials stored or disposed of at the proposed Yucca Mountain Repository. The Agency has issued a final rule, "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV," at 40 CFR Part 197.

4.3 (8290)
Comment - EIS001886 / 0011
IEER's [Institute for Energy and Environmental Research] main recommendations are:

- The EPA's choice of "reasonably maximally exposed individual" is fundamentally flawed. It should be replaced by a critical group of subsistence farmers, as discussed in Appendix D of the 1995 National Research Council Report entitled Technical Bases for Yucca Mountain Standards (DIRS 100018-National Research Council 1995).

- EPA should discard its proposed time limit of 10,000 years for radiation dose protection. The time at which the dose limit must be met should be the time of estimated peak dose, whenever that might occur, as recommended in the TBYMS report.

- The EPA's choices of location for withdrawal of groundwater are too far (at least several kilometers) from the repository footprint. The assumed location of groundwater withdrawal should be at the downgradient edge of the repository footprint, unless the estimated contaminant concentration due to all sources, including Yucca Mountain is greater at another location.

- EPA should take into account all relevant non-cancer and synergistic health and ecological risks from repository construction and waste disposal in it, even if the National Academy of Sciences has not so far evaluated these risks. Specifically, EPA should evaluate non-cancer risks from carbon-14 releases.

- The suggested limit of 15 millirem per year is not protective enough. It has been set without taking due account of potential future groundwater contamination from radionuclides left in the ground due to past nuclear testing, future "sub-critical" tests, which are expected to continue indefinitely, some other potential radionuclide sources in the region, and some non-cancer risks that may be relevant in the context of the Yucca Mountain repository.

- EPA should specify that groundwater protection requires that the dose limit of 4 millirem not be exceeded taking into account the cumulative contamination from all potential radionuclide contaminant sources, including but not limited to the Yucca Mountain repository alone. The final Yucca Mountain standard should require strict conformity with the Safe Drinking Water Act.

- EPA should require that the dose limit to the critical group correspond to the 99 percent upper confidence bound based on quantifiable parameters. This will build some room for unanticipated problems in a project whose performance assessment is likely to contain uncertainties and omissions that cannot be quantified.

- The EPA's inadvertent human intrusion scenario should be based on technology, such as laser drilling, which is foreseeable but which may not be commercial today.

Response
The Energy Policy Act of 1992 directed the Environmental Protection Agency to "promulgate, by rule, public health and safety standards for the protection of the public from releases from radioactive materials stored or disposed of in the repository at the Yucca Mountain site." As directed, the Environmental Protection Agency established the radiation protection standards for the proposed Yucca Mountain Repository, and the Nuclear Regulatory Commission developed criteria for licensing the repository that are consistent with the radiation protection standards.

The Environmental Protection Agency went through an extensive public process to ensure that the standards developed provide adequate protection of public health and safety. This process is documented in the background information presented with the final rule and the Background Information Document for 10 CFR Part 197 published by the Agency.

Pursuant to the NWPA, DOE is obligated to comply with the radiation protection standards for the proposed Yucca Mountain Repository or the Nuclear Regulatory Commission would not grant a license to construct and operate the proposed repository.

4.3 (8803)
Comment - EIS001907 / 0028
Current EPA standards (40 CFR Part 191) for the Waste Isolation Pilot Plant (WIPP) in Carlsbad, NM, limit doses from geologic repositories to members of the public to 15 millirem per year total effective dose equivalent (TEDE) from all pathways, and only 4 mrem/year from the groundwater pathway. However, it is already known that at some point in the future, the Yucca Mountain repository would massively violate the 4 mrem/year standard for water contamination, in fact, the worst doses to the public from the Yucca Mountain repository would be ingested via groundwater used for drinking and irrigating crops.

Why should Nevadans living near the proposed Yucca Mountain repository be less protected from radioactive contamination of their water supply than New Mexicans living near WIPP? This prejudice against what is considered a politically weak state is unacceptable, especially when you consider that Nevadans are already being exposed to radioactive contamination from leaking nuclear waste dumps in Beatty, and the Nevada Test Site.

Response
The Environmental Protection Agency standards for the Waste Isolation Pilot Plant (40 CFR Part 191, "Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level

and Transuranic Wastes") and Yucca Mountain (40 CFR Part 197, "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV") both apply to doses over the first 10,000 years after closure. Both standards limit doses to 15 millirem per year from all pathways, and to 4 millirem per year from groundwater. Individuals located at the boundary of the controlled area would receive a comparable level of protection with either standard. The analyses in Section 5.4 of the EIS indicate that doses resulting from releases of radionuclides from the Yucca Mountain Repository would be within the radiation protection standards established by the Environmental Protection Agency.

4.3 (9913)
Comment - EIS001888 / 0459
[Clark County summary of comments it has received from the public.]

A few commenters indicated a variety of concerns relevant to the analyses in the EIS, citing the failures by Environmental Protection Agency to set rigorous radiation-release standards based on Section 801 of the 1982 Energy Policy Act, and the failure to faithfully apply the scientific method, because Yucca Mountain would have been disqualified.

Response
Section 801 of the Energy Policy Act of 1992 requires the Environmental Protection Agency to set standards for the protection of public health and safety from radioactive releases from materials stored or disposed of at the proposed Yucca Mountain Repository. The Agency issued a final rule, "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV," at 40 CFR Part 197, which promulgated these standards.

The Environmental Protection Agency went through an extensive public process to ensure that the standards developed provide adequate protection of public health and safety. This process is documented in the background information presented with the final rule and the Background Information Document for 10 CFR Part 197 published by the Agency.

The work associated with the investigation of the Yucca Mountain site has been the subject of many reviews by independent scientific groups, most notably the Nuclear Waste Technical Review Board, which was created pursuant to Title V of the NWPA. The Board consists of 11 members nominated by the National Academy of Sciences and appointed by the President. Its function is to evaluate the technical and scientific validity of activities associated with the investigation of the Yucca Mountain site, including site characterization activities and packaging and transportation of spent nuclear fuel and high-level radioactive waste. Based on these reviews and the results of the site characterization program, the analyses in this EIS, and the analysis of the site suitability guidelines (10 CFR Part 963), the Secretary of Energy will make a recommendation to the President on whether to approve Yucca Mountain site for development as a repository.

4.3 (10582)
Comment - EIS002122 / 0003
In [section 1] on page 13 referring to the environmental protection standards, it's clear that the radiation standards for exposure have not been set yet. This is another question that has to be determined before you can even proceed to say what the impacts are likely to be or whether the Yucca Mountain facility would ever meet those standards.

Response
Radiation protection standards had not been established at the time the Draft EIS was published. However, pursuant to the Energy Policy Act of 1992, the Environmental Protection Agency has since issued 40 CFR Part 197, "Public Health and Environmental Radiation Protection Standard for Yucca Mountain, NV." In addition, the Energy Policy Act of 1992 requires the Nuclear Regulatory Commission to establish final criteria for licensing that are consistent with the radiation protection standards no more than 1 year after the Environmental Protection Agency publishes a final rule. The Commission has published a final rule that established a new 10 CFR Part 63, "Disposal of High-Level Radioactive Wastes at Yucca Mountain, Nevada."

Although the Environmental Protection Agency's standards are designed to protect public health and safety, analysis of compliance with standards is only a part of the analysis of potential environmental impacts that DOE conducts in an EIS. DOE also analyzes the potential impacts of proposed actions on human health, safety and the environment,

and does not necessarily need standards for this purpose. Chapter 5 of the Draft EIS discussed how DOE estimated the impacts of the Proposed Action before these radiation protection standards had been established. DOE has modified Chapter 5 to compare the impacts from the Proposed Action to the standards. DOE also modified Chapter 4 to discuss the final Environmental Protection Agency and Nuclear Regulatory Commission regulations.

4.3 (10753)
Comment - EIS001886 / 0008
The Draft EPA [Environmental Protection Agency] standard for the proposed Yucca Mountain repository, while containing some aspects that are in the direction of environmental protection, is fundamentally deficient in a number of procedural as well as substantive aspects. A final standard along the lines of the present draft will fail to ensure the protection of health and the environment for the time during which wastes disposed of in the repository will remain a hazard to public health.

Response
The Energy Policy Act of 1992 directed the Environmental Protection Agency to "promulgate, by rule, public health and safety standards for the protection of the public from releases from radioactive materials stored or disposed of in the repository at the Yucca Mountain site." As directed, the Environmental Protection Agency established the radiation protection standards for the proposed Yucca Mountain Repository, and the Nuclear Regulatory Commission developed criteria for licensing the repository that are consistent with the radiation protection standards.

The Environmental Protection Agency went through an extensive public process to ensure that the standards developed provide adequate protection of public health and safety. This process is documented in the background information presented with the final rule and the Background Information Document for 10 CFR Part 197 published by the Agency. Pursuant to the NWPA, DOE is obligated to comply with the radiation protection standards for the proposed Yucca Mountain Repository or the Nuclear Regulatory Commission would not grant a license to construct and operate the proposed repository.

4.3 (11931)
Comment - EIS002302 / 0002
I understand pending legislation would rewrite the Nuclear Waste Policy Act of [1982] (NWPA) - throwing out radiation standards that are already insufficient. In addition, the bill would provide for the federal government - taxpayers - to take ownership of the waste and accept liability. What a return this would be for members of the Nuclear Energy Institute who invested $12.8 million in their congressional delegations to encourage pro-nuclear laws.

Response
DOE is not clear about the specific piece of legislation to which the commenter refers. During the last several sessions of Congress, members introduced proposed legislation that would modify the NWPA. However, none of these bills were enacted into law.

As required by the Section 801 of the Energy Policy Act of 1992, the Environmental Protection Agency has established radiation protection standards for the Yucca Mountain Repository (40 CFR Part 197), and the Nuclear Regulatory Commission has published criteria at 10 CFR Part 63 for licensing the construction and operation of the repository that are consistent with these Environmental Protection Agency's radiation protection standards.

The NWPA requires the Federal Government to take ownership of commercial spent nuclear fuel and to develop a repository based, in part, on a surcharge to the utility ratepayers. Under the Act, the generators of the waste are responsible for the costs associated with waste disposal. Commercial utilities pay a fee of 1 mil (one tenth of one cent) per kilowatt-hour of electricity generated by nuclear energy to cover disposal costs for commercial spent nuclear fuel. The Federal Government, through taxpayer revenues, pays for disposal of spent nuclear fuel and high-level radioactive waste generated and owned by the United States. The utility fees go into the Nuclear Waste Fund where unused portions earn investment income. Both the utility and Federally funded shares are subject to revision based on a required annual review of adequacy. The latest review found that the current 1 mil-per-kilowatt-hour fee would be adequate to cover projected disposal expenses and that the fee should remain unchanged (DIRS 152076-CRWMS M&O 1999). That review also showed that approximately 70 percent of disposal-related costs would be

paid for from the Nuclear Waste Fund and the remaining 30 percent from taxpayer revenues. Since the passage of the Nuclear Waste Policy Act, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for the disposal of spent nuclear fuel and high-level radioactive waste.

4.3 (13535)
Comment - EIS000475 / 0019
OMB [Office of Management and Budget] Circular A-119 requires all federal agencies to use voluntary consensus standards in lieu of government-unique standards in procurement and regulatory actions, except where inconsistent with law or impractical. The standards for protection of the public and the environment otherwise required by DOE, NRC [Nuclear Regulatory Commission], and U.S. EPA [Environmental Protection Agency] are not being applied to Yucca Mountain. What standards to use, unique to Yucca Mountain is in dispute by NRC and U.S. EPA. DOE is apparently using "Voluntary Consensus Standards" when regulations already apply to all other DOE sites. Anticipation/determination by DOE, NRC, and/or U.S. EPA requires DOE to find the site unsuitable rather than insert new standards less protective into the process. It would seem rather obvious that DOE, NRC, U.S. EPA have apprehensions by virtue of the debate over which standards should apply. No confidence by regulatory agencies in the sites ability to perform to regulations does not inspire confidence in agency EIS draft "preferred alternative." Ref.: CERTIFICATION REQUIREMENTS, NEW GUIDANCE SHOULD ENCOURAGE TRANSPARENCY IN AGENCY DECISIONMAKING, GAO/GGD-99-170, Sept. 1999.

Response
Voluntary consensus standards are not applicable if there are applicable regulations, as there are for the proposed repository at Yucca Mountain. There are no voluntary consensus standards that would apply to the long-term performance of the repository.

Section 801 of the Energy Policy Act of 1992 requires the Environmental Protection Agency to set standards for the protection of public health and safety from releases from radioactive materials stored or disposed of at Yucca Mountain. The EPA has issued a final rule (40 CFR Part 197, "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV"). In addition, the Energy Policy Act of 1992 requires the Nuclear Regulatory Commission (NRC) to publish final criteria for licensing consistent with the radiation protection standards set by the EPA no more than 1 year after the EPA publishes its final rule. In response, the Commission has published 10 CFR Part 63, "Disposal of High-Level Radioactive Wastes at Yucca Mountain, Nevada." This rule establishes licensing criteria for the proposed geologic repository at Yucca Mountain, including a radiation protection standard.

DOE would have to demonstrate compliance with the final regulations set by the Environmental Protection Agency or the Nuclear Regulatory Commission will not grant a license to construct and operate the repository.

DOE also has published new "Site Suitability Guidelines for Yucca Mountain" (10 CFR Part 963). These guidelines are consistent with the criteria and methodologies in the Nuclear Regulatory Commission rules cited above.

DOE has modified Chapter 11 of the EIS to reflect the current status of Yucca Mountain-specific regulations.

4.4 Final Environmental Protection Agency and Nuclear Regulatory Commission Rules

4.4 (244)
Comment - 17 comments summarized
Commenters noted that the Supplement to the Draft EIS was based on the presumption that proposed health and safety standards to be issued by the Environmental Protection Agency (40 CFR Part 197) and the site-specific licensing criteria to be issued by the Nuclear Regulatory Commission (10 CFR Part 63) were already adopted. Commenters expressed concern that DOE could not demonstrate compliance because of the fact the proposed performance standards and licensing criteria were not in place. The Final EIS and any other supplement should reference these guidelines.

Response
Section 801 of the Energy Policy Act of 1992 required the Environmental Protection Agency (EPA) to develop public health and safety standards to protection the public from releases of radioactive materials stored or disposed of in a repository at the Yucca Mountain site. The Energy Policy Act of 1992 also directed the Nuclear Regulatory Commission (NRC) to publish criteria for licensing the repository that would be consistent with the radiation protection standards established by the EPA. These standards and criteria prescribe the radiation exposure limits that the repository, based on performance assessments, could not exceed during the 10,000-year period after closure. After DOE issued the Supplement to the Draft EIS in May 2001, both the EPA standards at 40 CFR Part 197 and the NRC licensing criteria at 10 CFR Part 63 were promulgated. In addition, in 2001 DOE promulgated its 10 CFR Part 963 guidelines to be consistent with the EPA standards and the NRC licensing criteria. The estimated impacts presented in the Final EIS fully consider, and provide comparisons with, the standards as promulgated. DOE has modified Chapter 11 of the EIS to include the promulgated regulations.

4.4 (11612)
Comment - 010242 / 0005
Because the Supplement relies on DOE models that indicate there would be no waste container failures during EPA's proposed regulatory period of 10,000 years, the Supplement concludes that there would be zero individual radionuclide dose during that time period, regardless of the repository design. However, it does project peak doses after 10,000 years as an impact indicator, and those expected doses exceed any proposed regulatory standard. The State's position is that the regulatory standard should be applied through the time of expected peak dose.

Response
DOE would comply with the requirements of 40 CFR Part 197. Recommendations regarding the applicable standards or the compliance period should be provided to the Environmental Protection Agency.

4.4 (12307)
Comment - 010104 / 0003
Table 3-1, Footnote e: The receptor dose is calculated at a distance of 20 km (12 miles). The EPA has determined the appropriate distance is 11 miles.

Response
Since DOE issued the Supplement to the Draft EIS in May 2001, the Environmental Protection Agency promulgated its environmental protection standards for Yucca Mountain at 40 CFR Part 197. In the final rule, the Agency modified the point of compliance for the reasonably maximally exposed individual from 20 kilometers (12 miles) to 18 kilometers (11 miles). The long-term performance analysis presented in Chapter 5 of this Final EIS reflects this change.

4.4 (12925)
Comment - 010286 / 0003
In addition, we are alarmed by the EPA's willingness to lower water standards so this project can be approved. It appears that there are still many unanswered questions, a lack of information and uncertainties about this project.

Response
The Environmental Protection Agency (EPA) issued the final rule for Yucca Mountain at 40 CFR Part 197 on June 13, 2001. The preamble to the final rule explains how the EPA incorporated public comments on the proposed rule. EPA acknowledged the difficulties associated with demonstrating long-term performance. EPA noted that the standards are "based upon and consistent with" the findings of the National Academy of Science. While there is no scientific basis for limiting the period of individual risk standards for 10,000 years or any other period, there is considerable uncertainty that current modeling will provide meaningful projections for tens of thousands to hundreds of thousands of years. EPA noted that concern has been expressed regarding residual risk and the ability of the licensee of any repository to demonstrate compliance with the standards given the uncertainties about these facilities that arise over the long time periods at issue.

4.4 (13094)
Comment - 010227 / 0012
There is an assumption in the SDEIS that the maximally exposed individual will be 20 km from the repository site, yet the recently released EPA regulations allow only an 11 mile buffer zone. The SDEIS allows an additional 1.4274 miles before the maximally exposed individual is counted.

Response
Since DOE issued the Supplement to the Draft EIS in May 2001, the Environmental Protection Agency promulgated its environmental protection standards for Yucca Mountain at 40 CFR Part 197. In the final rule, the Agency modified the point of compliance for the reasonably maximally exposed individual from 20 kilometers (12 miles) to about 18 kilometers (11 miles). The long-term performance analysis in Chapter 5 of the Final EIS reflects this change.

4.4 (13250)
Comment - 010328 / 0004
The assumption that the maximally exposed individual would be at 20 kilometers, now, this is a problem because there are laws on the books right now that don't say there's a 20 kilometer buffer zone. The proposed EPA rule is an 18 kilometer buffer zone. So I'm standing 19 kilometers away yet that's not -- you're assuming that the maximally exposed individual is 20 kilometers away. It's just not consistent. It's not even consistent with the proposed rules. And that's a concern, another one of many.

Response
Since DOE issued the Supplement to the Draft EIS in May 2001, the Environmental Protection Agency promulgated its environmental protection standards for Yucca Mountain at 40 CFR Part 197. In the final rule, the Agency modified the point of compliance for the reasonably maximally exposed individual from 20 kilometers (12 miles) to about 18 kilometers (11 miles). The long-term performance analysis in Chapter 5 of this Final EIS reflects this change.

4.4 (13269)
Comment - 010231 / 0003
EPA notes that since this supplement was prepared, the EPA Administrator has signed 40 CFR Part 197, *Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada.* The final EIS and any other supplements should reference these standards. Also, any subsequent documents should incorporate the provisions of Part 197 into the discussion and comparisons made in the EIS, e.g., the references to the "postclosure receptor" being located 20 kilometers south of the repository are outdated.

Response
After DOE issued the Supplement to the Draft EIS in May 2001, both the Environmental Protection Agency standards at 40 CFR Part 197 and the Nuclear Regulatory Commission licensing criteria at 10 CFR Part 63 were promulgated. In addition, in 2001 DOE promulgated its 10 CFR Part 963 guidelines to be consistent with the adopted EPA standards and the NRC licensing criteria. The estimated impacts presented in the Final EIS fully consider, and provide comparisons with, the final standards as promulgated. DOE has modified Chapter 11 of the EIS to include the final regulations.

4.5 Program, Project, and Policy Issues

4.5 (63)
Comment - 9 comments summarized
Commenters noted the limitation of 70,000 metric tons of heavy metal (MTHM) for a Yucca Mountain Repository, and expressed concern that more than 100,000 MTHM of estimated waste will need disposal. Some commenters stated that a single repository could be more efficient and could have less risk than building two repositories, and that the 70,000-MTHM limit is a potential obstacle to the best course of action. Commenters stated that this EIS should clearly state that DOE would prepare another EIS if there was a proposal to build a second repository. Without knowing how much waste could be emplaced at Yucca Mountain, no action should be considered.

Response
The NWPA states that any Nuclear Regulatory Commission decision to approve a DOE License Application shall prohibit the emplacement in the Yucca Mountain Repository of more than 70,000 MTHM of spent nuclear fuel and high-level radioactive waste until a second repository was in operation. For this reason, the Proposed Action limits its consideration to 70,000 MTHM. DOE understands that more than 70,000 MTHM could be generated and considers emplacement at Yucca Mountain of quantities in excess of 70,000 MTHM to be a reasonably foreseeable future action. For this reason, DOE analyzed a volume of about 107,500 MTHM of spent nuclear fuel in Section 8.2 of the EIS. However, as discussed in Chapter 8, the disposal of more than 70,000 MTHM in the proposed repository would require either a second repository be in operation or amendment of the NWPA by Congress.

Section 8.1.2.1 of the EIS discusses the area required for emplacement of more than 70,000 MTHM, and indicates the need for additional subsurface area beyond the one to three emplacement blocks for the Proposed Action. The additional emplacement blocks would require further characterization before their use. However, subject to the conditions discussed above, DOE is unaware of any technical reason why it could not use these blocks and, thus, could dispose of the inventory of about 107,500 MTHM in the repository. Legislative action would be required to emplace more than the statutory limit of 70,000 MTHM for a first repository. Additional National Environmental Policy Act review would likely be required in such an event (Chapter 8 has been modified to reflect this).

4.5 (92)
Comment - 31 comments summarized
Commenters expressed support for a centralized interim storage facility for high-level nuclear waste and suggested that DOE should give serious attention to developing a temporary storage capability at the Yucca Mountain site. Commenters noted that Congress has considered legislation to begin moving waste to Yucca Mountain before 2010. Other commenters argued against interim storage at the Yucca Mountain site and expressed concern that DOE would use the site for above-ground interim storage before repository approval, licensing, and operation and that, after the site was storing waste on an interim basis, pressure would mount for Nevada to accept it permanently. Commenters noted the Nuclear Waste Technical Review Board findings that there are no compelling technical or safety reasons for moving the waste to a centralized storage facility. A commenter suggested that waste could be shipped to the repository before the site suitability determination. A commenter questioned whether waste should be shipped to Yucca Mountain at any time before assurance that DOE could build structures to isolate it. Some commenters suggested that the aging facility and other operational features such as fuel blending, which are options in the flexible design described in this Final EIS, constitute interim storage, which is specifically prohibited at a proposed repository such as the Yucca Mountain site.

Response
Consistent with the NWPA, DOE performed detailed evaluations of the Yucca Mountain site. However, scenarios for possibly moving the spent nuclear fuel and high-level radioactive waste to a centralized interim storage or monitored retrievable storage site have been evaluated by others (see Table 7-1 in Chapter 7 of the EIS). For example, the Private Fuel Storage facility at Skull Valley, Utah is currently under study by the Nuclear Regulatory Commission. Since the publication of the Yucca Mountain Draft EIS, the Commission issued a Draft EIS related to the construction and operation of a privately owned facility at Skull Valley in Utah to store as much as 40,000 metric tons of heavy metal (MTHM) of commercial spent nuclear fuel (DIRS 152001-NRC 2000). DOE recognizes interim storage at the Private Fuel Storage facility in Utah to be a reasonably foreseeable future action and has included this proposed action as part of the cumulative impacts analysis in Chapter 8. Further, this Final EIS evaluates potential cumulative transportation impacts associated with the interim storage of 40,000 MTHM of commercial spent nuclear fuel to the proposed facility at Skull Valley (see Section 8.4).

Congress has not enacted legislation, introduced on several occasions, to amend the NWPA to allow interim storage at the Yucca Mountain site. Therefore, DOE has focused its evaluation on the Yucca Mountain Repository as directed by the NWPA. The Proposed Action analysis includes storage only to the extent that storage would be part of repository operations. The Environmental Protection Agency standards (40 CFR Part 197) establish environmental compliance limits for a Yucca Mountain Repository to protect human health and safety. The standards contemplate storage in the normal sense of preclosure repository operations as defined in Subpart A, "Environmental Standards for Storage."

Although the flexible design described in this Final EIS includes the potential for an aging facility for storage of as much as 40,000 MTHM over 50 years, DOE has proposed that facility as an operational option that could provide a cost-effective method of achieving a lower-temperature repository. DOE does not believe that the siting limitations for interim storage facilities in the Nuclear Waste Policy Act constrain the operational flexibility or ultimately the long-term performance of the repository. Rather, the Department believes that the spent nuclear fuel aging facility option constitutes a potential operational element of the repository.

4.5 (96)

Comment - 4 comments summarized

Commenters stated that the planned closure of the repository in 2033 is not consistent with DOE agreements with the State of Idaho that require that high-level radioactive waste from the Idaho Engineering and Environmental Laboratory (INEEL) only has to be ready to move by 2035. If the Yucca Mountain Repository closed before 2035, DOE could not use it for the disposal of INEEL waste. Commenters suggested an alternative in the EIS that includes accepting high-level radioactive waste shipments through 2060, which would provide a more reasonable timeframe at Yucca Mountain and enable the repository to accept the INEEL waste. Given the unlikely prospect for another repository in the current budgetary climate, commenters stated that the planned closure in 2033 is unreasonable. One commenter stated that the Waste Acceptance Criteria being prepared by DOE for Yucca Mountain should be structured to allow for acceptance of INEEL high-level radioactive waste.

Response

DOE is fully cognizant of the terms and conditions of the Settlement Orders related to Idaho National Engineering and Environmental Laboratory high-level radioactive waste and is making every effort to ensure that disposal operations could begin as planned and that waste currently in storage, to the amount allowed by law, would be brought to the Yucca Mountain Repository, if it is approved. The NWPA states that Nuclear Regulatory Commission approval of a DOE License Application would prohibit the emplacement of more than 70,000 metric tons of heavy metal (MTHM) of spent nuclear fuel and high-level radioactive waste in the proposed repository until a second repository was in operation. For this reason, the Proposed Action limits its consideration to 70,000 MTHM and DOE chose a 24-year emplacement period. DOE understands that more than 70,000 MTHM could be generated and considers this to be a reasonably foreseeable future action and, for this reason, analyzed a volume of about 107,500 MTHM of spent nuclear fuel in Section 8.2 of the EIS. However, as discussed in Chapter 8, the disposal of more than 70,000 MTHM in the proposed repository would require that either second repository in operation or legislative action by Congress.

DOE does not anticipate that the Yucca Mountain waste acceptance criteria would preclude acceptance of Idaho National Engineering and Environmental Laboratory high-level radioactive waste following treatment. For example, DOE believes this waste, which might contain listed hazardous waste, ultimately could be disposed of at Yucca Mountain. The Department would have to petition the appropriate regulatory agencies to "delist" such waste prior to disposal at Yucca Mountain.

4.5 (99)

Comment - 33 comments summarized

Commenters noted that utilities and their ratepayers have been paying into the Nuclear Waste Fund for years, and stated that as a result of delays in developing a repository, the utilities and their ratepayers would have to pay for additional storage that was not planned for based on the Nuclear Waste Policy Act requirement that the Federal Government begin accepting wastes by January 31, 1998. Commenters also believe that many plants would have to expand storage capacity, shut down prematurely, or would be unable to renew their operating licenses, and that ratepayers would have to pay these costs. Some commenters stated that the Federal Government should bear the added costs of disposal. Others stated that the Federal Government should not take responsibility for the waste until the repository was open.

Response

DOE cannot comment on issues related to the Standard Contract for Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste (10 CFR 961.11) or potential impacts resulting from the delay in DOE beginning to accept wastes on January 31, 1998, because it is the subject of ongoing litigation.

4.5 (107)
Comment - 10 comments summarized
Commenters stressed the importance of developing a viable waste management program for spent nuclear fuel and high-level radioactive waste and moving forward expeditiously to meet the 2010 schedule for acceptance of spent nuclear fuel and high-level-waste at the proposed repository. Commenters emphasized that nuclear power provides 20 percent of the Nation's electricity, that failure to meet the nuclear waste disposal challenge could result in the loss of this electric generating capacity, which would harm business, and that nuclear energy use avoided the generation of significant amounts of environmental pollution that would be created if this capacity was replaced with fossil fuel sources. Commenters also noted the importance of nuclear technology for medical and industrial purposes.

Response
As discussed in Section 1.3 of the EIS, the NWPA acknowledges the Federal Government's responsibility to provide permanent disposal of the nation's spent nuclear fuel and high-level radioactive waste and established the DOE Office of Civilian Radioactive Waste Management, which has the responsibility to carry out the evaluative, regulatory, developmental, and operational activities the Act assigns to the Secretary of Energy. The evaluation of the suitability of Yucca Mountain as a potential repository is part of the process mandated by Congress.

DOE is proceeding in accordance with the NWPA. To date, characterization activities at the Yucca Mountain site have yielded sufficient data to determine whether to recommend the site for further development. If the site is recommended and the recommendation is accepted by the President and if Congress passed a resolution of repository siting approval, DOE plans to submit a License Application to NRC in 2003 to begin accepting spent nuclear fuel in 2010.

4.5 (151)
Comment - 3 comment summarized
Commenters stated that DOE has an outstanding safety program that was second to none and might even go overboard on ensuring worker safety.

Response
Radiological and industrial safety are high priorities at DOE facilities. The Department's goal is to promote the safety of workers, as well as the public and the environment. While it might seem that attention to safety is too rigorous, this is the same culture that the DOE safety program has instilled in its workers, which helps ensure the prevention of injuries.

4.5 (214)
Comment - 3 comments summarized
Commenters suggested that plans for closing the repository lacked a strategy for long-term monitoring and that this was unacceptable in light of the lasting dangers of spent nuclear fuel and high-level radioactive waste. One commenter suggested that the Federal Government commit to mitigate any problems and ensure that no member of the public is ever in danger from the repository.

Response
A postclosure monitoring program is required by 10 CFR Part 63. This program would include the monitoring activities that would be conducted around the repository after the facility was closed and sealed. The regulations require that a license amendment be submitted for permanent closure of the repository [10 CFR 63.51(a)(1) and (2)]. This amendment must specifically provide an update of the assessment for the repository's performance for the period after permanent closure, as well as a description of the program for postclosure monitoring. This program would include continued oversight to prevent any activity at the site that posed an unreasonable risk of breaching the geologic repository's engineered barriers, or increasing the exposure of individual members of the public to radiation beyond allowable limits. The details of this program would be defined during the processing of the license amendment application for permanent closure. Deferring a description of this program until the closure period would allow for the identification of appropriate technology including technology that could become available in the future. See Section 2.1.2.4 of the EIS for more details.

4.5 (215)
Comment - 4 comments summarized
Commenters suggested that performance confirmation activities are nothing more than a continuation of DOE site characterization activities, that the Department changed the name of these activities because it will not have adequate information in time to support a Site Recommendation on its self-imposed schedule, and that, according to the Draft EIS and contrary to the intent of the NWPA [Section 114(a)(1)], DOE would not determine the suitability of the site for a repository until closure. Commenters suggested that more detail should be provided regarding the differences between site characterization, preconstruction performance confirmation, and performance conformation activities. In addition, commenters requested clarification about when site characterization activities would end and performance confirmation activities would begin.

Response
As required by the NWPA, DOE began site characterization activities to evaluate the suitability of the Yucca Mountain site for the location of a repository. As such, site characterization included activities the Secretary of Energy considered necessary to provide the data required for evaluation of the suitability of the site for submittal of an application to the Nuclear Regulatory Commission for a construction authorization for a repository. The Secretary will consider the information from the site characterization program, as well as the results of the environmental analyses of this EIS and public input, in determining whether to recommend to the President the development of the site as a geologic repository.

The performance confirmation and testing program is an important part of the strategy for the development of the postclosure safety case for the proposed repository (DIRS 153849-DOE 2001) and is designed to meet specific regulatory requirements [10 CFR 63.102(m) and 10 CFR Part 63, Subpart F]. As defined, the program would consist of tests, experiments, and analyses to evaluate the adequacy of the information used to demonstrate compliance that the repository would meet performance objectives. The description of the performance confirmation program is formally documented in the Performance Confirmation Plan (DIRS 146976-CRWMS M&O 2000) described in Section 4.1 and summarized in Section 2.1.2.3 of the EIS. The program started during site characterization.

The performance confirmation and testing period would begin before the end of site characterization; therefore, some activities would occur before the start of construction. In addition, performance confirmation activities would extend until the beginning of repository closure operations, as discussed in Section 2.1.2 of the EIS. Key geologic, hydrologic, geomechanical, and other processes or factors (and related parameters) would be monitored and tested throughout repository construction, emplacement, and operation to detect major changes from baseline conditions. DOE would use these data to confirm that subsurface conditions were consistent with the assumptions used in performance analyses and that barrier systems and components would operate as expected. DOE modified Sections 2.1.2 and 4.1 of the EIS to describe more accurately the performance confirmation program, and clarified the performance confirmation period.

4.5 (217)
Comment - 17 comments summarized
Commenters suggested that any solution to waste disposal must maintain the option to monitor and retrieve the waste at any time. Commenters said that this option was important because future generations might develop new technologies for reducing the materials' toxicity or discover new uses for the materials. Commenters stated that the EIS did not fully evaluate potential impacts resulting from retrieval of the materials including costs associated with identifying and developing alternative disposal sites or transporting the materials to alternative sites, or costs the Federal, state, and local governments could incur.

Response
Section 122 of the NWPA requires DOE to maintain the ability to retrieve emplaced spent nuclear fuel and high-level radioactive waste during an appropriate period of operation of the facility. Nuclear Regulatory Commission regulations [10 CFR Part 63, particularly Section 63.111(e)] require that the repository be designed so that any or all of the waste could be retrieved on a reasonable schedule starting at any time up to 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the Yucca Mountain Repository provides a design and management approach that would isolate wastes from the public in the future while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the

ability to retrieve emplaced materials for at least 100 years and possibly as long as 300 years to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. Because retrieval is not anticipated, DOE did not include it as part of the Proposed Action. However, the EIS evaluated retrieval as a contingency action, and describes potential impacts if it occurred (see Section 4.2 of the EIS).

Future actions regarding the management and disposal of these materials following retrieval would be at the direction of Congress and are highly speculative, DOE believes it is inappropriate to evaluate impacts that could result from these actions. In relation to the No-Action Alternative, Scenario 1 assumes that the spent nuclear fuel and high-level radioactive waste would be stored in a configuration that would allow retrieval at any time in the future; therefore, long-term retrievability is not an issue.

With regard to monitoring, 10 CFR 63.51 requires DOE to submit a license amendment application prior to permanent closure of the repository. This application would describe the program for post closure monitoring. Section 2.1.2.4 of the EIS provides information on activities that DOE has planned for the closure period (permanent monuments, land records, etc.) and indicates that the Department would add provisions for postclosure monitoring.

DOE recognizes that the development of new technologies for waste management could occur in the future. In fact, at the direction of Congress DOE is studying accelerator transmutation of radioactive waste. The transmutation process involves state-of-the-art principles, some of which are not yet proven. However, even if transmutation became a feasible technology, a repository would be an essential element of the nuclear fuel cycle because significant quantities of highly radioactive, long-lived materials would remain (see Section 9.1.3 of the EIS).

4.5 (435)
Comment - EIS000080 / 0006
Maintenance of capability. Who's going to ensure that the information that we know about the repository today is going to be available a hundred years down the road or 300 years down the road?

When a problem occurs, there's going to be a mad scramble to say, "What do we do? What's it like?"

We have to maintain that capability and knowledge about that repository with waste in it and what to do in the event of a failure.

Response
Regulations of the Nuclear Regulatory Commission (10 CFR 63.51) require DOE to submit an application to amend its license before permanent closure. The application is to provide a detailed description of the measures the Department would use to regulate or prevent activities that could impair the long-term isolation of emplaced waste and ensure the preservation of relevant information for future generations. At a minimum, the measures are to include:

- Identification of the site and repository operations area by monuments
- Placement of records in the archives and land record systems of local, state, and Federal agencies
- Records that identify the location of the repository including the underground facility, boreholes, shafts and ramps, and boundaries
- A program for continued oversight to prevent any activity at the site that poses an unreasonable risk of breaching the repository's engineered barriers or increasing exposure to members of the public beyond allowable limits

4.5 (463)
Comment - EIS000113 / 0002
And the other thing, of course, if you buy them out in Amargosa and in Beatty, eminent domain, and then everyone would have a straight shot to the Test Site.

This is a question that has not come out, and I'm glad I have a chance to say it, because it was asked and never answered. Might the government do this?

Response
DOE has no plans to buy out the residents of Amargosa Valley or Beatty, Nevada.

4.5 (633)
Comment - EIS000159 / 0006
DOE currently spends billions of dollars every year in an effort to protect the public from radioactive wastes dumped as a result of weapons production. The technical difficulties in doing this are nearly insurmountable and in some places, millions of dollars are being spent merely in monitoring the spread of the radiation. With 95% of the radioactivity in this country coming from commercial waste, DOE should reject the Yucca Mountain site and work to develop and implement nuclear waste policies based on sound science and protecting the public health instead of the nuclear industry's profits.

Response
The requirements of the NWPA, which directed DOE to consider only the Yucca Mountain site for the development of a geologic repository, guide Yucca Mountain-related activities. As required by the Act, DOE has performed site characterization activities at Yucca Mountain and studied its suitability as a repository for disposal of spent nuclear fuel and high-level radioactive waste. At the same time, DOE has continued development of a repository design for Yucca Mountain, which includes extensive review by independent technical experts including the National Academy of Sciences and the Nuclear Waste Technical Review Board. Ultimately, a repository would have to be licensed by the Nuclear Regulatory Commission, using standards established by the Environmental Protection Agency. These scientific peer reviews and regulatory requirements ensure the repository's design is based on sound science and that the long-term performance of the repository would be protective of public health, safety, and the environment.

Regarding protecting nuclear industry profits, in the "Findings" section of the NWPA, Congress stated that "while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel...." Since the passage of that Act, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999 (September 30, 1999), the program had spent approximately $6 billion for the purposes specified in the Nuclear Waste Policy Act.

Taxpayers fund only the management and disposal of DOE-produced and -owned materials; disposal of commercial spent nuclear fuel is funded by the generators (that is, commercial utilities). The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. This percentage is based on the space required to dispose of defense-related spent nuclear fuel and high-level radioactive waste. Thus, the commercial utilities are "paying their fair share" of repository program costs along with taxpayers.

4.5 (703)
Comment - EIS000181 / 0003
DOE is long overdue on its legal commitment to take the spent nuclear fuel (SNF) from the nation's nuclear powerplants. It should certainly proceed with Yucca [Mountain] as rapidly as possible and, in addition, should make arrangements for interim storage of the SNF pending Yucca [Mountain's] readiness.

Response
DOE cannot comment on issues related to the Standard Contract for Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste (10 CFR 961.11) or potential impacts resulting from its delay in beginning to accept spent nuclear fuel by January 31, 1998, because these issues are the subject of ongoing litigation.

As discussed in Section 1.3 of the EIS, the NWPA acknowledges the Federal Government's responsibility to provide permanent disposal of the nation's spent nuclear fuel and high-level radioactive waste and established the

DOE Office of Civilian Radioactive Waste Management, which has the responsibility to carry out the evaluative, regulatory, developmental, and operational activities the Act assigns to the Secretary of Energy. The evaluation of the suitability of Yucca Mountain as a potential repository is part of the process mandated by Congress.

DOE is proceeding in accordance with the NWPA. To date, characterization activities at the Yucca Mountain site have yielded sufficient data to determine whether to recommend the site for further development. If the site is recommended and the recommendation is accepted by the President and (if necessary) Congress passed a resolution of repository siting approval, DOE would submit a License Application to the Nuclear Regulatory Commission as soon as possible.

4.5 (709)
Comment - EIS000168 / 0006
CNTA [Citizens for Nuclear Technology Awareness] would also like to recommend that NAS [the National Academy of Sciences] be requested to revisit the issue of radioactive waste disposal before the EIS is finalized. The study should focus on the criteria set forth in the original recommendation and verify that Yucca Mountain meets those requirements. The results of this evaluation should expedite the EIS process by providing additional assurance to the public and elected officials that Yucca Mountain is a viable site for disposal of radioactive waste in rock deep underground.

Response
Section 801(a)(1) of the Energy Policy Act of 1992 requires the Environmental Protection Agency (EPA) to set standards, based on and consistent with the findings and recommendations of the National Academy of Sciences, for the protection of public health and safety from releases from radioactive materials disposed of at Yucca Mountain. In 1995, the National Research Council issued a report (DIRS 100018-National Research Council 1995) written for the EPA at the request of Congress, on its findings and recommendations on radiation protection standards for Yucca Mountain. On June 13, 2001, the EPA issued a final rule at 40 CFR Part 197, entitled "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada."

If the repository was recommended and approved for development by the President and Congress, its construction, operation and monitoring, and eventual closure would be regulated under a license issued by the Nuclear Regulatory Commission. Section 801(b)(1) of the Energy Policy Act requires that, the Commission publish final criteria for licensing that are consistent with the EPA radiation protection standards (40 CFR Part 197). The Commission has published final rule establishing new 10 CFR Part 63, "Disposal of High-Level Radioactive Wastes at Yucca Mountain, Nevada." This rule establishes licensing criteria for the proposed repository, including a proposed radiation protection standard. The Commission would ensure compliance with 10 CFR Part 63 before issuing a construction permit to DOE for the repository.

4.5 (768)
Comment - EIS000094 / 0004
Would the Senate, would the Congress, would both houses together give them the money that they need? So once this program starts, it seems to me a real disconnect when you've got a forever program that has to operate on annual appropriations from a Congress who from one year to the next is very uncertain about how important it is to them, and when they do close it up, the drip shields, the backfill, all of this stuff that's supposed to protect the site from leaking -- I don't know if it will or not -- are very expensive and they get paid for at the time it's closed, whether it's fifty years or 300 years, and this depends upon Congress thinking it's that important to appropriate the money. So I think people need to think about that. If you feel that Congress has not felt you were terribly important now, you know, it's possible that that would be a doubt in the future.

Response
In the "Findings" section of the NWPA, Congress stated that "...while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel...." Since the passage of that Act, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999, the program had spent approximately $6 billion for the purposes specified in the Act. DOE periodically assesses the adequacy of the

Nuclear Waste Fund, and has always found that the fund is adequate to pay for investigating, designing, licensing, operating and monitoring, and closing a repository, including considerations for enhanced engineered barriers such as drip shields.

Taxpayers fund only the management and disposal of DOE-generated and -owned materials; disposal of commercial spent nuclear fuel is funded by the generators (that is, the utilities). The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. This percentage is based on the space required to dispose of defense-related spent nuclear fuel and high-level radioactive waste. Thus, the private commercial utilities are "paying their fair share" of repository program costs along with taxpayers.

DOE believes that Congress, having directed the Federal Government to embark on this project, would continue to fund it adequately to protect the health and safety of the public and the environment.

4.5 (879)
Comment - EIS000208 / 0003
A vital aspect that the draft EIS fails to consider is the possible loss of the nuclear energy's electricity supply and environmental benefits if a permanent repository is not built.

The failure to open a permanent repository over the long term could diminish the availability of nuclear power in this country. Some state legislators and regulators already are imposing restrictions on additional storage for used fuel at nuclear plant sites because of the federal government's inaction. Should America's nuclear generating capacity be reduced because of the lack of a national repository, the environmental impact of cutting back on our largest source of emission-free electricity would be severe. The draft EIS discusses the various impacts related to on-site storage under the no-action scenarios, but fails to acknowledge the far-greater environmental impact on our air quality if fossil sources must be used to replace the 20 percent of electricity produced by nuclear powerplants.

By substituting for fossil fuels, nuclear energy each year avoids the emission of 155 million metric tons of carbon, 5 million tons of sulfur dioxide and 2.4 million tons of nitrogen oxides. Without the clean-air benefits of nuclear energy, our nation would find it nearly impossible to meet increasingly stringent Clean Air Act restrictions. Moreover, the United States would have to double the reductions in carbon to meet the commitments by the Clinton Administration under the 1998 Kyoto Protocol.

Response
DOE agrees with this comment and with the Nuclear Regulatory Commission (DIRS 152001-NRC 2000) that under the No-Action Alternative there would be an increased probability of shutdown of operating commercial nuclear reactors before operating license expiration due to lack of adequate spent nuclear fuel storage capacity, with an attendant loss of electric power generation for that area or region. While the Department recognizes that many environmental impacts could result from shutting down commercial nuclear reactors, a full evaluation of such impacts (such as generation of additional air pollution from replacement sources of electricity) would be highly speculative because the choice of a replacement power source (importation, solar, gas, coal, etc.) would be regionally dependent, and the affected utilities would make the ultimate decision. Because the determination of regional impacts from the loss of electric generating capacity for the shutdown reactors, including the potential for increased electricity prices, would be speculative, the EIS does not include a detailed discussion.

4.5 (987)
Comment - EIS000171 / 0003
We note with concern that the currently approved Yucca Mountain capacity is less than projected requirements for long-term geologic storage. We believe that this deficiency should be addressed now and recommend that the Department of Energy expedite efforts to develop and implement the promising Accelerator Transmutation of Waste (ATW) concept. While ATW is not a viable option in the short term to replace the necessary Yucca Mountain repository, it does have the longer-term potential to reduce the need for additional geologic repository space by eliminating long-lived fission products and significantly reducing the volume of wastes to be stored.

Response
When Congress passed the Nuclear Waste Policy Act of 1982, it established that the Federal Government is responsible for the permanent disposal of spent nuclear fuel and high-level radioactive waste. To accomplish this goal, Congress envisioned the possibility of more than one repository –prohibiting the Nuclear Regulatory Commission from approving a license for the emplacement of more than 70,000 metric tons of heavy metal (MTHM) in the first repository until a second repository was in operation [Nuclear Waste Policy Act, Section 114(d)]. The total projected inventory of spent nuclear fuel and high-level radioactive waste is more than 70,000 MTHM. Emplacement of more than 70,000 MTHM at Yucca Mountain would require legislative action by Congress unless a second repository was in operation.

It is reasonably foreseeable that Congress would take such a legislative action or ensure that a second repository would be in operation. Chapter 8 of the EIS analyzes cumulative impacts from the disposal at Yucca Mountain of all projected spent nuclear fuel and high-level radioactive waste through 2046 for which DOE will retain ultimate responsibility. In addition, Chapter 8 considers the disposal of Greater-Than-Class-C waste and Special-Performance-Assessment-Required waste at Yucca Mountain.

In the NWPA [Section 114(f)(2)], Congress directed that DOE need not consider alternatives to geologic disposal in this EIS (see Section 2.3.1). The future course that Congress, DOE, and the commercial utilities would take if Yucca Mountain did not receive a recommendation as a repository site is highly uncertain. Chapter 7 discusses the development of new technologies (such as accelerator transmutation of waste) as one possibility. DOE is investigating transmutation as a potential technology for reducing the volume of waste ultimately requiring geologic disposal.

4.5 (1101)
Comment - EIS000162 / 0007
More than 100,000 MTU [metric tons of uranium] of defense high-level radioactive waste is stored at the DOE's Savannah River Site. This is approximately 36 percent of the total inventory of high-level radioactive waste in the nation. The Savannah River Site is unacceptable as a repository. It borders the Savannah River, it is located near a major underground aquifer that provides water as far away as Florida, it is in an earthquake zone, and it is located in a populous and rainy area. Yucca Mountain was selected as the repository site because it has none of the characteristics associated with the Savannah River Site. Health, safety, and environmental concerns require that the repository be located at an isolated site having a sparse population, a dry climate, and low probability of natural disasters such as earthquakes, and not be near rivers or aquifers that supply water to a large population.

The Savannah River Site is not acceptable as an interim or permanent storage site because of health, safety, and environmental reasons.

Response
As discussed in Section A.2.3.5.1 of the EIS, the Savannah River Site will generate an estimated 11,600 metric tons (12,800 tons) of high-level radioactive waste in the form of borosilicate glass for disposal at the proposed Yucca Mountain Repository. As shown in the table in that section, this volume represents about 20 percent of the total high-level radioactive waste proposed for disposal at the repository.

In accordance with the NWPA, DOE is conducting site characterization activities only at Yucca Mountain to determine its suitability as a potential repository for the Nation's spent nuclear fuel and high-level radioactive waste. If the repository was recommended and approved for development, the Department would use it to dispose of the high-level radioactive waste at the Savannah River Site, which is currently stored safely.

4.5 (1338)
Comment - EIS000219 / 0003
In the years that Plant Hatch has been operating, the citizens of Georgia have paid over $500 million dollars into the nuclear waste fund. As you probably know, this fund was established by the Nuclear Waste Policy Act that required the government to take possession of utilities spent fuel by 1998. The government missed its contractual deadline, and in fact will probably not start taking possession of used fuel until sometime after 2010. Nationwide this figure is $16 billion dollars.

This delay has required us to spend an additional $22 million dollars to build an interim spent fuel storage site at Plant Hatch. An additional $4 million dollars a year will be spent until the government starts taking possession of the used fuel.

Our facility will be well designed and safe, however, it makes more sense to house used fuel at a centrally located facility where additional levels of safety and security can be built into the design. This not only enhances the overall safety of the nations used fuel, but it is much more economic, having potential savings in the multibillion to several trillion-dollar ranges.

Response
By the end of Fiscal Year 1999 (September 30, 1999), utilities and their ratepayers had paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999, the program had spent about $6 billion for the purposes specified in the NWPA. Due to accrued interest on the funds, the value of the Nuclear Waste Fund was $8.5 billion at the end of Fiscal Year 1999.

DOE cannot comment on issues related to the Standard Contract for Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste (10 CFR 961.11) or potential impacts, including cost of constructing added storage capacity resulting from DOE's delay in beginning to accept spent nuclear fuel by January 31, 1998, because these are the subjects of ongoing litigation.

4.5 (1340)
Comment - EIS001174 / 0003
We demand legislation providing for reduction of energy company inventories. If their cooling ponds are full, each rod taken gives them more storage space for new production, at unbelievable continuing expense to the public. This is charity to energy power utilities. We in Northeast Ohio have already given.

Response
DOE cannot comment on legislation that Congress might consider. However, Congress has made a determination on this matter in the past. In the NWPA, Congress stated that "... while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel..." Since the passage of that Act, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund for development of a repository for spent nuclear fuel and high-level radioactive waste.

The taxpayer will bear some of the cost of the repository. Congress appropriates funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the United States. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues.

4.5 (1343)
Comment - EIS000378 / 0001
There are two words that I would like you to remember from these comments, and those two words are zero tolerance. I think from some of the other comments that you've heard there should be zero tolerance for any miscalculation of what might happen at Yucca Mountain for the future of our lives and the future life as we know it; zero tolerance for any water contamination that might occur from Yucca Mountain; zero tolerance for any -- I think the word is millirem exposure; zero tolerance for any failure of any container of waste material; and zero tolerance for any accidents, no matter what the mode of transportation, whether it be rail or public highway.

Response
As required by the NWPA, DOE is developing an approach for the construction, operation (including transportation) and monitoring, and eventual closure of a repository. This approach would result in a repository licensed by an independent agency, the Nuclear Regulatory Commission, using standards established by the Environmental Protection Agency as required by Congress in the Energy Policy Act of 1992. The approach also would result in a transportation and packaging system that would comply with standards established by the Nuclear Regulatory

Commission and the U.S. Department of Transportation. Although "zero tolerance" as envisioned by this commenter might not be an achievable goal, particularly with the long periods required for waste isolation, DOE would be able to comply with the applicable regulations, as demonstrated in part by the analyses in the EIS.

4.5 (1525)
Comment - EIS000415 / 0005
This project that has already eaten up a large amount of government spending foresees clean up costs to be above 9.5 billion dollars.

Response
Section 2.1.5 of the Final EIS provides a total estimated cost of between about $43 billion to $57 billion to construct, operate and monitor, and close a repository at Yucca Mountain. This is a representative cost and would vary somewhat depending on the ultimate design and operating conditions.

4.5 (1534)
Comment - EIS000451 / 0002
DOE scientists have performed rigorous scientific testing to determine Yucca Mountain suitability. They have strongly made the case that this is the best place [to] store the nation's spent nuclear fuel and high-level radioactive waste. But the process has been marred by political procrastination. The delays are not affordable and will only lead to massive monetary damages, increased infrastructure costs and skyrocketing legal costs, all of which will be passed on to ratepayers and taxpayers. The federal government in 1982 made a legally binding promise to the ratepayers, taxpayers, utilities companies and state commissions to remove spent nuclear fuel and place it in a permanent location.

The DOE accepted tens of billions of dollars from ratepayers to pay for those activities and has already spent six billion dollars. But the January 1998 deadline has long come and gone, and none of the [material] has been moved to any permanent place. In the meantime, Congress has raided the nuclear waste trust fund to pay for all sorts of unrelated spending programs. This...makes a mockery of the whole notion of trust and threatens to cost taxpayers between 50 and 80 million dollars.

We particularly support provisions that safeguard the monies in the trust fund by guaranteeing that they be only used for trust fund purposes and for the completion of the permanent waste repository.

Our interest in moving ahead with the site of Yucca Mountain addresses our longstanding concern for taxpayers and making sure that the federal government is accountable for its spending.

We encourage DOE to keep the Yucca Mountain program appropriately funded and on schedule.

Response
DOE cannot comment on issues related to its delay in beginning to accept spent nuclear fuel by January 31, 1998, because they are the subject of ongoing litigation.

DOE is moving toward a determination whether to recommend the Yucca Mountain site as a permanent repository in accordance with the process specified in the NWPA. If the Secretary of Energy recommended the site to the President, and if the President recommended it to Congress, and if Congress, as necessary, accepted the recommendation, DOE would submit a License Application with the goal of first emplacement of spent nuclear fuel or high-level waste in 2010.

The Secretary of the Treasury administers the Nuclear Waste Fund. Excess funds for any year, as determined by the Secretary of Energy, are invested in obligations of the United States and, therefore, earn interest. The Secretary of Energy makes expenditures from the Fund subject to appropriations by Congress. In addition, Congress appropriates funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the United States.

Payments into the Nuclear Waste Fund between Fiscal Year 1983 and the end of Fiscal Year 1999 amounted to approximately $9.8 billion. By the end of Fiscal Year 1999, appropriations for defense nuclear waste disposal

totaled $1.1 billion, and the program had spent approximately $6 billion. Because of accrued interest, the Nuclear Waste Fund totaled approximately $8.5 billion at the end of Fiscal Year 1999.

DOE expects this money and future fees paid on electric generation at the rate of 1 mil per kilowatt-hour, combined with expected payments for the disposal of DOE spent nuclear fuel and high-level radioactive waste, to be adequate for expenditures for construction, operation and monitoring, and closure of a repository at Yucca Mountain.

4.5 (1730)
Comment - EIS000328 / 0002
The federal government continues to ignore its promise to the country and to utilities that it would take responsibility for the nuclear waste by the year 1998. Indeed, the Department of Energy (DOE) has said it would not be able to accept nuclear waste until at least 2012. And while DOE has been collecting money from utilities to build a national repository, it has not even determined what standards such a storage facility must meet.

Response
DOE cannot comment on issues related to the Standard Contract for Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste (10 CFR 961.11) or potential impacts resulting from its failure to begin accepting wastes by January 31, 1998, because they are the subject of ongoing litigation.

Regarding facility standards, Section 801 of the Energy Policy Act of 1992 requires the Environmental Protection Agency (EPA) to set standards for the protection of public health and safety from releases from radioactive materials stored or disposed of at Yucca Mountain. On June 13, 2001, EPA issued the required rule establishing 40 CFR Part 197, "Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada." The Energy Policy Act of 1992 gives the Nuclear Regulatory Commission (NRC) 1 year after EPA publishes a final rule to publish final criteria for licensing that are consistent with the EPA radiation protection standards. NRC has published its final rule, establishing 10 CFR Part 63, "Disposal of High-Level Radioactive Wastes at Yucca Mountain, Nevada." This rule establishes licensing criteria for the proposed geologic repository at Yucca Mountain, including a proposed radiation protection standard. The radiation protection standard in the final NRC rule is consistent with the radiation protection standard in the final EPA rule.

4.5 (1754)
Comment - EIS000458 / 0007
So long as Yucca Mountain is using up a majority of the financial resources of our nuclear waste program, no sound solution can be developed. Anyway you look at it, Yucca Mountain is a bad decision. Spending lots of money on a hole in the ground invites the political pressure to build a repository no matter how environmentally insane it is to do so. This has been exemplified by opening the Waste Isolation [Pilot] Project earlier this year. This nuclear waste approach or management approach is out of sight, out of mind. The U.S. government has to take a step back and take a deep breath and initiate a much broader effort to deal with our nuclear waste problems. All of the major states, cities, counties and reservations that are impacted have to be included in this process for it to have any meaning at all.

Response
Section 1.3 of the EIS provides a brief history of the management of spent nuclear fuel and high-level radioactive waste. Geologic disposal of radioactive waste has been the focus of scientific research for more than 40 years. As early as 1957, a National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1975, the Energy Research and Development Administration (another DOE predecessor), selected a site near Carlsbad, New Mexico, for the Waste Isolation Pilot Plant for the disposal of transuranic waste. In 1976, the Energy Research and Development Administration began to investigate other geologic formations and to consider different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and launching waste to the sun. Based on the results of these investigations, DOE determined in a Record of Decision issued in 1981 (46 *FR* 26677; May 14, 1981) that it would pursue mined geologic disposal.

In 1982, Congress enacted the original Nuclear Waste Policy Act (Public Law 97-425, 96 Stat. 2201), which acknowledged the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste. The Act began a process for selecting sites for technical study as potential

geologic repository locations. In 1986, DOE recommended three sites (Deaf Smith County, Texas; the Hanford Site, Washington; and Yucca Mountain, Nevada) for study as candidate repository sites. Through the passage of the Nuclear Waste Policy Amendments Act 1987 (Public Law 100-203, 101 Stat. 1330), Congress identified Yucca Mountain as the only site to be studied as a potential location for a geologic repository. (The full and current text of the Nuclear Waste Policy Act, as amended (NWPA), is codified at 42 U.S.C. 10101 *et seq.*) The overall concept of geologic disposal was confirmed again in 1990 by a panel of the National Academy of Sciences, which noted that there is "a worldwide scientific consensus that geological disposal, the approach followed by the United States, is the best option for disposing of high-level radioactive waste" (DIRS 100061-National Research Council 1990).

As discussed in Section 9.1.3 of the EIS, DOE continues to evaluate new technologies (such as accelerator transmutation of waste) to reduce the potential effects of the repository project. However, the Department cannot expend any funds not authorized and appropriated by Congress. The broader effort advocated by this comment would require such an appropriation, which, except on a limited basis for investigation of alternative methods of management of spent nuclear fuel and high-level radioactive waste, has not occurred.

In promulgating the NWPA, Congress found that state and public participation in the planning and development of repositories is essential to promote public confidence in the safety of disposal. In this spirit, a major element of the Yucca Mountain Project has been to ensure that stakeholders, the media, and the public have an opportunity to participate in and acquire the information that they need to make informed decisions about the project. This effort is focused on building and maintaining relationships with stakeholders, the public, and media through regular interaction and provision of information. DOE develops public information products, such as exhibits, information materials, models, audiovisual presentations, electronic media, publications, and public outreach announcements. These products are available at the Yucca Mountain Science Centers in Las Vegas, Pahrump, and Beatty, Nevada; on the Yucca Mountain Project and DOE Office of Civilian Radioactive Waste Management Internet sites (www.ymp.gov and www.rw.doe.gov, respectively); through public meetings and hearings on Yucca Mountain-related topics; during public tours of the Yucca Mountain site; and in response to specific inquiries and requests for materials. DOE provides speakers and technical experts on Yucca Mountain-related topics to technical groups, community groups, professional organizations, students, and other audiences, and has created programs and materials to enhance area school teacher and student awareness of issues related to the disposal of spent nuclear fuel and high-level radioactive waste. For more information on Yucca Mountain public outreach activities, call 1-702-295-1312 or 1-800-225-6972.

4.5 (1797)
Comment - EIS000312 / 0001
From a rate payer perspective, we've been paying quite some time, as has been indicated and well known, to this fund for a solution to the nuclear waste problem. And we're very concerned, given the flaws of Yucca Mountain that are understood, about the use of rate payer money and misuse of it in some ways that we understand haven't even been applied to the purpose that it was intended to. We would recognize the desperation that's there among people that work in this industry to put their waste somewhere and really get it off their hands. We urge the Department of Energy as it's proceeding here to spend resources developing a system that is safe and adequately funded and to spend taxpayer and rate payer money to find an appropriate site and location for this waste, and please not to throw the money away.

We're very concerned that this is happening in a form that is ultimately going to put human lives at risk along the transportation route, and concerned that the destination, the ultimate destination that is proposed here is known to be inadequate. And given that, we really raise the concerns about how the rate payer money and taxpayer money is being used and will be in the future.

Response
With regard to the concern that the Yucca Mountain Project is scientifically flawed, extensive independent peer reviews of all aspects of the project by such organizations as the National Academy of Sciences and the Nuclear Waste Technical Review Board help to ensure adequacy and technical soundness of the DOE evaluations. Many of the individuals involved in these reviews are appointed by the President and approved by Congress. In all cases, they possess impressive credentials. The rigorous review process should serve to detect and correct any serious flaws.

The NWPA directs DOE to investigate only Yucca Mountain for use as the first geologic repository for disposal of spent nuclear fuel and high-level radioactive waste. The investigations to date have found no reason for determining the site should be disqualified as a repository. Further, DOE has not spent money from the Nuclear Waste Fund for purposes not authorized by law.

With regard to adequate funding, Congress annually determines the appropriate funding for the DOE Office of Radioactive Waste Management, based on appropriate requests from the Secretary of Energy and the President. DOE believes that Congress, having directed the Government to begin this project, would continue to fund it adequately to protect the public health and safety and the environment.

4.5 (1839)
Comment - EIS000331 / 0002
DP [DOE Office of Defense Projects] waste is older, even at the newest plant (SRS [Savannah River Site]), by seven years than at the oldest civilian plant. Thus DP waste should go first. But, RW [DOE Office of Civilian Radioactive Waste Management] has scheduled DP to wait five years after the civilians start having their waste accepted. Were DP taken first, SRS might not have to build another glass waste storage building. Chance of redress here is zilch. The taxpayers will take it on the chin once again.

Response
The NWPA recognizes the responsibility of the Federal Government to provide permanent disposal of spent nuclear fuel and high-level radioactive waste. DOE signed contracts with commercial utilities obligating it to assume the responsibility for disposal of commercial spent nuclear fuel. These contracts contained information on the priority order for acceptance of spent nuclear fuel, and the courts have determined that the contracts are legally binding on DOE. Therefore, DOE is evaluating scenarios and schedules for shipment and receipt of spent nuclear fuel and high-level radioactive waste at the Yucca Mountain site.

4.5 (1927)
Comment - EIS000467 / 0002
Another point that I would like to make is that the proposal to make Yucca Mountain the national repository for high-level nuclear waste does not concentrate the waste in one site, as the nuclear industry would have us believe, but, rather, it is one more site in the country that would be a location of high-level nuclear waste. At reactors around the country as soon as waste is removed and there is more room to generate more, there will be more waste on those sites as well, and when you consider the transportation shipments of waste, that creates literally thousands of more waste sites across the country. So it is not one site. It just adds one more site and adds thousands of more sites.

Response
DOE disagrees that the successful development of a repository would not reduce the number of sites currently storing nuclear waste materials because the Department does not recognize a transportation vehicle as a waste site. DOE recognizes that onsite storage at nuclear facilities would continue for some time into the future, even after the development of a repository. However, successful development of a repository would, for example, allow sites that are presently in the decommissioning phase to complete site restoration and license termination by removing high-level waste from their properties. In addition, on cessation of operations at the end of their useful lives, currently operating nuclear facilities would have the ability to terminate their licenses and complete decommissioning, thereby restoring affected land for future uses.

4.5 (1935)
Comment - EIS000478 / 0003
We recommend that Yucca Mountain should not be made a permanently closed site. After the proposed one-hundred year open period, the site should continue to be monitored indefinitely to ensure the safety of surrounding communities and to provide access to waste should a better alternative to a repository solution arise. Because safety predictions on the long-term can be problematic, the DOE should always be in a position to make an emergency retrieval of waste from the Yucca Mountain site. Long-term monitoring, although more costly on the long-term than permanent closure, helps ensure the safety of local communities and would be less costly than permanent monitoring for the long-term at the nation's commercial reactor sites. The shift to a permanently open site would have implications for issues of air quality, and in order to assess these potential hazards, the DOE should consider as a part of the final EIS the health issues involved in a permanently accessible repository.

Response
Section 122 of the NWPA requires the ability to retrieve spent nuclear fuel and high-level radioactive waste at a repository. Federal regulations (10 CFR Part 63) require that the repository design preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of emplacement. In accordance with these requirements, the operational plan for the proposed Yucca Mountain Repository includes a design and management approach that would isolate wastes from the public while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly more than 300 years in the event of a retrieval decision to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. During this period, the repository would remain accessible to scientists to continue testing and monitoring and allow future generations to determine the timing and methods of closure. The final decision to close would come as a Nuclear Regulatory Commission action on an amendment to the operating license for the repository. DOE would submit the amendment to the Commission near the time of planned closure, which could be more than 100 years in the future. At that time there would be a wealth of knowledge about the site and the behavior of the waste material, as well as more powerful analysis techniques.

A post closure monitoring program is required by 10 CFR Part 63. This program would include the monitoring activities that would be conducted around the repository after the facility had been closed and sealed. Under 10 CFR 63.51 (a)(1) and (2), DOE would have to submit a license amendment application for permanent closure of the repository. This application must provide an update of the assessment of repository performance for the period after permanent closure, as well as a description of the program for post closure monitoring. This program would include continued oversight to prevent any activity at the site that posed an unreasonable risk of breaching the repository's engineered barriers or of increasing the exposure of individual members of the public to radiation beyond allowable limits. The details of this program would be defined during the processing of the license amendment for permanent closure. Deferring a description of this program until the closure period would enable the identification of appropriate technology, including technology that could become available in the future.

Although DOE did not evaluate a permanently open repository, it estimated air quality and human health impacts for the maximally exposed individual and populations during a 76-year monitoring and maintenance period following emplacement and determined that they would be very low (see Sections 4.1.2.3.2 and 4.1.7.2 of the EIS). If there was a decision to keep the repository open, these impacts could continue indefinitely into the future; however, they would decrease substantially at the end of forced ventilation.

4.5 (1942)
Comment - EIS000478 / 0010
Our nuclear waste is currently being stored at 78 separate sites around the nation, in 35 states. Many of these sites are located near population centers, and all of them are near and to the environment resulting from an accident at any one of these locations is huge. Two, these are short-term facilities, and a more permanent and low-risk solution to the disposal of these wastes must be found in the near future. Our research convinces us that Yucca Mountain is the safest alternative available. Decisive political action is crucial, since site development and use lead-times are immense. To assay irrational fears and local resistance, the DOE must educate the public as to the benefits of Yucca Mountain as compared to the alternatives for nuclear waste disposal, and address local concerns such as safe transportation, tourism, etc.

We understand that the Congressional vote on the Yucca Mountain Project may be divided along party lines, as nuclear waste disposal is a very sensitive and emotional issue among certain constituents and the populace. However, this issue is one of risk management, a scientific issue, and votes must be cast on the basis of the scientific evidence presented by the DOE and independent scientists.

The safe disposal of our nation's nuclear waste is too critical an issue to allow unwarranted fears to sway rational decision-making. A NO vote may, in the long run, be extremely detrimental to the environment and to the safety of future generations of American citizens. We cannot stress enough the importance of this vote. The long-term public interest must be chosen over local and short-term interests.

We urge you to vote YES when the Yucca Mountain Project comes before Congress for approval this coming year.

Response
DOE must comply with existing law, primarily the NWPA, in its investigation of the suitability of the Yucca Mountain site. During its last few sessions, Congress has attempted to pass legislation that would modify this Act. However, either the legislation has failed to pass both houses of Congress or the President has vetoed it.

As discussed in Section 1.3.2.3 of the EIS, the NWPA, enacted by Congress in 1982 and amended in 1987, establishes a process leading to a determination by the Secretary of Energy on whether to recommend that the President approve Yucca Mountain for development as a geologic repository. As part of this process, the Secretary is to:

- Undertake site characterization activities at Yucca Mountain to provide information and data required to evaluate the site.
- Prepare an EIS.
- Determine whether to recommend approval of the development of a geologic repository at Yucca Mountain to the President.

As part of this process and in compliance with the NWPA, a major element of the Yucca Mountain Repository program has been to ensure that stakeholders have an opportunity to participate in and acquire the information about the project they need to make informed decisions. This effort has focused on building and maintaining relationships with stakeholders through regular interactions and provision of project information.

4.5 (1961)
Comment - EIS000494 / 0002
[T]he delay in this project has made the United States the laughingstock of the international community.

Unfortunately, we have allowed ourselves to be held hostage by the narrowest of the special interest groups, organizations that routinely spread the worst kinds of misinformation and distort scientific fact, groups that constantly criticize without offering any alternative to the question of where our energy will come from in the future.

Yucca Mountain now runs the risk of becoming a monument to the worst kind of government inefficiency, insensitivity and indecisiveness. This delay, this inability to rely on dispassionate scientific fact, this will force us to effectively abandon nuclear energy as a viable source of energy in the future.

Response
All countries that use nuclear power face the issue of nuclear waste disposal and all have selected geologic disposal as their implementing option. Sweden, for example, expects to identify sites in the next year or two. Finland recently approved a plan to build a test facility that could eventually be expanded into a larger permanent disposal site. Many nations have seen delays such as those in the DOE Civilian Radioactive Waste Management Program, stemming from technical and political considerations.

4.5 (1971)
Comment - EIS000500 / 0001
I feel that the government is trying to rush into this in order to bow to pressure from the nuclear industry to build more reactors, fire up existing reactors, and there's also probably some military interests in that also.

The nuclear power industry and the nuclear weapons industry are integrally related. But you're going towards a political solution primarily, not really trying to safeguard the public so much.

Response
DOE is carrying out the mandates of the NWPA, which call for the development of a repository that would protect the public and the environment. As required by the NWPA (see Section 1.3.2 of the EIS), DOE is proceeding with an approach for the construction, operation and monitoring, and eventual closure of a repository. This approach would result in a repository that is licensed by an independent agency, the Nuclear Regulatory Commission, using radiation protection standards established by the Environmental Protection Agency.

4.5 (1976)
Comment - EIS000500 / 0006
You're looking at having it monitored and retrievable for about 100 years. I understand you need to look at that time being monitored and retrievable for a lot longer than that, not just shutting the door on it.

Response
Section 122 of the NWPA requires the ability to retrieve spent nuclear fuel and high-level radioactive waste at a repository. Federal regulations (10 CFR Part 63) require that the repository design preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of emplacement. In accordance with these requirements, the operational plan for the proposed Yucca Mountain Repository includes a design and management approach that would isolate wastes from the public while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly more than 300 years in the event of a retrieval decision to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. During this period, the repository would remain accessible to scientists to continue testing and monitoring and allow future generations to determine the timing and methods of closure. The final decision to close would come as a Nuclear Regulatory Commission action on an amendment to the operating license for the repository. DOE would submit the amendment to the Commission near the time of planned closure, which could be more than 100 years in the future. At that time there would be a wealth of knowledge about the site and the behavior of the waste material, as well as much more powerful analysis techniques.

A post closure monitoring program is required by 10 CFR Part 63. This program would include the monitoring activities that would be conducted around the repository after the facility had been closed and sealed. Federal regulations [10 CFR 63.51(a) (1) and (2)] require the submittal of a license amendment for permanent closure of the repository. This amendment must provide an update of the assessment of repository performance for the period after permanent closure, as well as a description of the program for post closure monitoring. This program would include continued oversight to prevent any activity at the site that posed an unreasonable risk of breaching the repository's engineered barriers or of increasing the exposure of individual members of the public to radiation beyond allowable limits. The details of this program would be defined during the processing of the license amendment for permanent closure. Deferring a description of this program until the closure period would enable the identification of appropriate technology, including technology that could become available in the future.

4.5 (2056)
Comment - EIS000576 / 0002
Let's look to the benefits of having the Yucca Mountain proposal, and let's look to the disadvantages.

Now supposedly the benefits are for Nevada. Let's look at Nevada. Nevada would supposedly get more employment, we could connect the state by rail line, we could have the focus of the Nevada economy shift towards more technical fields because there is going to be all this nuclear waste here.

Well, notice that most of these positives are primarily economic, whereas the disadvantages that everyone is talking about here tonight are risks of accidents in transportation, which would lead to contamination of waterways and airways and sickness and death. Another thing that's been talked about is health risks to employees and residents.

I mean, we're talking about nuclear waste from 77 sites here all in one place. This is a huge magnitude of waste. So there is going to be a lot of radiation coming from this huge magnitude of waste. More radiation is going to be coming out of this one spot than there is at any of the [other] sites right now.

Another thing, too, is that environmental harm, such as contamination of drinking water, and the risks of earthquakes, all of these kinds of things here that have all been mentioned by previous speakers all demonstrate that if you are going to compare these economic advantages of employment which we're going to have for a little while and connecting Nevada by rail line, if you compare these things, if you compare the money, the dollars, to quality of life, quality of the environment, there is really no contest here. So you can see that once again, this plan is failing on even demonstrating that it's beneficial. It is actually showing that it is more disadvantageous if we adopt the plan.

So at this point it seems pretty clear that the Yucca Mountain proposal isn't a very good one, but here is the key question right here. Would this be, if we did adopt it, the best course of action?

Response
The NWPA requires the Secretary of Energy to evaluate the suitability of Yucca Mountain for development as a repository. If the site is suitable, the Secretary must submit to the President a recommendation for approval of the site for development of a repository. That recommendation must be accompanied by a number of documents specified in the Act, including a Final EIS.

Council on Environmental Quality regulations (40 CFR 1502.16) require the evaluation of environmental impacts of the Proposed Action and a No-Action Alternative (40 CFR 1501.14d). The impacts can include those from actions that could have beneficial and detrimental effects, even if on balance the impact would be beneficial (40 CFR 1508.8). However, from the overall assessment, the EIS indicates that the No-Action Alternative would result in a wider range of potential impacts than the Proposed Action. As a consequence, DOE does not believe that this alternative would result in beneficial impacts to the Nation as a whole.

The comment states that transportation accidents would lead to contamination of waterways and airways and to sickness and death. The EIS evaluates health risks to residents along transportation routes, as well as potential health risks to employees (see Chapter 6 of the EIS for details). The analyses show that significant radiation exposures or contamination of waterways and air as a result of transportation would be very unlikely.

The EIS evaluates the potential effects of the repository on groundwater, and how earthquakes could change that risk (see Chapter 5). The Secretary will weigh this information and other available information in determining whether to recommend development of the Yucca Mountain site as a repository to the President. The President will then have to weigh all the available information and decide whether to recommend the site to Congress.

4.5 (2243)
Comment - EIS000633 / 0001
I don't understand why Congress has allowed this process to go through without addressing the need for this repository and the other -- the availability for use and the alternatives to geological disposal. I feel like it's a sham.

Response
As discussed in Section 1.5 of the EIS, the NWPA includes four provisions relevant to this EIS. Under the Act, the Secretary is not required to consider (1) the need for a geologic repository, (2) the time at which the repository could become available, (3) alternatives to isolating materials in a repository, and (4) any site other than Yucca Mountain for repository development. In 1980, DOE published the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980). That EIS examined geologic disposal and other alternatives, including deep seabed disposal, ice sheet disposal, disposal in deep boreholes, transmutation, and space disposal. The Record of Decision (46 *FR* 26677; May 14, 1981) announced the DOE decision to use geologic disposal.

4.5 (2643)
Comment - EIS000712 / 0003
Begin putting the time, money, and energy into the transportation issue that's going into the repository issue.

Response
In preparing the EIS, DOE recognized the importance of the transportation of spent nuclear fuel and high-level radioactive waste and included it as a component of the Proposed Action (see Chapter 2 of the EIS). Chapter 6 and Appendix J discuss transportation impacts.

The Secretary of Energy will consider potential impacts associated with the transportation of spent nuclear fuel and high-level radioactive waste when determining whether to make a recommendation to the President. DOE believes that the EIS adequately analyzes the potential environmental impacts that could result from the Proposed Action or the No-Action Alternative. Although transportation decisions would not be made until after the site was approved, DOE believes that the EIS provides the information necessary to make decisions on basic approaches (that is, mostly rail or mostly truck shipments), as well as the choice among alternative rail corridors in Nevada. If the site was

approved, DOE would conduct additional National Environmental Protection Act reviews for the specific alignment of a branch rail line in a corridor.

4.5 (2750)
Comment - EIS000807 / 0002
I sincerely hope that this proposal will be reconsidered. Given the importance of this issue, any decision should be based on the recommendations of the most knowledgeable people in the fields of study involved here and not be political at all. Is this possible?

Response
As required by the NWPA, DOE performs site characterization activities at Yucca Mountain to determine its potential suitability as a repository for disposal of the Nation's spent nuclear fuel and high-level radioactive waste. At the same time, the DOE repository design process for Yucca Mountain includes extensive review by independent technical experts, including the National Academy of Sciences and the Nuclear Waste Technical Review Board. If approved, the repository would be licensed by the Nuclear Regulatory Commission, using standards established by the Environmental Protection Agency.

4.5 (2934)
Comment - EIS000988 / 0002
It seems Congress is much more concerned with stockpiled radioactive waste storage problems of utilities with nuclear plants than the public in the 43 states that would have shipments moving through their communities or those near the Nevada dump site. Could this be because of the many campaign contributions from various nuclear industries and utilities? Congress is working overtime devising more subsidies for these business[es]. But nuclear power remains so unsound financially and technologically that no reactors have been built in over 25 years.

Response
Congress, in passing the NWPA, established a national policy for the permanent disposal of spent nuclear fuel and high-level radioactive waste. DOE must comply with the provisions of the Act that require, in part, the development of a repository that would protect the public and the environment from the hazards posed by these materials.

The fiscal and technological state of the nuclear power industry is not germane to the environmental analyses in this EIS. DOE has no authority over the operation of the Nation's nuclear powerplants or storage of spent nuclear fuel at those sites. The Nuclear Regulatory Commission, pursuant to the Atomic Energy Act, as amended, has jurisdictional authority in that regard.

4.5 (3073)
Comment - EIS000745 / 0005
A DUMP SITE IS A VERY COSTLY AND DANGEROUS TEMPORARY SOLUTION, which, if [implemented], will haunt future generations of humans on this planet of ours, and MAYBE EVEN DESTROY OUR PLANET.

It is an ill-conceived IDEA...another example of "sweeping the problem under a rug" so some future generation will have to deal with it instead of us. It is a WASTE of money to STUDY or PURSUE this temporary endeavor any further.

Response
A geologic repository is indeed a costly solution to the problem of spent nuclear fuel and high-level radioactive waste. However, it would not be temporary, but a facility for permanent disposal. In the Nuclear Waste Policy Act of 1982, Congress determined that there must be appropriate precautions to ensure that spent nuclear fuel and high-level radioactive waste do not adversely affect the public health and safety and the environment for this or future generations. Therefore, the purpose of the repository would be to isolate the waste from the human environment for thousands of years, and the purpose of the characterization work DOE has conducted at Yucca Mountain for more than a decade is to determine if the site is suitable for a repository.

4.5 (3241)
Comment - EIS000982 / 0004
I urge you to stand firm in your defense of the American people in the face of the obvious pressure you are facing from the nuclear energy industry. Admit there are no good solutions, demand cessation of waste produced, and begin using the funds you are now spending and propose to spend [to] protect Americans who live near the sites where the waste is now stored. Become advocates of safe energy solutions, such as the fuel cell, solar power, wind power, etc., and start demanding the research and development funds they deserve.

Response
In the "Findings" section of the NWPA Congress stated that "... while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel..." Further, Section 302 of the Act states that "... in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste or spent nuclear fuel involved as provided in this subtitle."

DOE has no authority over the operation of the Nation's nuclear powerplants or storage of spent nuclear fuel at those sites. As mandated by the Atomic Energy Act, as amended, the Nuclear Regulatory Commission has jurisdictional authority for commercial uses of nuclear materials, including the operation of reactors to produce electricity. This includes the production of electricity from nuclear energy and the interim storage of spent nuclear fuel at the reactor sites.

DOE is committed to the development and responsible use of all types of energy – nuclear, renewable, and fossil fuel. The DOE Office of Energy Efficiency and Renewable Energy is leading the Nation's efforts in the study of alternative energy technologies, including geothermal, hydropower, solar, wind, and others. For information on the Office's studies and other activities, visit its web site at http://www.eren.doe.gov or write to U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, 1000 Independence Ave., S.W., Washington, DC, 20585.

4.5 (3252)
Comment - EIS000949 / 0003
The federal government should establish a permanent sampling and monitoring program with a commitment to mitigate any problems and ensure that no member of the public is ever in danger from the repository.

Response
The Proposed Action includes a lengthy program of performance monitoring and testing before closure. This program would continue for perhaps more than 300 years (through repository closure, as described in Section 2.1.2 of the EIS). It would give future decisionmakers the ability to take advantage of technological advances, implement corrective actions, if required, and make societal choices on closing the repository or retrieving the wastes. As described in Chapter 2, the operational plan for the proposed repository includes a design and management approach that would isolate wastes from the public in the future while maintaining the flexibility to preserve options for modifying emplacement or retrieving the waste. The repository would remain accessible for scientists to continue testing and monitoring.

Section 122 of the NWPA requires DOE to maintain the ability to retrieve the materials emplaced in the repository in the event of a decision to retrieve them to protect public health and safety or the environment or to recover constituent parts of spent nuclear fuel. Although DOE does not anticipate retrieval, it would utilize the repository design to maintain the ability for future generations to retrieve these materials for at least 100 years and possibly for more than 300 years after emplacement operations have begun (see Section 4.2.1 of the EIS). The Federal Government, therefore, would maintain stewardship of the repository site for generations to come. Stewardship activities would entail site protection and confirmatory scientific work and a post closure monitoring program required by Nuclear Regulatory Commission rules governing the disposal of high-level wastes in a geologic repository (10 CFR 63.51).

This program would include monitoring activities around the repository after closure. Nuclear Regulatory Commission regulations [10 CFR 63.51(a)(1) and (2)] require submittal of a license amendment application for permanent closure of the repository. This application must include an update of the assessment of repository performance for the period after permanent closure, and a description of the program for postclosure monitoring. This program would include continued oversight to prevent any activity at the site that would pose an unreasonable risk of breaching the engineered barriers or increasing the exposure of individual members of the public to radiation beyond allowable limits. Section 2.1.2.4 of the EIS describes the program as currently envisioned. However, program details would be defined during the processing of the license amendment for permanent closure. Deferring a description of this program until the closure period would enable the identification of appropriate technology, including technology that could become available in the future.

DOE is considering a range of mitigation measures to reduce the effects of the repository project. These measures would complement the physical features, procedures, and safeguards already incorporated in the project plan and designed to reduce environmental consequences. Chapter 9 of the EIS, which contains the list of DOE commitments, identifies DOE-determined impact reduction features, procedures and safeguards, and mitigation measures under consideration for inclusion in the project plan and design. In addition, Chapter 9 identifies ongoing studies that could influence mitigation measures related to the project plan and design. For example, Section 9.2 discusses mitigation measures DOE would implement or consider to reduce potential impacts from the construction, operation and monitoring, and eventual closure of the repository. The Yucca Mountain site, if approved in accordance with the provisions of NWPA, would be subject to licensing by the Nuclear Regulatory Commission. DOE, in its application to the Commission to construct and operate the repository, would identify relevant commitments, including those identified in this Final EIS, and could reasonably expect a comprehensive set of mitigation measures or conditions of approval to be part of the licensing process.

Mitigation activities would be funded under the Nuclear Waste Fund or, moreover, the Price-Anderson Act, which provides liability coverage for commercial activities operating under a license from the Nuclear Regulatory Commission and DOE activities by establishing a system of private insurance and Federal indemnification that generally ensures that as much as $9.43 billion is available to compensate for damages suffered by the public from a "nuclear incident," regardless of who causes the damage. Payment would be from Federal funds or, if public liability arose from activities funded by the Nuclear Waste Fund (for example, activities at a geologic repository), from that Fund. DOE has revised the EIS to include more details about indemnification under the Price-Anderson Act (see Appendix M).

4.5 (3260)
Comment - EIS000997 / 0001
Studies have been done since the early 1960's (1) on how to deal with the high level wastes generated by the nuclear power industry. We fought against building these plants for over 20 years. You built them anyway. Now we have to deal with permanent storage of material that should never have been produced in the first place. St. Louis is still dealing with the waste of the Manhattan Project, the original nuclear bomb program. So we know the solutions are not simple.

Response
DOE agrees that solutions to problems dealing with nuclear waste are not simple. Congress passed the Nuclear Waste Policy Act to address the complex problems posed by nuclear waste disposal. After considering all factors, DOE believes that permanent deep geologic disposal is the best solution available at this time. This was affirmed in 1990 (DIRS 100061-National Research Council 1990) and as recently as May 2001 (DIRS156712-National Research Council 2001).

4.5 (3318)
Comment - EIS001000 / 0005
America's Congress needs to craft a new nuclear waste policy. One that will honestly address the dangers, the unknowns, and the true costs. The costs to the environment and to living creatures for as far into the future as anyone can imagine.

Response
In passing the Nuclear Waste Policy Act of 1982, Congress acknowledged the Federal Government's responsibility to provide for the permanent disposal of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. DOE will comply with any future nuclear waste legislation that Congress passes.

4.5 (3327)
Comment - EIS001002 / 0007
Another worry of mine that points to the possibility of incomplete or compromised science was a report that the tests to study the long term effects of heat on the storage site, particularly on the water in the rocks, will not be ready before 2006. Yet the current schedule which assumes approval is to start construction in 2005. The electric bill for the heaters they are using is $8823 a month, that is almost $106,000 a year for at least 8 years for results they are not going to wait for before they begin. I wish I owned stock in Nevada Power; they seem to be the only ones who will benefit from these tests.

Response
Testing of rock at the proposed repository for the effects of heating and cooling is an ongoing process. Single-heater and large block (multiple-heater) tests have been completed. The test referred to in this comment, the drift scale heater test, is still under way. This test involves 4 years of heating and 4 years of cooling. The heating phase will continue until 2001, when DOE will turn the heaters off and allow the drift to cool naturally. The first cooling data will be available in 2002. Such tests have provided important confirmatory data.

As directed by the NWPA, DOE undertook site characterization activities to evaluate the suitability of the Yucca Mountain site as the location of a repository. Site characterization includes activities necessary to provide data required for evaluation of the suitability of the site for a potential site recommendation and submittal of an application to the Nuclear Regulatory Commission for construction authorization for a repository.

The purpose of the Performance Confirmation and Testing Program is to ensure that the repository would meet specific regulatory requirements [10 CFR 63.102(m) and 10 CFR Part 63, Subpart F]. The program would consist of tests, experiments, and analyses to evaluate the adequacy of the information used to demonstrate compliance that the repository would meet performance objectives. The Performance Confirmation Plan (DIRS 146976-CRWMS M&O 2000) describes the program.

4.5 (3328)
Comment - EIS001002 / 0008
Unfortunately, now I have seen a lot of mistakes that resulted from what seemed like good science at the time. And accidents happen. Not everything can be anticipated. In my beloved space program we lost the Challenger over cheap O rings and now the Mars probes. Were both done too quickly for political expediency? The nuclear power plants were licensed [optimistically] expecting science would find a solution for the waste disposal before the end of their useful life. This is only our best guess so far and the only one the government has been considering since 1987. That is not certain enough for me.

Response
Based on current information, DOE believes that it can meet the requirements for licensing a geologic repository that are specified in Environmental Protection Agency and Nuclear Regulatory Commission regulations.

DOE has been focusing only on Yucca Mountain since 1987, as required by the NWPA. The Secretary of Energy will consider the information in this EIS and other available information in determining whether to recommend the site to the President for the development of a repository. The President would then consider the available information and make a decision on whether to recommend the site to Congress.

4.5 (3385)
Comment - EIS001387 / 0001
This comment relates to the removability/relocation of spent nuclear fuel stored at Yucca Mountain.

As a member of the State of Wisconsin Radioactive Waste Review Board, I have followed with interest the efforts to characterize the Yucca Mountain site. I believe it is impossible to convince the majority of the public that any projections of site characteristics can be made with [assurance] for 10,000 years. This being the case, I believe that it is important to discuss the ability to remove any stored waste and relocate it in the event that storage conditions deteriorate sufficiently to threaten the environment.

Please address such ability (more) thoroughly in the EIS.

Response
Section 122 of the NWPA, requires DOE to maintain the ability to retrieve emplaced materials. Nuclear Regulatory Commission regulations [10 CFR Part 63, particularly Section 63.111(e)] require that the repository be designed to preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the Yucca Mountain Repository provides a design and management approach that would isolate wastes from the public in the future while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly as long as 300 years to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. During this period, the repository would remain accessible for scientists to continue testing and monitoring and allow future generations to determine the timing and methods of repository closure.

Because retrieval is not anticipated, DOE did not include it as part of the Proposed Action. However, the EIS evaluated retrieval as a contingency action, and describes any potential impacts (see Section 4.2). The Department evaluated only actions it could predict with certainty (that is, removal of emplaced waste materials and subsequent onsite storage). Because future actions regarding the management and disposal of these materials following retrieval would be at the direction of Congress, are highly speculative, and are unnecessary to support current decisionmaking, DOE believes it is inappropriate to evaluate impacts that could result from these actions.

4.5 (3467)
Comment - EIS000722 / 0003
We protest that the entire process is much more driven by the short term financial interests of the nuclear industry than the health and safety interests of the public which you are supposed to represent. To cite just one example: Congress mandates that the transportation of spent fuel must be "commercially viable." Right off the bat, public health and safety issues take a backseat, which has direct implications ranging from cask design and testing requirements to how, where and when spent fuel is transported or stored at the reactors.

Response
In the NWPA, Congress states that " ... while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel...." Since the passage of the Act, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund for development of a repository for spent nuclear fuel and high-level radioactive waste. The taxpayers would also bear some of the cost of the repository because about 30 percent of the cost would be for the disposal of spent nuclear fuel and high-level radioactive waste from defense and research programs.

There is no requirement in the NWPA that the transportation of spent nuclear fuel and high-level radioactive waste to the proposed repository be "commercially viable", though it does state that commercial firms will be used to the extent possible. The Act does require transportation in casks that the Nuclear Regulatory Commission has certified for such a purpose.

4.5 (3582)
Comment - EIS000548 / 0003
I personally find it very sad that even before nuclear sites were set up that a plan of safe storage for this spent fuel was not designed.

By saying yes to Yucca Mountain, the government -- I know this is not a foregone conclusion, but I believe very strongly if somebody spent $3 billion on something, that the likelihood of them saying no to it is very slim.
So I'm assuming that Congress and the DOE are saying yes to Yucca Mountain. I believe by saying yes to this, continuance of nuclear energy which is a high-risk energy source -- what you are basically saying yes to, is the continuance of nuclear energy and the continuance and possibility of another Yucca Mountain.

What is going to happen to Yucca Mountain if it is not found as a viable site? Are they really going to abandon something they have spent $3 billion on?

Response
DOE has no authority over the operation of the Nation's nuclear powerplants or storage of spent nuclear fuel at those sites. As mandated by the Atomic Energy Act of 1954, as amended, the Nuclear Regulatory Commission has jurisdictional authority over commercial uses of nuclear materials, including the operation of reactors to produce electricity. This includes the production of electricity from nuclear energy and the interim storage of spent nuclear fuel at the reactor sites. As such, the Commission determined, through extensive safety reviews prior to issuing operating licenses, that the powerplants had adequately designed facilities and implementing procedures to ensure safe onsite storage of spent nuclear fuel. In addition, with the Waste Confidence Findings (10 CFR 51.23), the Commission determined that "if necessary, spent nuclear fuel generated at any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent storage installations."

If Yucca Mountain was not approved, DOE would stop ongoing work at the site and, as required by the Nuclear Waste Policy Act, submit recommendations to Congress for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste (see Section 2.2 of the EIS).

By the end of Fiscal Year 1999, DOE had spent about $6 billion on the proposed repository and another $1.1 billion on program management. Not all of this money was been spent on Yucca Mountain; some was spent on evaluation of basalt and salt sites before the redirection of the program by Congress in 1987.

4.5 (3586)
Comment - EIS000548 / 0006
Another thing, and I might be ignorant about this, but I want to know why isn't this Yucca Mountain on the ballot for citizens to vote on? Maybe it has been. I don't know. I have never read it anywhere.

Response
Yucca Mountain has not been on a ballot for the citizens of the United States to vote on directly. The NWPA was passed by the elected representatives of the people of the United States sitting in the House of Representatives and the Senate, and signed into law by the President.

4.5 (3605)
Comment - EIS001031 / 0010
I feel this action proposal was made with the nuclear power interests in mind, not the welfare of the people of this country, as so little attention given to the No Action Alternative indicates. This decision should be made according to what is best for all. We must wake up. We are going through a sixth mass extinction due to the many mistakes made by us humans in our treatment of the Earth. We cannot afford any more big mistakes. So what you do about this waste will be critical, now and in the future.

Response
The purpose of the proposed Yucca Mountain Repository is "permanent" disposal of nuclear waste, not interim storage or monitored retrievable storage. The concept of permanent disposal in a deep geologic repository stems

from studies initiated in the 1950s by the National Academy of Sciences. Continued studies in the United States and abroad have concluded that deep geologic disposal can keep nuclear waste isolated from the environment in formations that have been stable for millions of years, thus providing a safe location for the waste to decay into a stable form.

As required by the Nuclear Waste Policy Act, the Secretary of Energy will determine whether to recommend the development of Yucca Mountain as a repository to the President. If the site was approved, DOE would submit a License Application to the Nuclear Regulatory Commission.

4.5 (3615)
Comment - EIS001031 / 0021
I [hear] that the proposed estimate for the cost to the taxpayers for this project would be $42.5 billion? Why do we have to pay for the clean up? Why aren't the producers being forced to pay for it, while we oversee it? If we do have to pay for the clean up, wouldn't it be more cost effective to halt waste production, leave the stuff where it is and pay for any cleaning up and monitoring needed on-site? Aren't most of these sites contaminated anyway?

Response
The costs for the proposed Yucca Mountain Repository are not cleanup costs. The term "cleanup costs" indicates costs that would be associated with remediation of wastes released to the environment. Radiation from the spent nuclear fuel and high-level radioactive waste that DOE would dispose of in the repository has not been released to the environment and, therefore, costs associated with the repository do not include cleanup or remediation.

In the "Findings" section of the NWPA, Congress stated that "... while the Federal Government has the responsibility to provide for the permanent disposal of high-level nuclear waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel..." Section 302 of the Act specifies that funding for disposal of commercial spent nuclear fuel is provided by payment of fees to the Secretary of Energy by the generators of electricity from nuclear power plants. Equivalent amounts are paid by the Federal Government to cover similar costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States.

Since the passage of that Act, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for disposal of spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999, the program had spent approximately $6 billion for the purposes specified in the Act.

Taxpayers will bear some of the cost of the repository. Congress appropriates funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the United States. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. This percentage is based on the space required to dispose of defense-related spent nuclear fuel and high-level radioactive waste. Thus, the commercial utilities are "paying their fair share" of repository program costs along with taxpayers.

With regard to halting waste production, DOE has no authority over the operation of the Nation's nuclear powerplants or storage of spent nuclear fuel at those sites. As mandated by the Atomic Energy Act, as amended, the Nuclear Regulatory Commission has jurisdictional authority for commercial uses of nuclear materials, including the operation of reactors to produce electricity. This includes the production of electricity from nuclear energy and the interim storage of spent nuclear fuel at the reactor sites.

With regard to leaving the material where it is, as discussed in Section 1.3 of the EIS, Congress enacted the NWPA, acknowledging the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste. The Act established the Office of Civilian Radioactive Waste Management, which has the responsibility to perform the evaluative, regulatory, developmental, and operational activities the Act assigns to the Secretary of Energy. The evaluation of the suitability of Yucca Mountain as a potential repository and the preparation of this EIS are parts of the process mandated by Congress. Chapter 7 includes an evaluation of impacts associated with the No-Action Alternative, which assumes the spent nuclear fuel and high-level radioactive

waste would remain at their current locations. DOE included a No-Action Alternative that analyzed two scenarios to provide a basis for comparison with the Proposed Action and to reflect the range of impacts that could occur.

4.5 (3638)
Comment - EIS001105 / 0002
[F]ailure to isolate nuclear wastes so as to minimize their exposure to people and to conditions that could cause deterioration would be totally irresponsible and therefore is unacceptable in the CAB's [Savannah River Site Citizens Advisory Board's] opinion. Furthermore, plans for a geologic repository have been and continue to be a cornerstone of the nation's nuclear waste management program. Failure to urgently move forward with its construction and subsequent operation would undermine the integrity of the entire program. Even the postponement of a decision would have a similar impact. As a result, stakeholder support for many aspects of the waste management activities, such as nuclear material integration, could be lost.

Response
The Secretary of Energy will determine whether to submit the Site Recommendation to the President. If the site was approved, DOE would submit a License Application to the Nuclear Regulatory Commission as soon as possible.

4.5 (3641)
Comment - EIS001105 / 0005
Plan a comparative cost-benefit analysis of commercial SNF [spent nuclear fuel0, DOE SNF, and DOE HLW [high-level radioactive waste] to establish the optimum order of shipment of materials to the repository. This undertaking should not be allowed to interfere with the timely release of the final EIS.

Response
DOE is carefully weighing and balancing a number of issues to determine the best shipping scenario that would include commercial and DOE spent nuclear fuel and high-level radioactive waste. However, a specific shipping order has not been determined. Because it would be at least 10 years before the repository could begin accepting these materials, the process used to determine the order would continue to evolve for several more years. As a consequence, the process for determining a shipping order would not affect the EIS schedule.

4.5 (3684)
Comment - EIS001001 / 0003
There is no reason to rush in and begin shipping millions of atomic bomb's worth of radioactivity around the countryside and through neighborhoods and cities like ours to a controversial and questionably safe central site in Nevada. The real reason for the air of crisis is that utilities' temporary storage pools are filling up, and the utilities want additional storage space to fill with still more waste. Only about half of the nuclear waste that the DEIS is attempting to deal with has as yet been generated. So we have the absurd situation of the nuclear power industry requesting off site storage now, so it can commence to double the scale of the problem. And now we learn 3 x [times] with "assumed" 10 year extension of reactor life the aim should be a system wide solution which avoids further waste generation while still producing adequate electric power.

Response
In the "Findings" section of the NWPA Congress stated that "... while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel..." Further, Section 302 of the Act states that "... in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste or spent nuclear fuel involved as provided in this subtitle."

Storage facilities at some nuclear powerplants have reached, and at others are close to reaching, their licensed storage capacity. The utilities have relied on DOE to provide a repository in accord with the Nuclear Waste Policy Act. In addition, continued generation of electricity at the Nation's nuclear powerplants will continue to generate spent nuclear fuel in accord with their operating licenses, for which DOE has the responsibility for disposal.

Regardless of schedule or cost pressures, DOE would fully evaluate the repository site and ensure that it was in compliance with Environmental Protection Agency environmental protection standards before accepting waste. The

Nuclear Regulatory Commission would also evaluate the repository site and ensure its short- and long-term safety before issuing a license to operate.

4.5 (3706)
Comment - EIS001411 / 0003
It is arguably wrong for the government to spend $30,000 taxpayer dollars on advertising to convince Nevadans that the Yucca Mountain project is safe since most Nevadans strongly oppose the proposal. According to the Nuclear Waste Project Office in the State of Nevada, nearly eight out of ten Nevadans oppose the construction of a Nuclear Waste Dump in Yucca Mountain.

Response
Consistent with DOE implementing procedures for the National Environmental Policy Act [NEPA; 10 CFR 1021.313(b)], "DOE shall hold at least one public hearing on DOE draft EISs. Such public hearings shall be announced...." For each of the public hearings on the Draft EIS and Supplement to the Draft EIS, DOE placed newspaper advertisements that announced the subject, date, time, and location of the hearing. Depending on the hearing location, the cost for such advertisements can vary significantly based on the rates charged by local media outlets. The DOE hearing announcements fulfilled NEPA requirements by providing a notice to the public of an opportunity to participate in the NEPA process by attending a public hearing and providing comments. Neither public opposition nor support for the Proposed Action alters DOE's responsibility to advertise public hearings.

4.5 (3734)
Comment - EIS000976 / 0001
I believe that this process of democracy should have been received by the Department of Energy and the Department of Transportation [DOT] as a sign that the questions surrounding the transportation of nuclear materials needed to be answered before any more nuclear waste or components [were] created or transported. The only appropriate response to this democratic groundswell would have been to declare a moratorium on production of any further nuclear waste. Instead, the DOT preempted the ordinances and the DOE continued to allow the production of nuclear waste and weapons.

The DOE and the DOT preempted a democratic process that could have created the public will and resources to hold those corporations who have profited from the production of nuclear waste accountable for the social, economic, and environmental consequences of their actions. Instead, we are here today examining a proposal whose consequences have not been fully explored and which comes to us -- top down -- from the very agencies that refused to hear the will of the people two decades ago.

Response
As discussed in Section 1.3 of the EIS, in 1982 Congress enacted the Nuclear Waste Policy Act, which acknowledges the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste, and established the DOE Office of Civilian Radioactive Waste Management, which has the responsibility to perform the evaluative, regulatory, developmental, and operational activities the Act assigns to the Secretary of Energy. The evaluation of the suitability of Yucca Mountain as a potential repository and this EIS are parts of the process mandated by Congress.

DOE has no authority over the operation of the Nation's commercial nuclear powerplants. As mandated by the Atomic Energy Act, the Nuclear Regulatory Commission has jurisdictional authority for commercial uses of nuclear materials, including the operation of reactors to produce electricity. This includes the production of electricity from nuclear energy and the interim storage of spent nuclear fuel at reactor sites.

Regardless of the future of commercial nuclear power, a repository or some other form of permanent management is necessary for the existing inventories of spent nuclear fuel and high-level radioactive waste.

4.5 (3936)
Comment - EIS001329 / 0001
The waste acceptance criteria should be set now, so that present storage sites can plan treatments to meet the acceptance criteria.

Response
DOE recognizes the importance of finalizing waste acceptance criteria. However, it does not believe that setting these criteria without full consideration of input from the affected generators would be in the storage sites' best interest. Therefore, the Department has instituted a program for development of the criteria through a formal technical review and comment process with all affected parties to ensure it could transport and dispose of materials in a manner that would protect the public and provide reasonable expectation that the long-term performance objectives of the repository would be satisfied.

4.5 (4024)
Comment - EIS001208 / 0003
This DEIS is part of a piecemeal and confusing decision-making process. On August 31, 1995, then Governor Mike Lowry wrote to Secretary of Energy Hazel O'Leary, concerning the [confusion] resulting from DOE's piecemeal approach to dealing with nuclear wastes and materials through several different EISs:
"Instead of getting a cradle-to-grave and holistic picture about how this material would be dealt with, we found that process somewhat arbitrarily segmented and, as a result, it was difficult to fully understand the implications for Washington State."

"We recognize that you face legal constraints and time requirements. But it is time to help citizens and public officials see how these decisions relate to one another, and to begin a good-faith discussion about equity. My strong concern is that continuing the piecemeal approach to the public will prolong distrust and stymie the nation's ability to deal forthrightly with the nuclear legacy of the Cold War."

Lowry's letter included a list of 18 ongoing or proposed DOE environmental impact statements dealing with the disposition of nuclear wastes and materials, including the Yucca Mountain EIS.

Here are two clear instances where disconnects between the Yucca Mountain EIS and other DOE EISs leave significant questions unanswered:

What happens to Hanford's HLW [high-level radioactive waste]? If, as the "proposed action" in the Yucca Mountain EIS indicates, half or more of Hanford's HLW inventory stays in storage indefinitely, where are the impacts covered? Both DOE's Tank Waste Remediation System EIS and Waste Management Programmatic EIS assumed repository disposal for the HLW. The Yucca Mountain EIS, as noted above, includes no site-specific analysis of the results of continued on-site storage.

What about "Greater than Class C" and "Special Case" wastes? The Yucca Mountain EIS identifies these as part of "Inventory Module 2" for purposes of assessing repository impacts. However, the analysis specifically excludes them from examination of the "no action" alternative. Yet the EIS also admits that these cannot go to the repository without legislative and/or Nuclear Regulatory Commission action (p. S-59). Treatment, storage, and disposal of these same wastes were specifically excluded from DOE's Waste Management Programmatic EIS (May 1997, p. 51). So DOE has yet to address the impacts of continued storage of these wastes, or of any disposal path other than one not currently permitted by law.

Response
DOE believes that a "cradle-to-grave" approach would overreach the purpose established by Congress in the NWPA, and would duplicate analyses described in earlier DOE EISs that addressed portions of the nuclear fuel cycle on a programmatic or project-specific basis. The Act directs the Secretary of Energy to evaluate the suitability of the Yucca Mountain site for a geologic repository, to prepare a recommendation on the site for the President, and to provide an EIS to accompany the Site Recommendation. DOE believes it has followed this mandate in preparing this EIS.

In response to the comment that the EIS should provide an analysis of the impacts of continued storage or other management options of spent nuclear fuel and high-level radioactive waste not included in the Proposed Action, DOE believes that this EIS is consistent with the mandate of the NWPA. That is, it is not such a programmatic EIS and, in accordance with Section 114(a)(1)(D) of the NWPA, it does not consider the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain.

The EIS evaluates impacts associated with the disposal of 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste. Section 1.3.2.2 of the EIS identifies the total amount of these materials that would be generated in the foreseeable future. (Appendix A provides additional information about projected inventories.) This amount, called Module 1, includes spent nuclear fuel that would be generated as a result of nuclear plant life extensions (Section A.2.1.5.1), as well as the entire inventory of DOE spent nuclear fuel and high-level radioactive waste. Chapter 8 evaluates the impacts of transportation and disposal of the entire inventory. In addition, Section 7.3 evaluates the impacts of leaving these materials in their current locations as part of the No-Action Alternative.

The No-Action analysis evaluated DOE spent nuclear fuel and high-level radioactive waste at existing sites or at sites where Records of Decisions have placed or will place these materials. For example, in the Record of Decision (60 *FR* 18589, April 12, 1995) for the *Final Supplemental Environmental Impact Statement, Defense Waste Processing Facility* (DIRS 103191-DOE 1994), DOE decided to complete construction and operate the Defense Waste Processing Facility and associated facilities at the Savannah River Site to pretreat, immobilize, and store high-level radioactive waste. Similarly, the preferred alternative of the *Final Environmental Impact Statement for the Tank Waste Remediation System, Hanford Site, Richland, Washington* (DIRS 103214-DOE 1996) was ex situ vitrification of high-level radioactive waste with onsite storage until final disposition in a geologic repository. For DOE spent nuclear fuel, the Record of Decision (60 *FR* 28680, June 1, 1995) for the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DIRS 103205-DOE 1995) decided that Hanford production reactor fuel would remain at the Hanford Site; aluminum-clad fuel would be consolidated at the Savannah River Site; and non-aluminum-clad fuels (including spent nuclear fuel from the Fort St. Vrain reactor and naval spent nuclear fuel) would be transferred to the Idaho National Engineering and Environmental Laboratory. DOE continues to make decisions on the types and quantities of materials to be moved, as well as the schedules for these activities, in programmatic documents such as the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DIRS 103205-DOE 1995). The evaluations of impacts related to those decisions are in those documents and are beyond the scope of this EIS.

For this EIS, the NWPA, restricts the emplacement of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste in a first repository. Therefore, the evaluation of the Proposed Action was limited to impacts that could result from the emplacement of 70,000 metric tons of heavy metal. However, DOE recognizes that disposing of all commercial and DOE spent nuclear fuel and all high-level radioactive waste projected through 2046 (Module 1) as well as Greater-Than-Class-C and Special-Performance-Assessment-Required wastes (Module 2) in the repository represents a reasonably foreseeable future action. For this reason, Chapter 8 of this EIS evaluates potential cumulative impacts from these actions.

Section 7.2 of the EIS discusses continued storage at 77 commercial and DOE sites of spent nuclear fuel and high-level radioactive waste (Inventory Module 1). Section 7.2 discusses projected short- and long-term impacts at these sites. DOE did not include Module 2 in its consideration of potential impacts under the No-Action Alternative because there is not enough information about Module 2 wastes to perform a meaningful analysis. For example, private industry stores such materials as sealed radioactive sources, calibration, medical, and well-logging sources at hundreds of locations in the United States (DIRS 101798-DOE 1994). Environmental information at the hundreds of sites that use and store Greater-Than-Class-C and Special-Performance-Assessment-Required wastes is not readily available. Although specific analysis might not be possible, DOE believes short-term impacts such as those to socioeconomic resources and land use would not increase appreciably, but health effects could increase over the long term because workers and the public could be exposed to these waste types.

4.5 (4210)
Comment - EIS001160 / 0024
The DEIS does not adequately address issues raised and substantiated by White Pine County during the scoping process. For example:

The EIS should consider the possibility that the repository may never be permanently closed. Long-term below ground monitored retrievable storage at the site should be evaluated within the EIS. A comparative analysis of the merits of backfilling the facility vs. other means of closure should be included within the EIS. Alternative materials,

which might be used to achieve closure, should be evaluated against their contribution to risk management, retrievability and cost. The DEIS does not consider a repository with indefinite institutional control and lack of closure activity. Alternative methods for closure of the repository are not considered. Retrieval of waste (where waste is taken and how) is not considered within the DEIS.

The EIS should evaluate the risk management contributions of alternative methods of warning future generations of the hazardous nature of materials located within the repository. The DEIS does not consider the risk management benefits or the costs of alternative methods for warning future generations.

Response
Section 122 of the NWPA requires the ability to retrieve spent nuclear fuel and high-level radioactive waste at a repository. Federal regulations (10 CFR Part 63) require that the repository design preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of emplacement. In accordance with these requirements, the operational plan for the proposed Yucca Mountain Repository includes a design and management approach that would isolate wastes from the public while allowing flexibility to preserve options for modifying emplacement and retrieving material. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly more than 300 years in the event of a retrieval decision to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. During this period, the repository would remain accessible to scientists to continue testing and monitoring and allow future generations to determine the timing and methods of closure. The EIS evaluates retrievability as a contingency action and describes potential impacts if retrieval occurred (see Section 4.2 of the EIS).

The purpose of the proposed repository is long-term management that does not require a government to watch the site for 10,000 years or longer. Therefore, for impact analysis purposes only, the EIS assumed that passive institutional controls would be applied after repository closure, as described in Section 2.1.2.4. DOE based its decision to analyze passive controls for the postclosure period on recommendations from the National Research Council of the National Academy of Sciences. However, DOE understands that ensuring public safety requires continued stewardship and has developed components for the postclosure safety case, including site stewardship programs. These programs include, but are not limited to, long-term monitoring of the site and maintaining the integrity and security of the repository. After closure, DOE would have the responsibility of maintaining institutional control over the repository, as required by the Energy Policy Act of 1992. The methods, extent, and length of this regulatory requirement are not well defined at present. Therefore, the Department believes it would be speculative to prepare a meaningful cost-benefit analysis related to various warning devices. However, DOE would maintain appropriate institutional control for as long as required.

In addition to active controls, the repository area would be identified by monuments that would be designed, fabricated, and placed to be as permanent as practicable. The monuments would notify intruders in the area that the repository exists. The notification would enable the intruders to make informed decisions on the use of the surface and subsurface areas for habitation or other activities. The design and ultimate placement of these monuments is under study. Section 2.1.2 of the EIS contains information on the subject of human intrusion and long-term passive institutional control.

4.5 (4615)
Comment - EIS001410 / 0005
The plans for closing the site lack a strategy for long term monitoring. The report does not call for continued vigilance but only for the site to be marked and for "continuing performance confirmation as necessary." (4.1) This ambiguous plan is not satisfactory in light of the lasting dangers nuclear storage imposes on future generations. A clear and comprehensive long-term safety plan should be adopted prior to storage, rather than a "wait and see" attitude.

Response
In accordance with Nuclear Regulatory Commission regulations (10 CFR Part 63), the performance confirmation and testing program would end at the beginning of repository closure operations. DOE understands that ensuring public safety requires continued stewardship and has developed components for the postclosure safety case, including site stewardship programs. These programs include, but are not limited to, long-term monitoring of the site and maintaining the integrity and security of the repository.

A post closure monitoring program, as required by 10 CFR Part 63, would include monitoring activities that would occur around the repository after the facility had been closed and sealed. Nuclear Regulatory Commission regulations [10 CFR 63.51 (a)(1) and (2)] require the submittal to the Commission of a license amendment for permanent closure of the repository. This amendment must provide an update of the assessment of repository performance after permanent closure, and a description of the program for post closure monitoring. The details of this program would be defined during the processing of the license amendment for permanent closure. Deferring a description of this program until the closure period would enable the identification of appropriate technology, including technology that could be available in the future.

4.5 (4983)
Comment - EIS001709 / 0002
If how much radiation will leak is not clear; if when it will leak is not clear - then it's not clear when consideration for geological disposal of the nuclear waste should be considered. This is a call for a 3 year postponement of consideration.

Response
DOE has studied the Yucca Mountain site for more than 15 years and has evaluated the long-term consequences of waste isolation at a repository. Chapter 5 of the EIS provides estimates of potential public health and environmental impacts for 10,000 years and beyond. Based on the information and analyses available (including those in the EIS), the Secretary of Energy will determine whether to recommend the development of the Yucca Mountain site to the President as a repository. As discussed in Section 2.1.2.3, DOE would conduct a performance confirmation and testing program, required by the Nuclear Regulatory Commission regulations (10 CFR Part 63), to assess the performance of the proposed repository during operation and before closure.

4.5 (5206)
Comment - EIS001443 / 0030
DOE's proposal calls for backfilling of the emplacement drifts and closure of the repository between 50 and 300 years after disposal operations begin. Backfilling and closing the repository prohibits monitoring of the waste packages for structural integrity and increases the difficulty and cost of retrieving the waste should a radioactive release occur or new findings and technologies emerge which provide for safer forms of storage or reuse of the nuclear material.

Contrary to the expectation incorporated into [the] DEIS that significant radioactive releases from the repository are inevitable, DOE must adopt as its goal complete and permanent isolation of radioactive material from humans. In our estimation, the only way to both meet this goal and to mitigate the many uncertainties associated with repository performance is to have a permanently open and thoroughly monitored facility. DOE should not attempt to anticipate a closure date for the repository and should quantify, to the extent possible, the fiscal impact of funding a closely monitored facility capable of retrieving and replacing failed waste packages.

The project should provide, as a mitigation and risk-reduction measure, for on-site third party monitoring of the repository both during and after the emplacement phase. It is recommended that either the National Science Foundation or Nuclear Regulatory Commission be specified as the third party and provided the necessary funding via the Nuclear Waste Policy Act.

Response
Backfilling the repository emplacement drifts as a potential mitigation measure is not under active consideration by DOE. However, DOE would not make a final decision on permanent closure methods until the license amendment application required for closure (10 CFR 63.51). This would allow DOE to take full advantage of new information gathered during the preclosure and testing period that could be relevant regarding potential environmental impacts of repository closure.

As described in Section 2.1.2 of the EIS, the operational plan for the proposed repository includes a design and management approach that would isolate wastes from the public while allowing flexibility to preserve options for modifying emplacement, retrieving the waste, and closing the repository. The design would maintain the ability for at least 100 years and possibly more than 300 years to retrieve materials either to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. During this period, the repository would remain

accessible for scientists to continue testing and monitoring and allow future generations to determine the timing and methods of repository closure.

The purpose of any projected schedule for closure in the EIS is to estimate impacts. There is no implied commitment to such a schedule, although it is important to design considerations. The final decision to close would come as an action on an amendment to the operating license for the repository. DOE would submit the amendment to the Nuclear Regulatory Commission near the time of planned closure, which could be more than 300 years after the end of waste emplacement. At that time there would be a wealth of new information about the site and the behavior of the waste material as well as more powerful analysis techniques. Chapter 5 of the EIS provides more information about the potential environmental impacts associated with postclosure activities.

DOE understands that ensuring public safety requires continued stewardship, and has developed components for the postclosure safety case, including site stewardship programs. These programs would include, but not be limited to, long-term monitoring of the site and maintaining the integrity and security of the repository. After closure, DOE would be responsible for maintaining institutional control over the repository, as required by the Energy Policy Act of 1992. The methods, extent, and length of this requirement are not well defined at present. Therefore, DOE believes that it would be speculative to prepare a meaningful cost-benefit analysis related to closure options. However, the Department would maintain appropriate institutional control for as long as required to ensure protection of the public and the environment.

If the repository was approved, DOE would construct, operate and monitor, and eventually close it in accordance with license requirements issued by the Nuclear Regulatory Commission under 10 CFR Part 63. Repository activities would, therefore, be subject to frequent Commission compliance inspections and continued demonstrated compliance with applicable regulations and license specifications. Under the licensing authority provided by 10 CFR Part 63, the Commission would provide onsite third-party monitoring throughout repository operations and closure.

Since the passage of the Omnibus Budget Reconciliation Act of 1990, as amended, the Nuclear Regulatory Commission has been a fee-recovery Federal agency. By authority of 10 CFR Parts 170 and 171, the Commission receives fees from applicants and licensees to cover 100 percent of its budget authority, minus the amount paid by the Nuclear Waste Fund and appropriations from the General Fund to support regulatory reviews and support for other Federal agencies. DOE, therefore, anticipates that the Commission would assess fees to cover costs associated with the repository License Application review and annual license maintenance and ongoing compliance inspections. These fees would be paid from the Nuclear Waste Fund and the General Fund in proportion to the cost of the repository apportioned to the disposal of commercial and defense-related waste.

4.5 (5311)
Comment - EIS001887 / 0045
Page 1-1; Section 1 - Purpose and Need for Agency Action

The Draft EIS states that "DOE has ultimate management responsibility for other highly radioactive materials. Examples of such materials include Greater-Than Class-C and Special-Performance-Assessment-Required wastes. The Department might need to dispose of these materials in a monitored geologic repository to protect public health and safety. However, disposal of Greater-Than Class-C and Special-Performance-Assessment-Required wastes at the proposed Yucca Mountain Repository could require additional legislative action or a determination by the U.S. Nuclear Regulatory Commission to classify them as high-level radioactive waste."

The State of Nevada contends that DOE has not developed a "path forward" for the disposition of commercial Greater-Than Class-C (GTCC) waste and/or DOE owned Special-Performance-Assessment-Required wastes. DOE must acknowledge that the Waste Management Programmatic Environmental Impact Statement (DOE/EIS-0200-F) did not address bounding alternatives for the disposition of these waste types. Because of the long-lived radiation hazards associated with these waste types, the Draft EIS should have acknowledged that these wastes must be confined from the biosphere for the indefinite future. In other words, shallow land burial is not an option for final disposition of these wastes. Rather than provide a largely speculative discussion about what might be needed to resolve the "path forward" disposal options, the Final EIS must acknowledge that DOE has yet to postulate a preferred disposal option for these wastes.

Response
Disposal of commercial Greater-Than-Class-C and DOE Special-Performance-Assessment-Required low-level wastes at the Yucca Mountain Repository would require a determination by the Nuclear Regulatory Commission that such wastes require permanent isolation as well as legislative action by Congress unless a second repository was in operation (see Chapter 8 of the EIS). Until such a determination by the Commission or direction from Congress, the ultimate disposal option for such wastes will remain undetermined.

However, DOE recognizes that disposal of all commercial and DOE spent nuclear fuel and high-level radioactive waste projected through 2046 (Module 1) as well as Greater-Than-Class-C waste and Special-Performance-Assessment-Required low-level waste (Module 2) in the repository represents a reasonably foreseeable future action. For this reason and in response to scoping comments, DOE evaluated impacts from these actions as potential cumulative impacts and presented the results in Chapter 8 of the EIS.

4.5 (5354)
Comment - EIS001887 / 0075
Page 2-13; Section 2.1.2 - Repository Facilities and Operations

The intent to end emplacement in 2033 coincides with the last year of current reactor operating licenses. Will the last spent fuel generated by the last operating reactor be shipped to the repository immediately after reactor shut-down? Can this be done with the planned transportation casks? Does this require any special considerations for operations in the Waste Handling Building at the repository surface facility? Also, calcined waste from INEEL [Idaho National Engineering and Environmental Laboratory] won't be ready for shipment off-site until 2035. If this waste is to be emplaced in a repository at Yucca Mountain, the Draft EIS should be revised to reflect the possible change in the date for the end of emplacement at Yucca Mountain.

It should be noted that the NWPA [Nuclear Waste Policy Act] requires the waste to be retrievable from the repository for 50 years after initial emplacement. This means that, according to the schedule in Figure 2-9, the repository could be closed as early as 2060. Also, the rationale for assuming repository closure 100 years after first emplacement must be explained beyond the minimal explanation in Appendix E, at E.2.3.5, Timing of Repository Closure. This schedule is arbitrary, and the only number with any current basis is 50 years, as stated in the NWPA.

Response
DOE chose 2033 for the end of emplacement activities because of repository operational considerations and not to coincide with the final year of operations of commercial nuclear reactors. The EIS analysis assumed that DOE would receive an operating license for the repository in 2010 and that the surface and subsurface facilities would process and emplace about 3,000 metric tons of heavy metal (MTHM) per year. Under these assumptions, the repository would require until 2033 to receive and emplace the 70,000 MTHM assumed under the Proposed Action. In addition, current projections show that the 63,000 MTHM of commercial spent nuclear fuel slated for disposal in the first repository will be in storage by about 2011.

The EIS evaluates impacts associated with the disposal of 70,000 MTHM of spent nuclear fuel and high-level radioactive waste for the first repository in accordance with the Nuclear Waste Policy Act, as amended. However, DOE recognizes that some commercial powerplants will receive license extensions and could continue operating well past 2011, when the 72 commercial facilities would be ready to discharge the 63,000 MTHM of spent nuclear fuel. Therefore, Section 1.3.2.2 of the EIS identifies the total amount of these materials the facilities would generate through 2046 (Appendix A of the EIS provides more information about projected inventories). This amount, called Module 1, includes spent nuclear fuel that would be generated as a result of plant life extensions (Section A.2.1.5.1), as well as the entire inventory of DOE spent nuclear fuel and high-level radioactive waste, including Navy spent nuclear fuel. Chapter 8 of the EIS evaluates the impacts of transportation and disposal of the entire inventory. As stated in the introduction to Chapter 8, "The total projected inventory of spent nuclear fuel and high-level radioactive waste is more than the 70,000 MTHM considered for the Proposed Action. Its emplacement at Yucca Mountain would require legislative action by Congress unless a second repository was in operation." These restrictions could prevent DOE from disposing of all high-level radioactive waste at the proposed repository. A separate National Environmental Policy Act evaluation, as well as Congressional action, would have to occur before the Nuclear Regulatory Commission could license a second repository.

With regard to the adequacy of the transportation cask, the Standard Contract with the utilities (10 CFR Part 961) states that DOE is not required to accept spent nuclear fuel that is less than 5 years old. All of the 63,000 MTHM of commercial spent nuclear fuel projected for shipment to the proposed repository would be older than 5 years. However, the shipping casks would be capable of transporting 5-year-old fuel, although the amount in a cask could be reduced to less than a full load to accommodate the higher activity.

Section 122 of the NWPA, requires retrievability at a repository. Federal regulations (10 CFR Part 63) require that the repository design preserve the option of waste retrieval on a reasonable schedule for as long as 50 years after the start of emplacement. In accordance with these requirements, the operational plan for the proposed repository includes a design and management approach that would isolate wastes from the public while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This approach would maintain the ability to retrieve the waste to protect the public health and safety or the environment, or to recover resources from spent nuclear fuel for at least 100 years and possibly more than 300 years.

The purpose of any projected schedule for repository closure in the EIS is to estimate environmental impacts. There is no implied commitment to such a schedule, although it is important for design considerations. The final decision to close would come as an action on an amendment to the operating license for the repository. DOE would submit the amendment to the Nuclear Regulatory Commission near the time of planned closure. At that time there would be a wealth of knowledge about the site and the behavior of the waste material as well as more powerful analysis techniques.

4.5 (5640)
Comment - EIS001887 / 0264
Page 4-110; Section 4.2.2 - Impacts from Receipt Prior to the Start of Emplacement

The entire contingency related to centralized interim storage of spent fuel and high-level radioactive waste and early waste shipments to a Nevada facility is dealt with in three short paragraphs in the Draft EIS. The Draft EIS attempts to rationalize this truncated evaluation by stating that "the impacts resulting from the construction and staging of a Waste Staging Facility would be similar to those from the implementation of a retrieval contingency described in Section 4.2.1." This is an erroneous assumption.

In fact, early receipt of waste at an above ground facility would generate impacts similar to the start of repository activities. Significant impacts can be expected across the country with the onset of spent fuel and HLW [high-level radioactive waste] transportation operations. Early initiation of such shipments will likely result in increased impacts as state and local communities are forced to scramble to prepare for shipments and upgrade emergency response and related capabilities. In Nevada (as well as in cities and communities around the country), the onset of shipments and the initiation of waste receipt could trigger stigmatizing impacts and begin to negatively affect the State's principal economic sector. (See comments on Section 4.1.6 and Appendix I of these comments.)

If the Proposed Action includes a contingency for early waste acceptance at an above ground storage facility, such contingency must be analyzed and impacts assessed to the same level and degree as for the repository itself. This includes evaluating risks and impacts associated with construction, facility operations, and transportation (including how waste will get to such a facility given the early onset of operations, the feasibility of constructing a rail spur and the accelerated schedule, the impacts of intermodal and heavy-haul transport, and the impacts of legal-weight truck transport).

The assumptions in this analysis must be described. The Draft EIS seems to assume all waste arriving would be contained in uniform dimension canisters. If waste handling different from that anticipated for the conceptual retrieval operations is required, the impacts of this action must be evaluated.

Response
This comment is correct in that "early receipt" would trigger the transportation of spent nuclear fuel and high-level radioactive waste and their attendant environmental impacts. Although transportation under the early receipt contingency could begin a few years before the start of repository operations (2010), the transportation impacts described in Chapter 6 of the EIS are representative of those that would occur. DOE has modified Section 4.2.2 to clarify that early receipt-related transportation impacts would be similar to those for the Proposed Action.

However, as described in Section 4.2.2 of the EIS, early receipt facilities would consist of a series of concrete pads, rather than the waste handling and other facilities necessary to operate the repository (as described in Chapter 2). For this reason, DOE determined that the types of impacts resulting from the construction and operation of a surface staging facility would be similar to those from the implementation of a retrieval contingency (described in Section 4.2.1).

While stigmatization of southern Nevada can be envisioned under some scenarios, it is not inevitable or numerically predictable. Any such stigmatization would likely be an aftereffect of unpredictable future events, such as serious accidents, which might not occur. As a consequence, DOE addressed but did not attempt to quantify any potential for impacts from risk perceptions or stigma in this Final EIS (see Section 2.5.4 and Appendix N for additional information).

4.5 (5766)
Comment - 010027 / 0011
On Page 2-8 (Lower-Temperature Repository Operating Mode), it is noted that "placing younger fuel in surface aging facility" could vary thermal outputs. In essence this is recommending the development of an interim storage facility at the Yucca Mountain site. Construction of such a facility, of course, violates the provisions of the Nuclear Waste Policy Act (NWPA), which prohibits the siting of a repository and an interim storage facility in the same state. In addition to its illegality, the construction of such a facility would need to address a separate set of potential environmental impacts. Indeed, as is the case with the Private Storage Facility in Utah, proposed for the Skull Valley Goshute Reservation, it would require a separate EIS.

Response
Although the flexible design described in the Supplement to this EIS (and carried forward to the Final EIS) includes a surface aging facility for storage of as much as 40,000 metric tons of heavy metal over 50 years, this facility has been proposed as a repository operational option that could provide a cost-effective method of achieving a lower-temperature repository. DOE does not agree that the siting limitations for interim storage facilities contained in the NWPA constrain the operational flexibility of the repository or ultimately the long-term performance of the repository. Therefore, DOE believes that the surface aging facility option constitutes a potential operational element of a proposed repository.

DOE does not agree that a separate EIS would be required to evaluate potential impacts for a surface aging facility. Both the Supplement to the Draft EIS and this Final EIS include results of complete assessments of potential environmental impacts for both routine operations and potential accidents that could be related to a surface aging facility. These impacts included in Chapter 3 of the Supplement and Chapter 4 of this Final EIS.

4.5 (6128)
Comment - EIS001654 / 0042
As an organization concerned with protecting the investments of ratepayers who have contributed over $16 billion toward the solution to this difficult challenge, we want the federal government to fulfill its obligation under NWPA [the Nuclear Waste Policy Act] to design a safe repository that isolates the waste from the human environment, license it, build it expeditiously and begin transporting waste to it at the earliest.

Response
Utilities currently assess their ratepayers at the rate of 1 mil per kilowatt-hour for nuclear power generation. Payments into the Nuclear Waste Fund between Fiscal Year 1983 and the end of Fiscal Year 1999 amounted to about $9.8 billion. By the end of Fiscal Year 1999, the program had spent about $6 billion. As reported in *Report on Assessment of Fee Adequacy Based on FY 1999 Total System Life Cycle Cost Update* (DIRS 152076-CRWMS M&O 1999), the Nuclear Waste Fund investments had a market value of $8.6 billion by September 30, 1998, due to accrued interest on the funds.

The NWPA requires DOE to investigate the suitability of Yucca Mountain as a repository and determine whether it is appropriate to submit a recommendation, accompanied by a Final EIS, to the President to develop the Yucca Mountain site as a repository. The Department is fulfilling the requirements of the Act in publishing this EIS and, in doing so is pursuing resolution to the problem of managing the current and future inventory of spent nuclear fuel and high-level radioactive waste.

4.5 (6168)
Comment - EIS002249 / 0004
And they say they have another repository that they can build or whatever. They have got to deal with it; but that's not going to stop the waste production. All we are going to do is give the nuclear industry an excuse to create more waste, and I would like for them to address the seriousness of this decision on whether or not to go forth with Yucca Mountain or to, you know, deal with it in whatever ways possible.

Response
DOE has no authority over the operation of the Nation's commercial nuclear powerplants. As mandated by the Atomic Energy Act, as amended, the Nuclear Regulatory Commission has jurisdictional authority over commercial uses of nuclear materials, including the operation of reactors to produce electricity. This includes the production of electricity from nuclear energy and the interim storage of spent nuclear fuel at reactor sites.

Regardless of the future of commercial nuclear power, a repository or some other form of permanent management is needed for the existing inventories of spent nuclear fuel and high-level radioactive waste.

4.5 (6290)
Comment - EIS001955 / 0003
Further, the No-Action Alternatives do not meet the mandate of the Nuclear Waste Policy Act, which is to dispose of high-level radioactive waste in a geologic repository.

The Nuclear Waste Policy Act mandated that DOE begin accepting spent nuclear fuel from nuclear power plants in January 1998. DOE entered into contracts with plant operators committing to such action. Electric ratepayers, through plant operators, have in turn contributed over $16 billion to the Nuclear Waste Fund to support the development of a spent fuel/high-level radioactive waste disposal facility and supporting infrastructure. New York ratepayers, alone, have already contributed over $621 million to the Fund, with a total commitment exceeding $1 billion when pre-1983 assessments are considered. While the ratepayers have lived up to their end of the agreement, DOE has not.

Response
Section 114(f)(2)] of the NWPA directs DOE to perform detailed evaluations of the Yucca Mountain site and states that DOE need not consider alternatives to the Yucca Mountain Repository. DOE selected two hypothetical No-Action scenarios for evaluation to provide a basis for comparison to the Proposed Action and because they reflect a range of impacts that could occur from the continued onsite storage of material.

Payments into the Nuclear Waste Fund between Fiscal Year 1983 and the end of Fiscal Year 1999 amounted to approximately $9.8 billion. By the end of Fiscal Year 1999, appropriations for defense nuclear waste disposal totaled $1.1 billion, and the program had spent approximately $6 billion. Due to accrued interest, the Nuclear Waste Fund totaled about $8.5 billion at the end of Fiscal Year 1999. DOE is proceeding toward determining whether to recommend the Yucca Mountain site to the President. If a site recommendation was accepted and Congress passed a resolution of repository approval, if necessary, DOE would submit a License Application to the Nuclear Regulatory Commission and, under current plans, would begin accepting spent nuclear fuel and high-level radioactive waste in 2010.

DOE cannot comment on issues related to the Standard Contract for Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste (10 CFR 961.11) or potential impacts resulting from its delay in beginning to accept spent nuclear fuel by January, 31, 1998, because they are the subject of ongoing litigation.

4.5 (6425)
Comment - EIS001632 / 0011
Page 2-37, Section 2.1.2.3. In the final paragraph, the statement that DOE would use institutional controls "to limit or prevent intentional and unintentional activities in and around the closed repository" is problematic. EPA and the National Academy of Sciences maintain that prevention of such activities, including intrusion into the repository, cannot be assumed once active controls are discontinued. Since this paragraph refers to time beyond any reasonable active control period, e.g., more than 100 years it should be amended to read "to attempt to limit intentional and unintentional activities..."

Response
DOE agrees that the limitation or prevention of intentional and unintentional activities around the closed repository could not be guaranteed.

4.5 (6439)
Comment - EIS001632 / 0013
Page 2-37, Section 2.1.2.4, first paragraph: When does the Department expect to have a performance confirmation program in place, and how will DOE decide which data to evaluate? We note that this paragraph says that the "performance confirmation programs could include" the listed data types. [emphasis added] EPA recommends using all of these factors to improve the performance assessment.

Response
The Performance Confirmation and Testing Program is an important part of the strategy for the development of the postclosure safety case for the proposed repository (DIRS 153849-DOE 2001) and is designed to meet specific regulatory requirements [10 CFR 63.102(m) and 10 CFR Part 63, Subpart F]. As defined, the program would consist of tests, experiments, and analyses to evaluate the adequacy of the information used to demonstrate that the repository would meet performance objectives. The description of the performance confirmation program is formally documented in the Performance Confirmation Plan (DIRS 146976-CRWMS M&O 2000) and described in Sections 2.5 and 4.6 and summarized in Section 2.1.2.4 of the Final EIS. The program started during site characterization. Performance confirmation activities would extend until the beginning of repository closure operations, as shown on Figure 2-9 of the EIS. Key geologic, hydrologic, geomechanical, and other processes or factors (and related parameters) would be monitored and tested throughout repository construction, emplacement, and operation to detect major changes from baseline conditions. DOE would use these data to confirm that subsurface conditions were consistent with the assumptions used in performance analyses and that barrier systems and components would operate as expected. DOE modified Sections 2.1.2 and 4.1 of the EIS to describe more accurately the performance confirmation program, and clarified the performance confirmation period shown on Figure 2-9.

4.5 (6643)
Comment - EIS001878 / 0032
"Affected units of local government" not accurately defined. The DEIS says that "affected units of local government include county governments near the potential repository site and along potential transportation routes within Nevada." (p. 3-1) Appendix C says, "As defined by the NWPA [Nuclear Waste Policy Act], the affected units of local government are local governments (counties) with jurisdiction over the site of a repository." (p. C-9) Neither definition is accurate. DOE has interpreted Section 116 of the NWPA as amended to mean that the affected units of government are Nye County (the situs county) and the nine counties contiguous to Nye County. The definition on p. 3-1 is misleading because there are Nevada counties along potential transportation routes that are not considered "affected" counties under the NWPA, e.g., Elko County. The definition on p. C-9 is misleading because it is circular. Finally, the DEIS should acknowledge the special legal status of "affected units of local government" under the NWPA.

Response
Section 2 the NWPA, states: "The term 'affected unit of local government' means the unit of local government with jurisdiction over the site of a repository or a monitored retrievable storage facility. Such term may, at the discretion of the Secretary, include units of local government that are contiguous with such unit."

The EIS reflects this statutory definition and notes that DOE has included the contiguous counties and sought input from Elko County, which, while not the host county (Nye County) or contiguous to the host county, could be affected by the transportation of spent nuclear fuel and high-level radioactive waste to the repository. DOE has revised the definitions in the introduction to Chapter 3 and in Section C.2.4.1 of the EIS to clarify the term.

The special legal status under the NWPA is limited to the financial assistance provisions of Section 116(c) of the Act. The Act provides that DOE shall provide grants to affected units of local government to:

1. Review activities taken under Subtitle A of the NWPA,

2. Develop requests for impact assistance,

3. Engage in monitoring, testing, or evaluation activities related to the characterization program,

4. Provide information to Nevada residents on activities of the State, the Secretary of Energy, or the Nuclear Regulatory Commission with regard to the site, or

5. Request information from or provide information to the Secretary.

In addition, the Act requires that the Secretary of Energy provide financial and technical assistance to the State of Nevada and affected units of local government to mitigate impacts of the development of the repository and in the form of payments in lieu of taxes.

4.5 (6789)
Comment - EIS001905 / 0002
The federal government may regain its citizens' confidence and restore some fairness in this issue by showing a good faith effort that American citizens will not continue to bear the brunt of nuclear power failings. One such step is to ensure that a reactor has ceased operations before the federal government transports any high level nuclear waste from the reactor. Such an action allows Ohioans to be confident that their roads and rails will not be forever subjected to the dangers expressed below and that the misguided federal commercial nuclear policies are coming to a close.

Response
DOE must carry out its obligations mandated by Congress under the NWPA. In the "Findings" section of the Act, Congress stated that "...while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel..."

Further, Section 302 of the Act states that "...in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste or spent nuclear fuel involved as provided in this subtitle." Since the passage of the Act, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund for development of a repository for spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999, the program had spent approximately $6 billion for the purposes specified in the Act. Due to accrued interest, the value of the Nuclear Waste Fund was $8.5 billion at the end of Fiscal Year 1999.

Taxpayers would bear some of the cost of a repository. Congress appropriates funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the United States. Most of these materials were produced at DOE defense production facilities. The most recent estimates show that about 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. This percentage is based on the space required to dispose of defense-related spent nuclear fuel and high-level radioactive waste.

With regard to the future generation of waste, DOE has no authority over the operation of the Nation's commercial nuclear powerplants. As mandated by the Atomic Energy Act, as amended, the Nuclear Regulatory Commission has jurisdictional authority over commercial uses of nuclear materials, including the operation of reactors to produce electricity. This includes the production of electricity from nuclear energy and the interim storage of spent nuclear fuel at reactor sites.

4.5 (6912)
Comment - EIS001784 / 0003
Which leads me to a second concern, that of possible misinformation. I am a co-author of a new brochure that alerts the general public for the first time to the potential medical hazards of routine, planned radioactivity releases into the air and water that occur daily at all 103 nuclear plants. That releases such as this do, in fact, occur used to be documented by the NRC in their publication put out yearly, NUREG-2907. Unfortunately, this very valuable

informational document which brought together in one place information about routine and accidental releases and waste shipments that we have talked about tonight at all nuclear power plants was discontinued for budgetary reasons in 1995.

What key medical information about the Yucca Mountain nuclear repository have we not been told? Will public information be withheld invoking similar budgetary constraints? After all, I assume the public will foot the bill even though commercial nuclear power plants will contribute 90 percent of the wastes. Why did the public utilities not plan for this easily foreseeable waste buildup and why did they not budget to cover it? This does not inspire public confidence in cost estimates for the present monumental plan.

Response
The Nuclear Regulatory Commission published *Radioactive Material Released From Nuclear Power Plants* annually until 1994 (for example, DIRS 155108-Tichler, Dody, and Lucadamo 1995). The information in the report is still available from the Commission on a plant-by-plant basis, but is no longer compiled into a single report due to budgetary constraints. This report was limited to a presentation of routine and accidental releases from nuclear powerplants and did not provide information on releases from transportation.

In the NWPA, Congress determined that "State and public participation in the planning and development of repositories is essential to promote public confidence in the safety of disposal." In this spirit, a major element of the Yucca Mountain Project has been to ensure that stakeholders, the media, and the public have an opportunity to participate in and acquire the information about the project that they need to make informed decisions. This effort is focused on building and maintaining relationships with stakeholders, the public, and media through regular interaction and provision of project information. DOE develops many different forms of public information including permanent and portable field exhibits, fact sheets, exhibits and models, audiovisual materials, electronic media, reports and publications, and public outreach announcements. These public information sources are available at the Yucca Mountain Site Characterization Office Science Centers in Las Vegas, Pahrump, and Beatty, Nevada; on the Yucca Mountain Project website (www.ymp.gov) and the DOE Office of Civilian Radioactive Waste Management website (www.rw.doe.gov); through public meetings and hearings on Yucca Mountain-related topics and during public tours of the Yucca Mountain Site; and by specific inquiries and requests for information materials. For more information on Yucca Mountain public outreach activities call 1-702-295-1312 or 1-800-225-6972. Other sources of information about Yucca Mountain include the Nuclear Regulatory Commission website (www.nrc.gov), the Nuclear Waste Technical Review Board website (www.nwtrb.gov), and the Environmental Protection Agency website (www.epa.gov).

In the "Findings" section of the NWPA, Congress stated that "while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel." Since the passage of that Act, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for disposal of spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999, the program had spent approximately $6 billion for the purposes specified in the Act. As reported in *Report on Assessment of Fee Adequacy Based on FY 1999 Total System Life Cycle Cost Update* (DIRS 152076-CRWMS M&O 1999), the Nuclear Waste Fund investments had a market value of $8.6 billion by September 30, 1998, due to accrued interest on the funds. Taxpayers would bear some of the cost of the repository. Approximately 30 percent of the costs of the repository are attributed to disposal of spent nuclear fuel and high-level radioactive waste from the defense and research programs.

4.5 (6985)
Comment - EIS000557 / 0002
If you are spending so much money just focusing on Yucca Mountain. I say you go all the way and spend all your money focusing on other sites as well. That way you get the full view of sites, because it is not worth the risk.

Response
In 1982, Congress enacted the NWPA, which acknowledges the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste. The Act began a process for selecting sites for technical study as potential geologic repository locations. In 1986, DOE recommended three sites

(Deaf Smith County, Texas; the Hanford Site, Washington; and Yucca Mountain, Nevada) for study as candidate repository sites. In 1987, Congress amended the Nuclear Waste Policy Act of 1982 and identified Yucca Mountain as the only site to be studied as a potential location for a geologic repository. The overall concept of geologic disposal was confirmed again in 1990 by a panel of the National Academy of Sciences, which noted that there is "a worldwide scientific consensus that geological disposal, the approach followed by the United States, is the best option for disposing of high-level radioactive waste" (DIRS 100061-National Research Council 1990).

As mentioned above, in 1987 Congress amended the Nuclear Waste Policy Act. The NWPA directs DOE to focus solely on Yucca Mountain and to stop work on other sites. As directed by Congress, DOE stopped work on the alternative sites. To resume work on alternative sites would require Congress to amend the law again.

4.5 (7072)
Comment - EIS000995 / 0003
What guarantees are there that this nuclear waste will remain in storage permanently at Yucca Mountain, if shipped there? Is it at all possible that the waste would have to be transported again at some point in the future, once more endangering life all along the shipping route?

Response
The purpose of the proposed Yucca Mountain Repository is "permanent" disposal of nuclear waste, not interim storage or monitored retrievable storage. The concept of permanent disposal in a deep geologic repository stems from studies initiated in the 1950s by the National Academy of Sciences. Studies in the United States and abroad have concluded that deep geologic disposal is the best long-term solution, as this approach can keep nuclear waste isolated from the environment in stable geologic formations, thus providing a safe location for the waste to decay into a stable form.

The purpose of this EIS is to evaluate environmental impacts associated with the Proposed Action to construct, operate and monitor, and eventually close a geologic repository. In accordance with Section 122 of the NWPA and Nuclear Regulatory Commission regulations governing geologic disposal of radioactive wastes (10 CFR Part 63), a decision to retrieve waste would pertain to the protection of public health and safety or the environment or recovery of resources from spent nuclear fuel. Waste retrieval would be a consideration for at least 50 years and possibly more than 300 years after emplacement operations began. Section 4.2 of the EIS describes the impacts from above-ground storage.

4.5 (7153)
Comment - EIS000409 / 0003
NAS [National Academy of Sciences] professors don't have the needed industrial experience or business experience and are not expected to understand that Industrial Turnaround Experience is needed for this world class project. NAS doesn't want to assume the responsibility that modern science and common sense would make all contingent YM [Yucca Mountain] plans unacceptable. They clearly express that they don't want the public involved in this process at all.

For example .... Contingency plans: The removal of the rods from the ponds without incident is almost impossible at many sites. Hanford is such a site. The M & O [Management and Operating Contractor] Fleur-Daniels [Fluor-Daniel] even with $1 billion over their last year's budget does not have the expertise to do the job. The cost at this one site is $1.7 billion. Can this M & O be allowed to continue to wag the tail of the DOE & DOD [Department of Defense] & NRC [Nuclear Regulatory Commission]? I will continue to contend that CLASSIFIED waste cannot be allowed in YM.

Response
The National Academy of Sciences and the Nuclear Waste Technical Review Board perform independent peer reviews of all aspects of the Yucca Mountain Project. These reviews help ensure the adequacy and technical soundness of the DOE evaluations. Many of the individuals involved in these reviews are appointed by the President and approved by Congress. In all cases, these individuals possess impressive credentials, which include extensive educational training and experience directly pertinent to issues involving the Yucca Mountain Project.

DOE is not clear on the commenter's point that the National Academy of Sciences does not want the public involved in the process. Public involvement is an important component of the Yucca Mountain Project. The Nuclear Waste Policy Act establishes points in the process at which DOE must solicit input from the public. In addition, the Act requires DOE to comply with the National Environmental Policy Act and implementing regulations that include requirements for public involvement. Finally, the Act requires DOE to comply with regulations issued by the Nuclear Regulatory Commission as part of its licensing process, which also includes requirements for public review and comment.

DOE has many sites across the country. Some of these, such as the Hanford Site, maintain inventories of spent nuclear fuel and high-level radioactive waste that are candidates for disposal at Yucca Mountain. These sites are managed and operated by contractors under work scopes and tasks developed by DOE, for which Congress establishes budgets through annual appropriations. Activities at these sites are independent of the work at Yucca Mountain. They are separately budgeted and are not funded through the Nuclear Waste Fund, which is the primary source of funding for the Yucca Mountain Project.

Regarding classified materials in Yucca Mountain, Appendix A of the EIS provides an inventory of all candidate materials for disposal in the repository. All waste accepted for disposal would meet the repository waste acceptance criteria and the packaging requirements, regardless of the classification of the material. These requirements would ensure that the repository could meet the long-term performance objectives.

4.5 (7181)
Comment - EIS001337 / 0069
Page 2-15 Figure 2-9. This figure portrays unrealistic schedule assumptions, which imply that repository construction may [proceed] prior to resolution of transportation routing and modal decisions. In the worst case, transportation of waste to a repository could proceed along routes, which do not serve to minimize risk because transportation issues and related construction might not be completed in 2010. Further, this schedule does not appear to reflect the length of time that will be required to resolve the certain (given deficiencies in this DEIS) legal challenges to the sufficiency of this DEIS that will occur. Such legal challenges will likely be filed in the winter of 2000 and will probably not be resolved for 18 to 24 months. At that time DOE may be required to prepare a supplement to the EIS. Under these time frames, the site recommendation could not be made until early 2003 (particularly given proposed revisions to 10 CFR 960, which defer to the EIS for information on environmental, socioeconomic and transportation issues). A more realistic schedule should be included within the FEIS.

Response
The Secretary of Energy will consider potential impacts associated with transportation of spent nuclear fuel and high-level radioactive waste in determining whether to recommend the Yucca Mountain site to the President as this Nation's first monitored geologic repository. DOE believes that the EIS adequately evaluates the potential environmental impacts that could result from the Proposed Action or the No-Action Alternative. Although DOE would not make any transportation decisions unless and until site approval, it believes that the EIS provides the information necessary to make decisions on basic approaches (mostly rail or mostly truck shipments), and if rail was chosen, the choice among the candidate rail corridors in Nevada.

The comment notes that the timeframe might not be realistic due to legal challenges that are likely to occur, given the asserted deficiencies in the EIS. DOE cannot make schedules based on lawsuits that others might file.

4.5 (7636)
Comment - EIS001928 / 0004
The No-Action alternative means the federal government has not recognized its trust responsibility to the Tribes or its DOE Indian Policy. As stated in the DEIS, Congress has affirmed that the DOE is responsible for the permanent disposal of spent nuclear fuel and highly radioactive waste. The safe removal and disposal of this waste is a national responsibility and priority. The no-action alternative is unacceptable. The waste must be removed from INEEL [Idaho National Engineering and Environmental Laboratory].

In addition, any failure to dispose of the waste by 2035 would be a violation of the January 29, 1998 agreement between the United States Department of Defense, Department of the Navy and the Shoshone-Bannock Tribes.

Response
As discussed in Section 2.2 of the EIS, DOE included a No-Action Alternative to provide a basis for comparison with the Proposed Action. However, if there was a decision not to proceed with the development of a repository at Yucca Mountain, DOE would still comply with the terms of existing Settlement Orders and compliance agreements regarding the management of spent nuclear fuel and high-level radioactive waste.

4.5 (7642)
Comment - EIS001928 / 0007
pg. S-20-lower box - what criteria will be considered in determining whether the retrieval option will be 100 years or 300 years or somewhere in between?

Response
Section 122 of the NWPA requires retrievability at a high-level waste repository. Federal regulations (10 CFR Part 63) require that the repository design preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of waste emplacement. The final decision to close would come as an action on an amendment to the operating license for the repository. At this time, DOE has not identified criteria to determine the time of closure, but prefers to leave the development of those criteria, as well as the decision to close the repository, to future generations.

4.5 (7836)
Comment - EIS001653 / 0027
The No-Action Alternative (Scenario 1 and 2) essentially describes interim above ground storage conditions at the reactor sites. Would this same situation apply to waste held above ground at a centralized DOE facility? If not, why not? It is also likely that DOE will have to take title to the waste if a repository does not open. Would DOE allow for loss of institutional control?

Response
The EIS No-Action scenarios would apply to both commercial reactor sites and DOE facilities. As stated in the EIS, neither No-Action scenario would be likely to occur (Section 2.2 and the introduction to Chapter 7). DOE selected two hypothetical scenarios for evaluation, not because it believes they are alternatives to disposal in a repository, but to provide a basis for comparison to the Proposed Action and because they reflect a range of potential environmental impacts that could occur from the continued onsite storage of material at its current locations.

Under the NWPA, DOE is directed to perform detailed evaluations for the Yucca Mountain site and need not consider other alternatives to the proposed Yucca Mountain Repository [Section 114(f)(2)]. If the Yucca Mountain site was not approved, DOE would not proceed with the development of the repository but, as directed by the Act [Section 113(c)(3)], it would prepare a report to Congress with its recommendations for further action to ensure the safe, permanent disposal.of spent nuclear fuel and high-level radioactive waste -- including the need for new legislative authority.

With regard to whether DOE would be required to take title to the waste if a repository does not open, DOE cannot comment on issues related to the Standard Contract for Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste (10 CFR 961.11) or potential impacts resulting from its delay in beginning to accept spent nuclear fuel by January 31, 1998, because they are the subject of ongoing litigation.

4.5 (8010)
Comment - EIS000817 / 0061
I'm really interested in these "monuments" [monuments to notify possible future intruders] and what you expect people to understand from them in the future. What is planned here?

Response
The repository area would be identified by monuments that would be designed, fabricated, and placed to be as permanent as practicable. The monuments would notify intruders in the area that the repository exists. The notification would enable intruders to make informed decisions on the use of the surface and subsurface areas for habitation or other activities. The design and ultimate placement of these monuments is currently under study.

Section 2.1.2 of the EIS and Science and Engineering Report Sections 2.5, 4.1.5, and 4.6 contain information on the subject of human intrusion and long-term passive institutional control.

4.5 (8087)
Comment - EIS001653 / 0065
Pg. 4-98 Describes short-term impacts from the retrieval contingency yet the proposed action does not include such action. Why? The contingency action needs to be [completely] described in the proposed action.
Response
Because retrieval is not an expected activity, DOE did not include it as part of the Proposed Action. However, the EIS evaluated retrieval as a contingency action and described potential impacts if it occurred (see Section 4.2). This evaluation included only actions DOE could predict with certainty (that is, removal of emplaced waste materials and subsequent onsite storage). Because future actions regarding the management and disposal of these materials after retrieval would be at the direction of Congress (and are highly speculative), DOE believes it is inappropriate to evaluate impacts from such actions.

4.5 (8163)
Comment - EIS000817 / 0086
Full cask arrays of spent fuel do not exist at this point. We don't know for sure how long the above ground casks will last, how the spent fuel will be inside them over time, how to unload them, or how casks will really affect each other over time when a pad is full of them. Radiation reflected, skyshine, effects on the pad and soil below it, etc. are really unknowns. More time is needed. Certainly it isn't prudent to ship all this spent fuel from commercial reactors out west to one big ISFSI [independent spent fuel storage installation] and then find you have unexpected problems.

Response
Dry cask storage systems, which are licensed by the Nuclear Regulatory Commission, are in operation at more than 10 nuclear powerplants across the United States. The casks are large structures designed to withstand environmental conditions for 40 years or longer without change in their safety and operational characteristics. With the exception of changes in temperature and the radioactivity of the spent nuclear fuel, DOE does not expect that the storage casks or their contents, either as individual units or as groups in storage areas, would undergo measurable changes that would cause changes in requirements or procedures for handling or unloading the casks and, as needed, handling and loading spent nuclear fuel into transportation casks. Regarding the knowledge necessary to handle and unload storage casks after long-term storage, applicants, as a condition of licensing, must demonstrate to the Commission procedures they can use for handling, loading, and unloading casks. The Commission addressed environmental effects of radiation from dry storage casks in its environmental impact statement for nuclear powerplant license renewal (DIRS 101899-NRC 1996). That EIS concluded that long-term effects to nearby environments, including effects of skyshine and ground-penetrating radiation, would be small.

The Nuclear Regulatory Commission, the Electric Power Research Institute, and DOE are sponsoring a program to examine fuel that has been in dry storage for 15 years. To support applications for licenses to store spent nuclear fuel, the Commission requires applicants to provide technical information demonstrating that no gross degradation would occur while such fuel was in storage (DIRS 148185-NRC 1999).

Changes in a fuel rod during long-term storage would be thermally activated; that is, such changes are time-at-temperature mechanisms. The lower the temperature, the slower the rate of degradation. Conversely, the longer the storage time, the more likely changes are to occur. Short-term laboratory tests at elevated temperatures have been used to determine the expected degradation or, conversely, to set temperatures that preclude degradation. Over time, the temperature of spent nuclear fuel in a storage cask will decrease. After 10 years, peak rod temperatures are in the range 100°C to 125°C (212°F to 257°F). For spent nuclear fuel stored at these temperatures, laboratory work shows that cladding degradation has essentially stopped. Data are currently available only for light-water reactor spent nuclear fuel with burnup below 45 gigawatt-days per metric ton of uranium. The Nuclear Regulatory Commission is working to determine the long-term performance of spent nuclear fuel in dry storage where the burnup is greater than 45 gigawatt-days per metric ton of uranium.

Based on this information, DOE is confident that the integrity of spent nuclear fuel that has been stored at commercial nuclear reactor sites for long periods will be satisfactory for transportation to a repository at Yucca Mountain and, if required, temporary storage prior to disposal.

4.5 (8242)
Comment - EIS000497 / 0011
The Western Governors' Association supports the national policy for permanent, safe, geologic disposal as an appropriate means of managing and finally disposing of spent nuclear fuel and high-level radioactive waste.

The Governors strongly encourage the U.S. Department of Energy to work cooperatively with the states in implementing this policy; to ensure the safe storage, transportation and disposal of spent nuclear fuel and high-level radioactive waste; and to comply with agreements which have been negotiated and entered into by a state's governor regarding the management, transportation and storage of spent nuclear fuel and high-level radioactive waste. Moreover, the federal government should not site such waste in a state for interim storage without written agreement from the affected states' governors.

The Governors support efforts by the federal government to examine alternative waste acceptance options, including but not limited to, providing funds to utilities for expanded on-site storage and taking title to spent nuclear fuel at individual reactor sites. The search for alternatives must not be construed as lessening the need to develop a permanent solution to the management of spent nuclear fuel.

Response
DOE is working to implement the national policy for permanent, safe, geologic disposal of spent nuclear fuel and high-level radioactive waste according to the NWPA. In implementing its responsibilities under the Act, DOE will continue to work with state governments and to comply with any DOE agreements with affected states on the management, transportation, and storage of spent nuclear fuel and high-level radioactive waste.

At present, DOE is not considering the construction and operation of an interim storage facility for spent nuclear fuel and high-level radioactive waste because it is not permitted under the NWPA. However, DOE would comply with any future legislation mandating such storage.

DOE cannot comment on the issue of when or where it would take title to spent nuclear fuel currently in storage at commercial nuclear reactor sites around the country because this is the subject of ongoing litigation.

4.5 (8322)
Comment - EIS001572 / 0001
I think there should be more accurate costs of generation and that these costs should be calculated into our power costs to ensure less future waste.

Response
Utilities currently assess their ratepayers at the rate of 1 mil per kilowatt-hour for nuclear generation. Payments into the Nuclear Waste Fund between Fiscal Year 1983 and the end of Fiscal Year 1999 amounted to about $9.8 billion. By the end of Fiscal Year 1999, appropriations for defense nuclear waste disposal totaled $ 1.1 billion, and the program had spent about $6 billion. As reported in *Report on Assessment of Fee Adequacy Based on FY 1999 Total System Life Cycle Cost Update* (DIRS 152076-CRWMS M&O 1999), the Nuclear Waste Fund investments had a market value of $8.6 billion by September 30, 1998, due to accrued interest on the funds.

DOE expects this money, along with future fees paid on nuclear electric power generation (net) and payments from the General Fund for the disposal of DOE spent nuclear fuel and high-level radioactive waste, should be adequate to cover expenditures for the construction, operation and monitoring, and closure of a repository.

With regard to the future generation of waste, DOE has no authority over the operation of the Nation's commercial nuclear powerplants. As mandated by the Atomic Energy Act, as amended, the Nuclear Regulatory Commission has jurisdictional authority for commercial uses of nuclear materials, including the operation of reactors to produce electricity. This includes the production of electricity from nuclear energy and the interim storage of spent nuclear fuel at reactor sites.

4.5 (8355)
Comment - EIS001627 / 0005
Also, on an economic note, Pennsylvania ratepayers have already paid $1 billion into the Nuclear Waste Fund which was established through the NWPA to pay for the construction of a permanent repository. To date, approximately $16 billion has been collected through a surcharge on electricity generated by nuclear power plants and $6 billion has been spent by DOE. The Pennsylvania ratepayers who have paid into this fund have an interest in seeing that the money is spent for what it was intended as do all customers who have relied on electricity generated by nuclear power.

Response
Monies from the Nuclear Waste Fund are spent for the purposes specified in the NWPA. DOE periodically assesses the Fund, and to date has found that it is adequate to pay for the investigations, design, licensing, and if approved, the construction, operation and monitoring, and closure of a repository. (See also, *Report on Assessment of Fee Adequacy Based on FY 1999 Total System Life Cycle Cost Update* (DIRS 152076-CRWMS M&O 1999); the analysis in this report found that the current fee of 1 mil per kilowatt hour charged to generators of commercial spent nuclear fuel was adequate to cover projected disposal expenses and recommended that the fee remain unchanged.)

4.5 (8432)
Comment - EIS001397 / 0005
Although beyond the purview of an EIS, it must be noted that this project sets the will of the state of Nevada and its citizens on a collision course with dictatorial federal policy. This will only lead to lengthy litigation and conflict far into the future if the project continues to attempt to move forward.

Response
In 1982, Congress passed the original Nuclear Waste Policy Act (Public Law 97-425, 96 Stat. 2201). As directed by the Act, DOE identified nine potential repository sites, including Yucca Mountain. In 1987, through the passage of the Nuclear Waste Policy Amendments Act of 1987 (Public Law 101-203, 101 Stat. 1330), Congress directed DOE to perform detailed characterization only at the Yucca Mountain site as a potential location for a monitored geologic repository (see Section 1.3.2 of the EIS).

In addition, the Act (NWPA; 42 U.S.C. 10101 *et seq.*) requires the preparation of an EIS to accompany any site recommendation that the Secretary of Energy might make to the President to approve the site. The Act states that the EIS does not need to consider the need for a repository, the time of initial availability of a repository, alternatives to isolation of spent nuclear fuel and high-level radioactive waste in a repository, or alternative sites to Yucca Mountain.

In accordance with the NWPA, the EIS analyzes a Proposed Action to construct, operate and monitor, and eventually close a geologic repository at the Yucca Mountain site.

4.5 (8665)
Comment - EIS001837 / 0025
If storing the waste in casks on site is an alternative, then it should have been addressed in the DEIS. And if it is an alternative, why did the DOE waste so much money on writing this DEIS? PARD [People Against Radioactive Dumping] demands a complete disclosure of the costs of the DEIS including, allocations already made to prepare for intermodal transfers and fund promises made (to government officials, private individuals, etc.).

Response
Section 2.2 and Chapter 7 of the EIS address the No-Action Alternative, including the storage of spent nuclear fuel and high-level radioactive waste at the generator sites. As discussed in Section 2.2, DOE included a No-Action Alternative under which commercial nuclear power utilities and DOE would continue to manage the waste materials at 77 sites in the United States (continued onsite storage). The purpose of this alternative was to provide a basis for comparison to impacts from the Proposed Action.

The NWPA requires the Secretary of Energy to prepare an EIS to accompany any Site Recommendation to the President. As discussed in Section 1.5 of the EIS, the EIS does not have to consider (1) the need for a geologic

repository, (2) the time at which a repository could become available, (3) alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository, and (4) any site other than Yucca Mountain.

DOE has expended about $30 million to prepare the EIS. In addition, pursuant to Congressional direction, the Department has provided funds to the State of Nevada and affected units of local government. Estimates of the costs of an intermodal transfer facility have been generated but no funds have been allocated. Under Section 180(c) of the NWPA, DOE would provide technical and financial assistance to states and tribes to support training of state, tribal, and local public safety officials to help ensure safe routine transportation and emergency response for shipments to Yucca Mountain. Appendix M of the EIS discusses the provisions of Section 180(c) and DOE's Draft Policy for its implementation. For both highway and rail routes, distribution of funds for training under the provisions of Section 180(c) of the NWPA would begin approximately 4 years before the scheduled start of shipments. This schedule falls well within the timeframe most state, tribal, and local governments have said they would need to prepare for the shipments.

Section 116(c) of the Act provides that DOE shall provide grants to affected units of local government to:

1. Review activities taken under Subtitle A of the NWPA

2. Develop requests for impact assistance

3. Engage in monitoring, testing, or evaluation activities related to the characterization program

4. Provide information to Nevada residents regarding activities of the State, the Secretary of Energy, or the Nuclear Regulatory Commission with regard to the site

5. Request information from or provide information to the Secretary

The Act also requires that the Secretary provide financial and technical assistance to the State of Nevada and affected units of local government to mitigate impacts of the development of the repository and in the form of payments in lieu of taxes. There have been no promises to provide funding to government officials or individuals outside of these provisions of the NWPA.

4.5 (8692)
Comment - EIS001480 / 0006
I have to say personally that I believe in the next 50 years or so the people involved in this process, and that's all of you or most of you in this room hopefully will be held accountable for your actions for your crimes against humanity and your crimes against nature.

Response
Comment noted.

4.5 (8762)
Comment - EIS001907 / 0013
The DEIS fails to address the needs of the Nuclear industry, already there are thousands of tons of nuclear waste piling up at sites around the country, and only a fraction of these extremely deadly materials would be shipped to the Yucca Mountain site. What does the DOE plan on doing with the rest of it? Where is the next sacrifice zone going to be, once Yucca Mountain is filled up and closed? Who is going to monitor these wastes for the next 10,000 years? The US government cannot guarantee that itself will be around at that time – who is going to warn my great- grandkids not to play on this hotspot, ready to blow at any second?

Response
The EIS addresses the disposal of all spent nuclear fuel and high-level radioactive waste that would be generated in the absence of licensing new nuclear power generation facilities (see Chapter 8 of the EIS). Under the NWPA, the only current option for spent nuclear fuel and high-level radioactive waste in excess of the 70,000-metric-tons-of-

heavy-metal limit would be a second repository. The only alternative available at this time would be for Congress to change the legislation.

While the Federal Government cannot guarantee that it would be around for the next 10,000 years, the purpose of the repository would be long-term isolation of spent nuclear fuel and high-level radioactive waste that did not require a government to be watching the site for 10,000 years or longer. However, DOE would identify the repository area with monuments that it would design, fabricate, and place to be as permanent as practicable [see Section 2.1.2 of the EIS and Sections 2.5, 4.1.5, and 4.6 of the Science and Engineering Report (DIRS 153849-DOE 2001). The purpose of the monuments would be to notify intruders of the existence of the repository. The notification would enable intruders to make informed decisions about the use of the surface and subsurface areas for habitation or other activities. The design and ultimate placement of these monuments is under study. A National Academy of Sciences report contains more information on the subject of human intrusion and long-term passive institutional control (DIRS 100018-National Research Council 1995).

Even if no markers were present, the public would not need to fear an explosive event from the repository. The repository design employs a defense-in-depth strategy as an integral part of the design to preclude a criticality event. As indicated in Section 5.8 of the EIS, an explosive criticality would not be a credible scenario.

4.5 (8875)
Comment - EIS002086 / 0004
The other thing that I would like to say is that, in my opinion, money speaks louder than positions.

Response
Without more information, DOE is unable to respond to this comment.

4.5 (8942)
Comment - EIS002127 / 0003
There has been no field testing of the system for retrieving the rods should that become [necessary]. How can we place confidence in a project that claims retrieval of the rods would take a minimum of twenty-five years? If for some reason the computer generated models of Yucca Mountain safety were wrong and the rods had to be retrieved, what would happen in those intervening years? Would the Federal Government relocate all affected residents to a safe area, buy their properties, assure economic availability despite relocation?

Response
The NWPA requires retrievability at a geologic repository. Federal regulations (10 CFR Part 63) require that the repository be designed to preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of waste emplacement. "Reasonable" is defined as approximately the same amount of time devoted to repository construction and emplacement. The current schedule for retrievability complies with this reasonable schedule requirement. Although DOE does not anticipate retrieval, it has evaluated retrievability and incorporated it in the repository design. The current design would maintain the ability to retrieve materials for at least 100 years and possibly for more than 300 years. The EIS analyzes the impacts of retrieval as a contingency action.

DOE has developed methods, equipment, and procedures it would use for retrieval under normal and abnormal conditions. The equipment would include currently available technologies, the conceptual use of which has been demonstrated. As required in 10 CFR Part 63, DOE would describe its plans for retrieval and alternative storage of waste in the repository Safety Analysis Report. The required "description of plans" for unanticipated retrieval operations is not the same type of detailed integrated safety analyses required in 10 CFR Parts 60 and 63 for designs and plans associated with fuel receipt, handling, and emplacement, which would be part of the Proposed Action. This is because the Nuclear Regulatory Commission would have to approve a decision to retrieve the waste (separately from the Proposed Action), at which time it would review detailed retrieval plans and facility designs.

If a repository-related incident posed imminent danger of injury or property damage, state or local officials could initiate a "precautionary evacuation" in the Yucca Mountain region. Under such circumstances, financial protection for persons who might be liable and who might be injured would be provided by the Price-Anderson Act. This Act establishes a system of private insurance and Federal indemnification that generally ensures that as much as

$9.43 billion is available to compensate for damages suffered by the public, regardless of who causes the damages (see Section M.8 of the Final EIS).

In the event that claims exceeded the statutory dollar limit, the President would have to submit a compensation plan to the Congress, providing prompt and full compensation for all valid claims. In the Price-Anderson Act, Congress promised to "take whatever action is determined to be necessary (including approval of appropriate compensation plans and appropriation of funds) to provide full and prompt compensation to the public for all liability claims resulting from a disaster of such magnitude."

4.5 (9015)
Comment - EIS001324 / 0005
It is essential that much more time be given to solving the very real problems of finding sensible, appropriate, and safe ways of disposing of nuclear materials. (The present EIS report is impressive only in its voluminousness, but not by the clarity or wisdom of its contents).

It has become essential to consider not only the present nuclear waste problem, but also to worry about the poisonous accumulations that are currently being generated! It should be remembered at all times that this situation is on-going!

Response
Appendix A of the EIS addresses the future generation of spent nuclear fuel under the assumption that nuclear powerplants will operate until the end of their license periods, and that all currently operating nuclear powerplants will renew their operating licenses for an additional 10 years. The total projected amount of commercial spent nuclear fuel is approximately 105,000 metric tons of heavy metal. Section 8.2 addresses the disposal of this additional spent nuclear fuel.

Congress made the decision to focus on the Yucca Mountain site as a geologic repository when it amended the Nuclear Waste Policy Act in 1987. The Act directs the Secretary of Energy to perform site characterization activities at the Yucca Mountain site, and, if the site is found suitable, make a recommendation to the President on whether to approve the site for a development of a repository. However, the quest to find new technologies for safe ways to dispose of nuclear waste continues. DOE has evaluated a number of technologies, including deep-hole disposal, rock melt disposal, island-based disposal, subseabed disposal, well injection disposal, and disposal in outer space. To date, only deep geologic disposal has demonstrated an acceptable combination of benefits and risks. At the direction of Congress, DOE is currently studying accelerator transmutation of radioactive waste. Refer to Section 9.1.3 of the Final EIS for ongoing studies. The transmutation process involves state-of-the-art principles, some of which are not yet proven. In addition, many long-lived radionuclides might be difficult both to isolate and transmute. Even if transmutation became a feasible technology, a repository would still be an essential element of the nuclear fuel cycle because significant quantities of highly radioactive, long-lived materials would remain. DOE does not recommend abandoning the Nation's current waste management strategies in anticipation of currently nonexistent technologies.

4.5 (9125)
Comment - EIS001824 / 0006
DOE should live up to its statutory and contractual obligations by finalizing the EIS and proceeding expeditiously toward the licensing, construction, and operation of a repository at Yucca Mountain. We urge DOE to remove high-level radioactive waste from reactor sites as soon as possible to prevent unnecessary and duplicative costs to utility customers in the State of Florida.
Response
DOE is required by the NWPA, to investigate the suitability of Yucca Mountain as a repository and to determine whether to recommend to the President that the site be approved for development as a repository, or, in the event the site is not approved, to submit a report to Congress containing recommendations for further action to ensure the safe, permanent disposal of spend nuclear fuel and high-level radioactive waste. The Act also requires that a Final EIS accompany any approval recommendation. The Department is fulfilling the requirements of the Act in publishing this EIS.

DOE cannot comment on issues related to the Standard Contract for Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste (10 CFR 961.11) or potential impacts resulting from its delay in beginning to accept spent nuclear fuel by January 31, 1998, because they are the subject of ongoing litigation.

4.5 (9272)
Comment - EIS001971 / 0013
"For consistency with the Proposed Action, this analysis assumed the No-Action scenarios would begin in 2002" (7.2, paragraph 2). Does this mean that if any dimension of the recommendation process for permitting for Yucca Mountain falters on its timeline, that the no-action alternative would be automatically triggered? Please explain.

Response
DOE included the No-Action Alternative in the EIS to provide a basis for comparison with the Proposed Action. The EIS includes information about environmental impacts that could result from the Proposed Action or the No-Action Alternative. DOE chose 2002 to be parallel with the analysis period for the Proposed Action, thereby allowing a direct comparison of potential impacts. The No-Action Alternative would not be triggered by a change in the timeline.

4.5 (9323)
Comment - 010325 / 0007
Is exposing our region to this incomplete plan being done merely to avoid litigation from nuclear utility companies?

Response
In 1987, Congress amended the Nuclear Waste Policy Act of 1982, directing the Secretary of Energy to perform site characterization activities only at the Yucca Mountain site, and, if the site is found suitable, to make a recommendation to the President on whether to approve the site for development of a repository. Any approval recommendation must be accompanied by a final EIS. DOE believes that the EIS adequately analyzes the potential environmental impacts that could result from either the Proposed Action or the No-Action Alternative. This belief is based on the level of information and analysis, the analytical methods and approaches used to represent conservatively the reasonably foreseeable impacts that could occur, and the use of bounding assumptions where information is incomplete or unavailable or where uncertainties exist.

The Department cannot comment on matters currently under litigation or speculate on the potential for future litigation.

4.5 (9365)
Comment - EIS001373 / 0005
What specific actions and planning activities has DOE undertaken if it is determined during this EIS process that the Yucca Mountain site is unsatisfactory?

Response
As discussed in Chapter 7 of the EIS, if the Secretary of Energy determined that Yucca Mountain is unsatisfactory, the NWPA directs the Secretary to end site characterization activities, begin site decommissioning and reclamation, and send to Congress within 6 months a recommendation for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority.

4.5 (9367)
Comment - EIS001373 / 0007
This site characterization activity, which has been ongoing since the mid-1980's, is no longer an effort to evaluate the feasibility of Yucca Mountain; but rather, it has become a political and technical crusade to force the Yucca Mountain site to be acceptable and become the nation's first and only geological repository for high-level nuclear waste.

Response
The focus on Yucca Mountain is mandated by the NWPA, which directed the Secretary of Energy to terminate site-specific activities (other than reclamation) at all candidate sites except Yucca Mountain. The Act mandates an extensive process of site characterization, testing, and consideration for approval.

This EIS evaluates the environmental impacts of construction, operation and monitoring, and closure of a repository at Yucca Mountain, including impacts of transporting spent nuclear fuel and high-level radioactive waste nationally and in Nevada. The EIS also evaluates the impacts of the No-Action Alternative, that is, not proceeding with the Proposed Action. The No-Action Alternative is not an NWPA requirement. DOE included its evaluation in the EIS for use as a basis for comparison to the Proposed Action.

4.5 (9399)
Comment - EIS001437 / 0006
The Number of Years! Thirty long years are currently proposed for the completion of the project. Who, if any, of the people who draft it now will even be around in the future to monitor it? Or if they are around, will they continue as retirees to have the concern and zeal required to maintain alleged safeguards, or instruct others as to potential dangers? How might future political changes or modifications affect the plan, and who can predict what these changes might be? How would downsizing of personnel, or cutbacks in funding affect efficiency -- and ultimately safety? What will be the condition of the Yucca Mountain dumping site during this period and beyond? And what will be the overall state of the world during the next 30 years? How might future local conflicts or international wars affect the project? How about the very real possibilities of terrorism, of sabotage? These legitimate anxieties have not been seriously addressed.

Response
DOE believes that it is reasonable to expect that social stability in the United States would remain fairly constant over the more than 30 years required to construct and operate a repository at Yucca Mountain. It also believes that our elected representatives, having directed the Government to embark on this project, would continue to fund it adequately to protect the public health and welfare. Furthermore, during this period DOE would maintain the site facilities to ensure protection of public health and safety and the environment.

DOE cannot predict impacts on the repository program of changes in world political conditions and local and international wars, and has not addressed them in the EIS. However, EIS Sections 4.1.8.3 and 6.2.4.2.3 discuss sabotage.

4.5 (9753)
Comment - EIS001888 / 0336
[Clark County summary of comments it has received from the public.]

DOE needs an interactive data collection, management, and study methodology for various EISs that they are doing. This would help local [governments] monitor DOE processes.

Response
DOE maintains and uses several management tools to track the status of and relationships among its National Environmental Policy Act (NEPA) documents. In addition, DOE has prepared guidance on many aspects of the NEPA process, including methodology for preparing environmental assessments and environmental impact statements. DOE makes all of this information available to the public on its NEPA Internet site (http://tis.eh.doe.gov/nepa/). This site has several interactive tools to help the public monitor and participate in the DOE NEPA process.

The following are helpful tools on the NEPA Internet site that allow the public to monitor DOE processes:

- DOE NEPA Announcements – Provides a reference to current DOE NEPA information and events, including public participation opportunities; includes useful links and references.

- DOE NEPA Analyses – Provides an interactive vehicle for accessing, browsing, and searching DOE NEPA documents; provides links to other Federal Internet sites that contain NEPA-related material.

- DOE NEPA Tools – Provides NEPA regulations, orders, policy, and guidance.

- DOE NEPA Process Information – Includes:

- EA/EIS Status Chart – Provides the status of NEPA environmental assessments and environmental impact statements in preparation, organized by Program and Field Office.

- Key Environmental Impact Statements in the Department of Energy – Provides schedules, in timeline format, for current DOE EISs.

- Lessons Learned Quarterly Reports – Provides a quarterly summary of DOE NEPA activities, including articles, guidance, updates, and (annually) a cumulative index of all information in the reports.

4.5 (9755)
Comment - EIS001888 / 0337
[Clark County summary of comments it has received from the public.]

Draft comments [on the] NOI [Notice of Intent] for Yucca [Mountain] EIS. Since DOE plans to use much of EIS data to support license they must use QA/QC [quality assurance/quality control] techniques required by licensing process for EIS. DOE needs to share this plan with stakeholders. Public can use to evaluate EIS findings.

Response
DOE and its contractors subjected all parts of the preparation of the EIS to an appropriate level of quality assurance. The Department has procedures in place to evaluate every activity related to the Yucca Mountain Project (for example, the preparation of the EIS) to determine if that activity is subject to the quality assurance requirements for site recommendation or licensing. The evaluation concluded that the EIS is not a site recommendation or licensing activity. The EIS analyses relied on much of the same technical data collected and analyzed for a potential site recommendation (and eventually licensing), so the collection and analysis of some data used in the EIS was in accordance with the stricter site recommendation and licensing quality assurance requirements.

4.5 (9764)
Comment - EIS001888 / 0349
[Clark County summary of comments it received from a member of the public.]

One commenter stated that the EIS should discuss how the nuclear waste program will improve performance of DOE's technical and scientific investigations, and program management to increase scientific legitimacy.

Response
DOE site characterization and related work at Yucca Mountain has been, and continues to be, subject to the scrutiny of Congress, the National Academy of Sciences, the Nuclear Waste Technical Review Board, the Environmental Protection Agency, the Nuclear Regulatory Commission, the State of Nevada, affected counties, and Native American Tribes. This scrutiny has helped to ensure the technical adequacy and credibility of the DOE evaluation, and to enhance public confidence in the scientific basis and management of the program.

4.5 (9805)
Comment - EIS001888 / 0392
[Clark County summary of comments it has received from the public.]

Several commenters requested the preparation of a programmatic EIS that would evaluate the Nation's nuclear waste policy, possibly including an independent review process. EISs for related program elements would be tiered to the programmatic EIS. The programmatic EIS should include: an evaluation of major siting decisions involving co-location of both defense and non-defense storage and disposal facilities in Nevada; transport of waste, including accidental releases and incremental exposure to radiation at communities along waste-transport routes; and the impacts of nuclear power plants.

Response
The NWPA requires DOE to provide an EIS for the proposed repository at Yucca Mountain, which the Department has done.

As a separate matter, DOE prepared a programmatic EIS for its waste management program. The *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DIRS 101816-DOE 1997) covers the Department's management of radioactive wastes under its control. In addition, DOE prepared the *Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Environmental Impact Statement* (DIRS 101802-DOE 1995), which covers the Department's management of DOE spent nuclear fuel.

4.5 (9823)
Comment - EIS002158 / 0004
Many of these people admit that they're the paid spokesmen of the nuclear industry, groups like the study committee and so forth that all want to tell us that there's nothing we can do about it. This stuff's coming, anyway. The area's contaminated already. Therefore it's the best place for it. Is that the way you treat a desecrated sacred land? Add more on top of what you already have? I was talking about this problem addressed to my comments. This was in the context of some of the issues that were raised in the scoping hearings that the DEIS doesn't address.

Response
The NWPA directs the Secretary of Energy to undertake site characterization activities to provide information and data required to evaluate the Yucca Mountain site, provide an EIS, and determine whether to recommend approval of the development of a geologic repository at the site to the President.

DOE considered all comments received during the public scoping period. Many of the comments that were related to the requirements of the NWPA, as amended, and the scope of the EIS led to changes in the EIS analytical approach. DOE also considered comments that presented views and concerns not related to the scope or content of the EIS, and recorded those concerns in the comment summary document on the scoping process (DIRS 104630-YMP 1997).

4.5 (9916)
Comment - EIS001888 / 0463
[Clark County summary of comments it has received from the public.]

Four commenters were concerned about the schedule for opening a repository at Yucca Mountain. Three noted that DOE has a responsibility to start accepting waste shipments at the repository in 1998, but that 2010 is now the best that can be done. The other requested that the amount of time between scoping and licensing be explained.

Response
The comment is correct that DOE has missed the statutory deadline to begin to accept waste. The Department is working to have the repository, if approved, open by 2010. After License Application, DOE would receive a construction authorization and begin work to facilitate waste acceptance by 2010.

4.5 (9980)
Comment - EIS001888 / 0486
[Clark County summary of comments it has received from the public.]

Yucca Mountain should be discussed as a national sacrifice zone.

Response
The Yucca Mountain site is not a "sacrifice zone." It is, however, the only site evaluated in this EIS because Congress, in the NWPA, directed DOE to consider deep geologic disposal only at the Yucca Mountain site.

4.5 (9982)
Comment - EIS001888 / 0488
[Clark County summary of comments it has received from the public.]

Assumptions concerning expected levels of program funding should be discussed in the EIS.

Response
DOE believes that Congress, having directed the Federal Government to undertake this project, would continue to fund it adequately to protect public health, safety, and welfare. Analysis of any other assumption would be based on expected funding levels over time and would be extremely speculative.

4.5 (10105)
Comment - EIS002155 / 0001
I, too, think that this process has been somewhat flawed. I think that the project obviously is huge, already having spent three billion dollars, and I understand that to make any project successful, particularly a large one, you have to define what the scope is, but I think there are a few things that have been missed in the scope of this project and I'm disappointed how many of my tax dollars have been spent to get us to where we are today.

Response
As discussed in Section 1.5.1 of the EIS, DOE held the public scoping process in 1995, eventually holding 15 public meetings around the country. The purpose of this process was to determine the scope of the EIS and to identify the significant issues the EIS would analyze in depth. This EIS is the outcome of that process.

4.5 (10217)
Comment - EIS001888 / 0579
[Clark County summary of comments it has received from the public.]

Issues raised by the commenters included: The lack of funding for Nevada's Nuclear Waste Project Office because the office is finding scientific problems with the Yucca Mountain site.

Response
Funding for the Nevada Nuclear Waste Project Office is determined by Congress based on appropriation requests from the Secretary of Energy and the President. DOE believes that Congress, having directed the Federal Government to embark on this project, would continue to fund it adequately to protect the public health, safety, and welfare.

4.5 (10429)
Comment - EIS001927 / 0035
Why is civil disobedience not adequately discussed, when in Germany 20,000 protestors blocked a handful of casks, requiring the deployment of 30,000 police at the cost of $100 million?

Response
DOE recognizes that many U.S. citizens oppose the manufacture, use, storage, and transportation of materials related to the production of nuclear energy and nuclear weapons. The Department also recognizes the possibility of civil protests against these activities. However, actions of the Federal Republic of Germany and local German authorities against protesters and media representatives related to the transport of nuclear materials in that country are outside the scope of this EIS.

In transporting spent nuclear fuel and high-level radioactive waste to the proposed repository at Yucca Mountain, DOE would work with representatives of other Federal agencies and state, local, and tribal governments to ensure the shipments progressed as safely and quickly as possible. Further, DOE would continue public involvement activities with its stakeholders, including citizens' groups and the media, to ensure the continued flow of repository-related information. Finally, DOE security personnel would work with Federal, state, local, and tribal law enforcement agencies to ensure that protests, if they happened, were as peaceful and nonconfrontational as possible. DOE employees and contractors responsible for shipments of spent nuclear fuel and high-level radioactive waste would receive training on appropriate actions in case of such protests.

4.5 (10731)
Comment - EIS001890 / 0005
This project is completely unacceptable. I am sure that American taxpayers do not want their money to be used to contaminate the environment and exploit the Shoshone Nation. I urge you to reconsider the project and find a viable alternative.

I realize that electric utilities bombard Congress with enough money to encourage pro-nuclear law, but I refuse to take financial responsibility for the problems of waste that these companies have created for thirty years. Please consider the cries of the Shoshone and concerned citizens as you ponder the next move at Yucca Mountain.

Response
DOE must carry out its obligations mandated by Congress under the NWPA. If Congress amended the Act and changed the DOE mandate or imposed new or additional requirements, DOE would comply with that modified direction.

In the "Findings" section of the NWPA, Congress states that "... while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel..."

Since the passage of the Nuclear Waste Policy Act of 1982, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund for development of a repository for spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999, the program had spent about $6 billion for the purposes specified in the Act. With accrued interest, the value of the Fund at the end of Fiscal Year 1999 was $8.5 billion.

Taxpayers would bear some of the cost of the repository. Congress appropriates funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level nuclear waste generated or owned by the United States. These materials were produced primarily at DOE defense production facilities. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues.

The Federal Government owns the land encompassing the Yucca Mountain site, as documented by a U.S. Supreme Court decision that says the Government has paid for the land, and that payment constitutes a final settlement (see Section 3.1.1.4 of the EIS). DOE must act in accordance with that decision, which dealt with the Ruby Valley Treaty of 1863. The Department is aware that the Western Shoshone community disagrees with rulings thus far and that it considers several points to be at issue.

DOE recognizes that Native American tribes living near Yucca Mountain have concerns about protection of traditional uses and the spiritual integrity of the land associated with the Proposed Action. Further, DOE recognizes that implementation of the Proposed Action would continue current restrictions on access to the site, as discussed in Section 4.1.3.4 of the EIS. DOE continues to work with tribal representatives to mitigate adverse impacts.

4.5 (10737)
Comment - EIS002142 /.0001
I've been in the nuclear industry for over thirty-five years in numerous sites throughout the United States, and I think that you people here in Nevada at Yucca Mountain have probably got some of the top engineers and scientists in the United States or in the world, and I feel with their expertise --

I feel that we should go on with this -- with your EIS and I feel that we also should have in there a little about retrievable waste monitoring.

Response
Than you for your comment.

The evaluation of monitored retrievable storage is not included in the scope of the Yucca Mountain Repository EIS. However, the scenario for possibly moving the spent nuclear fuel and high-level radioactive waste to a centralized interim storage or monitored retrievable storage site has been evaluated by others and is currently under study by the Nuclear Regulatory Commission (see the introduction to Chapter 7 for details).

4.5 (10763)
Comment - EIS000246 / 0005
We in the United States have chosen a course of action, which is entirely different from that of the other countries in the world of major users of nuclear energy.

We have chosen to throw away 93 percent of the useable energy in those fuels. They have only extracted from them 7 percent of the available energy. I consider this a terrible waste of energy resources.

Now, at the present state we have abundant supplies of uranium at low cost in the ground in the United States. So at this time it does not make sense economically to reprocess the fuel. Despite the fact that the government has taken the position that it will not be reprocessed regardless of economics.

To waste 93 percent of the energy is profligate. The DOE has proposed that the fuel will be restored economically in a retrievable fashion for anywhere from 50 to 100, I guess, 300 years.

I encourage them to make this process easily retrievable because it's my opinion that the United States will come to its senses in the next 10 or 20 years and realize that this fuel needs to be reprocessed. There is a big advantage for Yucca Mountain by doing this because it would extend the volume. It would extend the lifetime of Yucca Mountain by reducing the volume of the waste, extend the lifetime of Yucca two to five times beyond what you are now projecting forward.

Response
At present, the United States does not reprocess spent nuclear fuel. On April 7, 1977, President Carter announced his policy to defer indefinitely the reprocessing of spent nuclear fuel in this country. On September 27, 1993, President Clinton announced to the United Nations that the U.S. would seek to eliminate where possible the accumulation of stockpiles of highly enriched uranium or plutonium, and to explore means to limit stockpiling of plutonium from civilian nuclear programs. He explained that the United States "does not encourage the use of civil plutonium and, accordingly, does not itself engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes."

Section 122 of the NWPA requires retrievability at a high-level waste repository. Federal regulations (10 CFR Part 63) require that DOE design the repository to preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the proposed Yucca Mountain Repository includes a design and management approach that would isolate wastes from the public in the future while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly more than 300 years in the event of a decision to retrieve the waste either to protect the public health and safety or the environment or to recover resources from spent nuclear fuel.

4.5 (10850)
Comment - EIS000359 / 0006
There have been some comments this afternoon and this evening regarding that movement of spent nuclear fuel won't create fewer sites with nuclear waste but will create just one more. And I would actually like to say that that's really not true. As soon as the Department of Energy disposal facility or – I personally would prefer an interim storage facility to start sooner than that. But as soon as the Federal facility for spent nuclear fuel begins operation, there will, within a matter of several years, be at least 10 to 12 fewer sites storing spent nuclear fuel because we have quite a number of shutdown nuclear reactors around the country, and fuel would move from those sites.

Response
DOE agrees that successful development of a geologic repository would enable sites that are in the decommissioning phase to complete site restoration and license termination by removal of spent nuclear fuel and/or waste materials from their properties, thereby reducing the number of nuclear sites. In addition, on cessation of operations at the end of their useful lives, currently operating nuclear facilities would have the ability to terminate their licenses and complete decommissioning, thereby restoring the affected land for future uses. However, at this

time DOE believes that it would be too speculative to attempt to estimate the number of sites potentially affected or the time at which decommissioning would occur.

With regard to interim storage, consistent with the NWPA, DOE performed detailed evaluations of the Yucca Mountain site. However, scenarios for possibly moving the spent nuclear fuel and high-level radioactive waste to a centralized interim storage or monitored retrievable storage site have been evaluated by others (see the introduction to Chapter 7). For example, the Private Fuel Storage facility at Skull Valley, Utah is currently under study by the Nuclear Regulatory Commission. Since the publication of the Yucca Mountain Draft EIS, the Commission issued a Draft EIS related to the construction and operation of a privately owned facility at Skull Valley in Utah to store as much as 40,000 metric tons of heavy metal (MTHM) of commercial spent nuclear fuel (DIRS 152001-NRC 2000). DOE recognizes interim storage at the Private Fuel Storage facility in Utah to be a reasonably foreseeable future action and has included this proposed action as part of the cumulative impacts analysis in Chapter 8. Further, this Final EIS evaluates potential cumulative transportation impacts associated with the interim storage of 40,000 MTHM of commercial spent nuclear fuel at the proposed facility at Skull Valley (see Section 8.4).

4.5 (11050)
Comment - EIS000475 / 0008
To further compound the deception being perpetrated by the agency upon the directly affected public, interested parties, citizens, and taxpayers, congressional intent in Nuclear Waste Policy Act is being "revisited" by various vested-interest parties by stuffing Yucca Mountain full to capacity (70,000 metric tons) with high-level radioactive waste, while disingenuously claiming that Nuclear Waste Policy Act, with amendment, allows the same arbitrary name-a-second-high-level radioactive waste repository candidate site process. DOE is engaging in double-speak and double-cross which is incompatible with democratic process. In essence, "impediment" to construction and operation of Yucca Mountain as well as low-level radioactive disposal facilities through the regional compact system is public participation, i.e., "the opposition." DOE is by "unintentional bias" or outright deception excluding the public from decision-making (meaningful participation) in the NEPA [National Environmental Policy Act] process while picking and choosing the science that sounds like it fits the total project design implementation plan. DOE is specifically directed by federal law and agency regulation to avoid all acts which are likely (predicted) to result in loss of trust and confidence by the people in their government and its agencies. How does DOE intend to comply, and when is compliance anticipated to begin in agency high-level radioactive waste disposal/MOX [mixed-oxide] fuel/surplus plutonium disposition decision-making process?

Response
As discussed in Chapter 8 of the EIS, the NWPA restricts the Nuclear Regulatory Commission from licensing the disposal of more than 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste in a first repository until a second repository is in operation. This restriction forms the basis of the Proposed Action discussed in Section 2.1. During the scoping period on the EIS (see Section 1.5.1), DOE received many comments that noted the potential existence of more than 70,000 metric tons of heavy metal of these materials and encouraged the Department to evaluate the total projected inventory. In addition, some commenters requested that the EIS evaluate the disposal of radioactive waste types that might require permanent isolation, such as Greater-Than-Class-C low-level waste and Special-Performance-Assessment-Required waste. For these reasons, DOE included impact analyses of these materials in Chapter 8 as a reasonably foreseeable future action.

DOE has involved the public in the decisionmaking process consistent with the National Environmental Policy Act. As discussed in Section 1.5.1 of the EIS, DOE published a Notice of Intent announcing preparation of this EIS on August 7, 1995, and sought public input in identifying the scope and significant issues it would analyze in the EIS. DOE held 15 scoping meeting across the country during a 120-day period that ended on December 5, 1995. The additional analysis of materials discussed above is an example of the public involvement in determining the scope of the EIS. The Draft EIS was issued on August 7, 1999, to solicit public comments. DOE conducted 21 public hearings over the 199-day comment period on the Draft EIS, which ended on February 28, 2000. The Supplement to the Draft EIS was released May 11, 2001. The Department addressed the more than 13,000 comments received on the Draft and Supplement during the preparation of this Final EIS.

Section 1.5.3 of the EIS discusses the relationships between a number of completed, in-preparation, or proposed DOE National Environmental Policy Act documents and this EIS. These documents form a basis for decisions associated with a geologic repository disposal program and for the investigation of Yucca Mountain as a potential

repository site. The Final EIS for surplus plutonium disposition (DIRS 118979-DOE 1999) and the resulting Record of Decision (65 *FR* 1608, January 11, 2000) represent the Department's decisionmaking process for the disposal of this material, either as high-level radioactive waste or through the creation of mixed-oxide fuel, with the underlying assumption, for purposes of analysis, that the Yucca Mountain site would be approved for development as a repository.

4.5 (11064)
Comment - EIS000475 / 0013
In related revamp of the rules, the Tennessee Valley Authority [TVA] as of December 9, 1999 approved a plan to produce nuclear weapons materials in a civilian nuclear reactor. Although the separation of nuclear materials and civilian nuclear materials has, in fact, been a paper partition, policy decisions by DOE, Congress, and other federal agencies have historically made decisions using that separation policy! To further add the "uncertainties" in context of continual rule and policy changes, Congress has, for the first time, allocated $700 million taxpayer/general revenue dollars for Superfund Sites remediation/clean-up. Yucca Mountain's High-Level Radioactive Waste Repository has been promoted by the generators of the waste to be "isolated" as a project destined to be paid for by the generators. TVA recent decision and taxpayer financial burden for releases of toxic materials to the human and natural environment would certainly appear to change the rules in mid-siting process, and confuse the national interests, i.e., production of tritium, in commercial nuclear power reactors with the national interests.

Response
In 1995, the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DIRS 103208-DOE 1995) established the need for a source of tritium to replenish this necessary component of the Nation's nuclear weapons. DOE subsequently produced three EISs tiered (linked) to this programmatic EIS to evaluate three components of the tritium supply program (DIRS 104227-CRWMS M&O 1999; DIRS 118979-DOE 1999; DIRS 147938-DOE 1999). The Consolidated Record of Decision for the three EISs (64 *FR* 26369; May 14, 1999) announced the following decisions: (1) the use of commercial light-water reactors would be the primary tritium supply source; (2) an accelerator at the Savannah River Site in South Carolina would be the backup tritium supply source (but would not be built); (3) the Tennessee Valley Authority's Watts Bar Unit 1 and Sequoyah Unit 1 and 2 reactors would provide irradiation services for tritium supply; and (4) the Savannah River Site will be the location of a new Tritium Extraction Facility. Details about tritium production or these proposed actions are beyond the scope of this EIS.

The appropriation of money from the General Fund for Superfund cleanup activities is unrelated to the funding for the Repository Program and beyond the scope of this EIS. The Secretary of Energy makes expenditures from the Nuclear Waste Fund subject to appropriations by Congress. Congress also appropriates the funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the United States. These materials were produced primarily at DOE defense production facilities. Taxpayers fund only the management and disposal of DOE-produced and -owned materials; disposal of commercial spent nuclear fuel is funded by the generators (commercial utilities). The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. Thus, the private commercial utilities are "paying their fair share" of repository program costs along with taxpayers.

This comment expresses concern that the Yucca Mountain Repository would not remain "isolated" as a project destined to be paid for by the generators of spent nuclear fuel from commercial powerplants and spent nuclear fuel and high-level radioactive waste from U.S. defense and research programs. Since 1982, utilities and their ratepayers have paid about $9.8 billion into the Nuclear Waste Fund for development of the repository. By the end of Fiscal Year 1999, the program had spent about $6 billion for the purposes specified in the NWPA.

4.5 (11076)
Comment - EIS000475 / 0018
DOE's final decision must include priorities and considerations actually used by the agency in reaching final finding. Priorities from other DOE programs, other federal agency programs, the national interests, and international policies and agreements certainly appear to have intruded on the Yucca Mountain repository siting process. Transparency and accountability in agency decision making is most urgently required, and is herein specifically requested. Priorities of DOE must address other agency-decision making "drivers" so that interested

parties, concerned citizens, taxpayers, and directly affected parties can begin, at this stage of the siting process, to comprehend what is actually being decided by whom and why! If my understanding of the term, "transparency" is essentially correct, DOE as well as other federal agencies are encouraged to make decision-making "drivers" known to interested parties before, during, and/or after the decision making process. DOE has obligations to identify for public comment, during comment period, which factors have been determined by DOE to receive "top priorities status" in this process.

The nuclear power industry (now armed with military tritium producing purpose) has obvious financial interest in DOE decision-making process at Yucca Mountain.

DOE Yucca Mountain "solution" apparently, but not transparently, is being blended with agency and other priorities, including U.S. excess Plutonium weapons material disposition, and the role nuclear power directly and indirectly plays in the nation's security and energy interests. DOE is requested to define and clarify its priorities and their order in final Yucca Mountain draft EIS. Who are the players and what are the rules of the game? The public participation process is rendered meaningless without basic knowledge of what is actually being decided and by whom?

Response
As discussed in Section 1.3.2.3 of the EIS, the NWPA, establishes a process leading to a determination by the Secretary of Energy on whether to recommend that the President approve Yucca Mountain for development as a geologic repository. As part of this process, the Secretary is to:

- Undertake site characterization activities at Yucca Mountain to provide information and data required to evaluate the site.
- Prepare an EIS.
- Determine whether to recommend approval of the development of a geologic repository at Yucca Mountain to the President.

Throughout its investigative activities at Yucca Mountain, DOE has operated in an open manner by allowing full access to other Federal agencies, state and local governments, interested stakeholders, and the general public.

Section 1.5.3 of the EIS provides a comprehensive list of completed, in-preparation, and proposed DOE National Environmental Policy Act documents related to this EIS. Other Federal agencies have prepared related EISs. As directed by the Council on Environmental Quality regulations that implement the National Environmental Policy Act, DOE used information from these documents in its analyses and incorporated this material by reference, as appropriate.

As discussed in the Foreword, the EIS provides information on potential environmental impacts that could result from a Proposed Action to construct, operate and monitor, and eventually close a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste at the Yucca Mountain site. The EIS also provides information on potential environmental impacts from the No-Action Alternative, under which there would be no development of a repository at Yucca Mountain.

4.5 (11096)
Comment - EIS002135 / 0002
So getting to the DEIS, on page 4 of the DEIS summary, it states that the DOE is responsible for implementing a permanent solution for the management of spent fuel and high-level nuclear waste. Yucca Mountain is not a permanent solution since it does not even take care of even close to all the nuclear waste that's produced right now and is going to be produced in the next thirty years. Yucca Mountain is supposed to only be designed for 70,000 metric tons and we're going to have much, much more nuclear waste than that, so where are they going to put it? Of course it's all going to end up coming to Yucca Mountain and the DEIS does not cover that issue.

Response
In passing the NWPA, Congress established that the Federal Government is responsible for the permanent disposal of spent nuclear fuel and high-level radioactive waste. To accomplish such disposal, Congress envisioned more than one repository, but prohibited the Nuclear Regulatory Commission from approving a license for the emplacement of more than 70,000 metric tons of heavy metal (MTHM) in a first repository until a second repository was in operation [see Section 114(d) of the NWPA]. The total projected inventory of spent nuclear fuel and high-level radioactive waste is more than 70,000 MTHM. Its emplacement at Yucca Mountain would require legislative action by Congress unless a second repository was in operation.

It is reasonably foreseeable that Congress would take such a legislative action or ensure that a second repository would be in operation. Therefore, Chapter 8 of the EIS analyzes cumulative impacts from the disposal at Yucca Mountain of all spent nuclear fuel and high-level radioactive waste projected to be produced through 2046 for which DOE would retain ultimate responsibility. Section 8.2 also analyzes the disposal of Greater-Than-Class-C and Special-Performance-Assessment-Required wastes at Yucca Mountain.

4.5 (11122)
Comment - EIS000168 / 0007
CNTA [Citizens for Nuclear Technology Awareness] is vitally concerned about the problem of nuclear waste because approximately 10 percent of the current interim storage locations (6 nuclear power stations and the Savannah River Site) are within South Carolina and Georgia. While this interim storage is acceptable for the short-term, a long-term solution has been expected for some time. Additionally, the continuing lack of resolution of the issue of nuclear waste is a waste of taxpayer's money.

Response
DOE believes that completion of this EIS is a step toward providing a permanent solution to the disposal of spent nuclear fuel and high-level radioactive waste as required by the NWPA.

4.5 (11154)
Comment - EIS000278 / 0004
More than 100 metric tons uranium, of high-level radioactive waste, is stored at DOE's Savannah River Site. This is approximately 36 percent of the total inventory of high-level radioactive waste in the nation. The Savannah River Site is unacceptable as a repository. It borders the Savannah River, it's located near a major underground aquifer that provides water as far away as Florida, it is in an earthquake zone, and it's located in a populous and rainy area.

Response
As discussed in Section A.2.3.5.1 of the EIS, the Savannah River Site will generate an estimated 11,600 metric tons (12,800 tons) of high-level radioactive waste in the form of borosilicate glass for disposal at the proposed Yucca Mountain Repository. As shown in the table, this volume represents about 20 percent of the total high-level radioactive waste proposed for disposal at the repository.

In accordance with the NWPA, DOE is conducting site characterization activities only at Yucca Mountain to determine its suitability as a potential repository for the Nation's spent nuclear fuel and high-level radioactive waste. If the repository was recommended and approved for development, the Department would use it to dispose of the high-level radioactive waste at the Savannah River Site, which is currently stored safely.

4.5 (11165)
Comment - EIS000372 / 0004
DOE must have as its goal complete and permanent isolation of radioactive materials from humans. It is our estimation the only way to meet this goal is to have a permanently open and thoroughly monitored facility.

Backfilling and closing the repository complicates close monitoring of the waste packages for structural integrity and increases the difficulty and cost of retrieving the waste, should a radioactive release occur, and new findings and technology emerge which provide for safer forms of storage or reuse of the nuclear material.

With a closed repository, groundwater contamination will not be noticed until radioactive material shows up in monitoring wells and by which time a contaminant plume is probably already well developed and beyond mitigation.

Leaving the repository open and ventilated also has a potential to drive out heat and moisture which would otherwise build up in the facility, possibly slowing or eliminating movement of water through the facility into the groundwater. The EIS should include as a mitigation measure a commitment to leave the repository open and ventilated indefinitely, with a decision to close the facility left up to future generations.

The project and the EIS should not anticipate a closure date for the repository, and, in order to mitigate the many uncertainties associated with repository performance, to allow flexibility and future decision-making and to safeguard the residents and users of Amargosa Valley and Death Valley, and the facility should be kept open and monitored on an indefinite basis.

Response
Section 122 of the NWPA requires retrievability at a geologic repository. Federal regulations (10 CFR Part 63) require that the repository be designed and operated to preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the proposed repository includes a design and management approach that would isolate wastes from the public while allowing flexibility to preserve options for modifying emplacement and retrieving the waste (see Section 2.1.2 of the EIS). This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly more than 300 years in the event of a decision to retrieve materials to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. During this period, the repository would remain accessible for scientists to continue testing and monitoring and allow future generations to determine the timing and methods of repository closure.
The Federal Government, therefore, would maintain stewardship of the repository site for generations to come. This would permit site protection and continued monitoring and confirmatory scientific work. In the short term on the geologic disposal timeline (50 to 100 years or more), the repository would be a type of "field laboratory" for continuing confirmatory science on geologic disposal.

However, any projected schedule in the EIS for repository closure is for the purpose of estimating potential environmental impacts. There is no implied commitment to such a schedule, although it is important to design considerations. The final decision to close would come as a Nuclear Regulatory Commission action on an amendment to the operating license for the repository. DOE would submit the amendment to the Commission near the time of planned closure, which could be up to 300 years in the future. At that time more information would have been collected about the site, about the behavior of the spent nuclear fuel and high-level radioactive waste over a longer timeframe, and more powerful analysis techniques could be available.

A postclosure monitoring program is required by 10 CFR Part 63. This program would include the monitoring activities that would be conducted around the repository after the facility had been closed and sealed. DOE would be required to submit a license amendment application to the Nuclear Regulatory Commission for permanent closure of the repository [see 10 CFR 63.51 (a)(1) and (2)]. This application must specifically provide an update of the assessment of repository performance for the period after permanent closure, as well as a description of the program for postclosure monitoring. This program would include continued oversight to prevent any activity at the site that posed an unreasonable risk of breaching the repository's engineered barriers or of increasing the exposure of individual members of the public to radiation beyond allowable limits. This program would be described at the time of closure to allow for the identification of emerging technology available in the future.

4.5 (11323)
Comment - EIS002238 / 0006
Nye County has called for not sealing the repository, but leaving it open for a number of years so that we can have access to the canisters and to the mountain and to collect additional data for a long period of time before the nation has the confidence that the repository will behave as predicted and will not pose an additional risk upon the citizens of Nye County and adjoining Inyo County as to their groundwater resources.

Response
Section 122 of the NWPA requires retrievability at a geologic repository. Federal regulations (10 CFR Part 63) require that the repository design preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the proposed repository includes a design and management approach that would isolate wastes from the public while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly more than 300 years in the event of a decision to retrieve materials to protect the public health and safety or the environment or to recover resources from spent nuclear fuel. During this period, the repository would remain accessible for scientists to continue testing and monitoring and allow future generations to determine the timing and methods of repository closure.

The Federal Government, therefore, would maintain stewardship of the repository site for generations to come. This would permit site protection and continued monitoring and confirmatory scientific work. In the short term on the geologic disposal timeline (50 to up to 300 years or more), the repository would be a type of "field laboratory" for continuing confirmatory science on geologic disposal.

4.5 (11379)
Comment - EIS002259 / 0001
I do have a question. I notice that this is the 21st meeting that you had. I happen to have a little network of people that I correspond with all over the United States. And I happen to correspond with some people in Missouri. And I'd like to know what's the timeline that we are going to start shipping this stuff? I heard 2010, 2007. It seems to me in St. Louis, they heard it was 2004.

Response
At each of the 21 public hearings on the Draft EIS, DOE presented the sequence of past disposal decisions and possible repository activities, as discussed and shown in Sections S.2.2 and 2.1.2 of the EIS. Repository operations would begin after DOE received a license from the Nuclear Regulatory Commission to receive and possess nuclear material at the Yucca Mountain site. For this EIS, DOE anticipates that the receipt and emplacement of spent nuclear fuel and high-level radioactive waste would begin in 2010.

4.5 (11387)
Comment - EIS002230 / 0008
Congress has spent billions of dollars on the Yucca Mountain storage site, and it is still unknown whether the site is sound or not. As I indicated, it is right near the earthquake faults in the immediate area with 35 faults identified in the immediate area. Over 600 and some earthquakes have occurred in the immediate area.

Why should our tax dollars be spent on health damages and our health be put to risk without finding out all aspects of this issue?

Nuclear waste and these serious issues must be handled very carefully and thoroughly.
Response
DOE is performing its investigation of the Yucca Mountain site as required by the NWPA. The Department agrees that nuclear waste is a serious issue, and it has conducted a careful and thorough investigation of the site.

With regard to the use of tax dollars, the taxpayer will bear some of the cost of the repository. Congress appropriates funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level nuclear waste generated or owned by the United States. The most recent estimates show that approximately 70 percent of repository-related costs would come from the Nuclear Waste Fund, which is funded by the commercial nuclear utilities, and about 30 percent from taxpayer revenues. This percentage is based on the space that would be required to dispose of defense-related spent nuclear fuel and high-level radioactive waste.

4.5 (11438)
Comment - EIS001229 / 0008
We note that the Department of Energy has been inconsistent in their recommendations for handling radioactive wastes - sometimes advocating moving them around the country and concentrating them in one or a few sites, and

other times saying that keeping them at the sites where generated is safer and less costly. It is clear the federal government still does not have a long term answer to the dilemma of safe disposal of radioactive wastes, even after more than a half century of generating these highly toxic materials.

Response
A number of completed, in-preparation, or proposed DOE National Environmental Policy Act documents relate to this Final EIS. In addition, other Federal agencies have prepared related EISs. As directed by the Council on Environmental Quality regulations (40 CFR Parts 1500 to 1508) that implement the National Environmental Policy Act, DOE has used information from these documents in its analysis and has incorporated appropriate material by reference throughout this EIS. Section 1.5.3 of the EIS lists the documents that formed a basis for decisions associated with a geologic disposal program and investigation of Yucca Mountain as a potential repository site. These include the EIS for Management of Commercially Generated Radioactive Waste (DIRS 104832-DOE 1980), the Surplus Plutonium Disposition EIS (DIRS 118979-DOE 1998), and the Yucca Mountain Site Environmental Assessment (DIRS 101314-DOE 1986).

In addition, Section 1.5.3 of the EIS lists Records of Decisions that have placed or would place DOE spent nuclear fuel and high-level radioactive waste for storage prior to shipment to a permanent repository. For example, in the Record of Decision (60 *FR* 18589, April 12, 1995) for the *Final Supplemental Environmental Impact Statement, Defense Waste Processing Facility* (DIRS 103191-DOE 1994), DOE decided to complete construction and operate the Defense Waste Processing Facility and associated facilities at the Savannah River Site to pretreat, immobilize, and store high-level radioactive waste. Similarly, in the Record of Decision (62 *FR* 8693, February 26, 1997) for the *Final Environmental Impact Statement for the Tank Waste Remediation System, Hanford Site, Richland, Washington* (DIRS 103214-DOE 1996) DOE decided to implement ex situ vitrification of high-level radioactive waste with onsite storage until final disposition in a geologic repository. For DOE spent nuclear fuel, the Record of Decision (60 *FR* 28680, June 1, 1995) for the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DIRS 103205-DOE 1995) decided that Hanford production reactor fuel would remain at the Hanford Site; aluminum-clad fuel would be consolidated at the Savannah River Site; and non-aluminum-clad fuels (including spent nuclear fuel from the Fort St. Vrain reactor and naval spent nuclear fuel) would be transferred to the Idaho National Engineering and Environmental Laboratory. DOE continues to make decisions on the types and quantities of materials to be moved, as well as the schedules for these activities, in programmatic documents such as *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DIRS 103205-DOE 1995). The evaluations of impacts related to those decisions are in those documents and are beyond the scope of this EIS.

In accordance with the NWPA, this EIS evaluates impacts associated with the disposal of spent nuclear fuel and high-level radioactive waste. That is, it is not a programmatic EIS and, in accordance with Section 114(a)(1)(D) of the Act, it does not consider the need for a repository, alternatives to geologic disposal, or alternative sites to Yucca Mountain. The Act directs the Secretary of Energy to evaluate the suitability of the Yucca Mountain site for a geologic repository, to prepare a recommendation on the suitability of the site for the President, and to provide an EIS to accompany the Site Recommendation. DOE believes that it has followed this mandate in preparing this EIS.

4.5 (11501)
Comment - EIS002137 / 0002
Keep in mind Yucca Mountain's being built with today's technology, today's minerals, today's education. I am one of the people that firmly believe leave it monitored, temperature for water, et cetera. Leave it retrievable.

I believe our educational system will provide us in a few hundred to 300 years with another doable solution. It may be the fact that Yucca Mountain will be looked at as a stewardship, a stewardship, a renewable energy source.

Response
The operational plan for the proposed Yucca Mountain Repository includes a design and management approach that would isolate wastes from the public in the future while allowing the flexibility to preserve options for modifying emplacement or retrieving the waste. The repository would remain accessible for scientists to continue testing and monitoring. Section 122 of the NWPA requires DOE to maintain the ability to retrieve materials from the repository

if there was a decision to retrieve them to protect public health and safety and the environment, or to recover constituent parts of spent nuclear fuel. Although DOE does not believe that retrieval would be necessary, it would maintain this ability for at least 100 years and possibly more than 300 years after the end of waste emplacement (see Section 4.2.1 of the EIS). The Federal Government, therefore, would maintain stewardship of the repository site for generations to come. This would permit site protection and continued monitoring and confirmatory scientific work. In the short term on the geologic disposal timeline (50 to 100 years or more), the repository would be a "field laboratory" for continuing confirmatory scientific work on geologic disposal.

4.5 (11535)
Comment - 010133 / 0004
You know, we got 50 years of expertise at the Nevada Test Site. We got the mountain, the management, the manpower, some 15 years of study. A lot of us believe those studies should continue and come to a resolve.

Response
Characterization activities at the Yucca Mountain site have yielded sufficient data to determine the suitability for a recommendation for further development. DOE is proceeding toward a determination on whether to recommend the site and plans to make a determination as soon as possible. Assuming that the site was recommended and the recommendation was accepted by the President and Congress passed a resolution of repository siting approval, if necessary, DOE plans to submit a License Application to the Nuclear Regulatory Commission as soon as possible to begin accepting spent nuclear fuel in 2010.

4.5 (11548)
Comment - 010130 / 0002
So at this point we all need to get active. A couple speakers ago one of the speakers mentioned that there is a bill that's coming up during this week that's asking the Department of Energy to divert spending from storage, which is what we've all heard about tonight, to instead spend money on breaking down waste, on speeding up the recycling of waste, which is being done in France now where they're very dependent on nuclear energy.

President Bush, as the speaker mentioned, has said that breaking down waste is of secondary importance to him and that the primary focus should be on storage. Well, we need, as citizens, if this bill does not pass it's my opinion at that time we should start the protest process. At that time we should begin action.

If this bill is not passed and President Bush and the Congress do not accept the change to study the breaking down of nuclear energy as the first study that should be done for as long as it takes and if that fails, then maybe we'll have to consider storing waste. But skipping the step of breaking down waste as a study is ridiculous and we need to protest that if that bill does not pass.

So I would ask everybody to watch the newspapers, watch the news and see if this bill does pass. If it doesn't, please talk to your neighbors, as the speaker before me suggested, talk to your friends. Let's get more media involved and let's get more bills presented to the congress.

Response
As discussed in Section 9.1.3 of the EIS, DOE continues to evaluate new technologies (such as accelerator transmutation of waste) to reduce the potential effects of the repository project. However, the Department cannot expend any funds not authorized and appropriated by Congress. The effort referred to by the commenter would require appropriation of funds by Congress; except on a limited basis, funds for investigation of alternative methods of management of spent nuclear fuel and high-level waste have not been appropriated. However, even if transmutation or other new technologies became feasible sometime in the future, the Department believes a repository would be an essential element of the nuclear fuel cycle because of the likelihood that significant quantities of highly radioactive, long-lived materials could not be effectively treated.

4.5 (11574)
Comment - EIS002287 / 0005
Has DOE expended funds for outside consultation regarding the DEIS from persons or scientists not influenced or working for the federal government?

Response
Chapter 13 of the EIS contains a list of individuals who filled primary roles in the preparation of this EIS. DOE directed the preparation of the EIS with primary support and assistance from Jason Technologies Corporation and its subcontractors. As required by Council on Environmental Quality regulations [40 CFR 1506.5(c)], neither Jason Technologies Corporation nor its subcontractors has any financial interest or other interest in the outcome of the project. During the preparation of the EIS, DOE relied on the expertise of individuals not directly employed by the Department for focused peer reviews. For example, during preparation of the No-Action Alternative analysis (Chapter 7), DOE sought the guidance of five individuals with national and international recognition in disciplines key to the analysis, such as radionuclide multimedia transport, waste form degradation, and facility degradation. One of the key purposes for providing a Draft EIS (and, in this case, a Supplement to the Draft EIS) for review is to solicit inputs and views from persons not associated with the proposed action. DOE distributed thousands of copies of the Draft EIS and the Supplement to the Draft EIS, and made the documents available on the Internet in an effort to solicit comments.

4.5 (11918)
Comment - EIS002303 / 0003
The federal government should not force taxpayers to pay for disposal of nuclear waste from private industry. Private industry should pay for their own waste storage. Nuclear waste should be stored near its place of origin and this storage paid for by the company that produced it.

Response
In the "Findings" section of the NWPA, Congress states that "...while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel..." Since the passage of the Act, utilities and their ratepayers have paid about $9.8 billion into the Nuclear Waste Fund to pay for development of a repository. Expenditures from the Fund have been used exclusively for the purposes specified in the NWPA, such as site characterization and facility design.

Taxpayers would bear some of the cost of a repository. The Secretary of Energy makes expenditures from the Nuclear Waste Fund subject to appropriations by Congress. Congress also appropriates funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the United States. Most of these materials were produced at DOE defense production facilities. The most recent estimates show that about 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. This percentage is based on the space required to dispose of defense-related spent nuclear fuel and high-level radioactive waste. Thus, the commercial utilities are "paying their fair share" of repository costs along with taxpayers.

With regard to the suggestion that the nuclear waste should be stored near its place of origin, DOE evaluated potential environmental impacts from the continued storage of spent nuclear fuel and high-level radioactive waste at their present locations. Chapter 7 and Appendix K of the EIS discuss the results of these evaluations for the No-Action Alternative. DOE believes that the continued storage scenarios analyzed in the EIS do not represent a likely or predictable action. The NWPA recognizes a need to ensure that spent nuclear fuel and high-level radioactive waste do not adversely affect public health and safety and the environment.

As stated in Section 2.3.1 of the EIS, virtually every expert group that has examined the problem of nuclear waste disposal has agreed that a geologic repository is the best approach. For example, a panel of the National Academy of Sciences noted in 1990 that there is a worldwide scientific consensus that deep geologic disposal is the best option for disposing of high-level radioactive waste (DIRS 100061-National Research Council 1990). DOE agrees with this consensus, so the EIS does not consider continued storage at the place of origin an appropriate solution.

4.5 (12002)
Comment - EIS000331 / 0003

1. Because 1 kwhr (e) [kilowatt-hour (electric)] is made by 3 kwhr (thermal), the cost for the utilities should be 1/3 of a mill/kwhr (thermal) or 1/30th of a cent per kwhr (thermal).

2. Because a kwhr (thermal) at any plant - civilian or DP [DOE Office of Defense Programs], will produce the same amount of radioactive waste, shouldn't the fee be the same for both? The law says so. Namely, 1/3 mill/kwhr (thermal) of civilian and DP. After all, we are only disposing of identical quantities of fission products, which will have the same risk per gram, or per kwhr (thermal) or per any other measure.

3. Here is the punch line! The RW [DOE Office of Civilian Radioactive Waste Management] folks have somehow decided that DP should be charged about 10 billion, or 25% of the cost, not 2 billion (or 5%), which would be equivalent to the DP share of fission products (or risk) disposed of. Do you tax payers feel happy about being taxed 8 billion extra to subsidize the nuclear plants? I'll bet not!

4. Think what the feds might use that extra 8 billion for. There are plenty of good federal programs that could use help. But I fear that the DP folks don't have as strong a lobby as the utilities do. So, once again, I think the chances for any corrections will be zilch.

5. If the most efficient plant sells juice for 2 cents per kwhr (e), the disposal fee is only 5% of their income from that plant. Isn't that really quite a bargain? The waste would be gone irretrievably forever. What a deal! And for the plants at 7 cents per kwhr, the percent for the disposal fee is 1/10th cent divided by 7 cents, or less than 1 1/2%. A whopper of a bargain. All gained at the taxpayers expense.

Response
DOE's share of repository costs, approximately 30 percent, is more closely related to the space the spent nuclear fuel and high-level radioactive waste would occupy in the repository, which is directly related to the number of waste packages.

Under current planning, defense-related wastes would require 32.8 percent of the waste packages, and commercial spent nuclear fuel would require 67.2 percent. Defense-related spent nuclear fuel and high-level radioactive waste would comprise 10 percent of the total load (metric tons of heavy metal) in the repository.

Congress, not DOE, sets the fee structure.

4.5 (12045)
Comment - EIS001553 / 0001
It is essential that used nuclear fuel above Class C nuclear material and other waste identified that has been involved in the governmental programs over the years, be safely and efficiently stored. Completion of the emergency Environmental Impact Statement is an essential element in the process of the continuing evaluation of the safety of the site, the building of the facility and the operation of the repository at Yucca Mountain. We expect the Department of Energy to fulfill it's legal obligation to the nuclear utilities and the public at large in this role.

Response
As currently written, the NWPA mandates a repository inventory of 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste. Disposal of commercial Greater-Than-Class-C and Special-Performance-Assessment-Required wastes at the proposed Yucca Mountain Repository could require a determination by the Nuclear Regulatory Commission that these wastes require permanent isolation as well as legislative action by Congress unless a second repository was in operation (see Chapter 8).

DOE does not consider this to be an "emergency" EIS. The Secretary of Energy is required by the NWPA to investigate the suitability of Yucca Mountain as a repository and to submit a recommendation to the President accompanied by a Final EIS. The Secretary will comply with the Act.

4.5 (12098)
Comment - EIS001887 / 0385
NEPA [the National Environmental Policy Act] is a policy act containing both procedural and substantive provisions and intents. The Act sets a course for government action and, despite its action-forcing features, the Act is not considered a regulatory statute in a quantitative sense regarding individual components of the environment such as air and water. The Act establishes national environmental policy and is meant to coordinate responses to environmental issues by bringing together other environmental legislation and policy for all environmental media

regarding an individual major action. Typically, most federal agencies succeed in doing this. Where the YMP [Yucca Mountain Project] DEIS falls short is in regard to joint regional land use planning with other agencies, citizens, and private stakeholders.

Response
All land that is part of or adjacent to the proposed repository site is administered and managed by the Federal Government. At present, the Yucca Mountain Project is a tenant on land under the administration of three Federal agencies: the Department of the Interior, Bureau of Land Management; the U.S. Air Force for the Nellis Range; and DOE for the Nevada Test Site. Use of the Nevada Test Site area by the Yucca Mountain Project is controlled by an intra-agency Memorandum of Agreement with the DOE Nevada Operations Office that allows the use of about 230 square kilometers (57,000 acres) of the Test Site for characterization activities. Through the Memorandum of Agreement, the Yucca Mountain Project is accountable for conducting its activities in accordance with the environmental requirements used on the Test Site. Further, the Memorandum of Agreement gives the Yucca Mountain Project technical responsibility independent of, but coordinated with, environmental activities at the Test Site. In addition, DOE received right-of-way reservations from the Bureau of Land Management for access to the portions of public land and the Nellis Range for site characterization activities. These agreements contain environmental requirements. Therefore, as a tenant, the Yucca Mountain Project falls under agreements with the Bureau of Land Management, the Air Force, and the DOE Nevada Operations Office.

For the Nevada Test Site land, the Yucca Mountain Project falls under the DOE Nevada Operations Office Resource Management Plan. If Congress authorized a land withdrawal for the proposed repository at Yucca Mountain, DOE would reevaluate the need for a site-specific land use plan to ensure compliance with applicable requirements. That plan, based on the principles of ecosystem management and sustainable development, would formally synthesize Yucca Mountain Project policies and procedures already in place, draw on the successes of the Nevada Test Site Resource Management Plan, and solicit input from Federal and state agencies, stakeholders, and the general public. Appendix C of the EIS discusses consultations and similar interactions DOE has held in the course of evaluating the Proposed Action.

4.5 (12191)
Comment - EIS001888 / 0494
[Clark County summary of comments it received from a member of the public.]

A commenter recommended that the EIS discuss uncertainties and potential changes within the Yucca Mountain Project and the Civilian Radioactive Waste [Management] Program that may be affected by funding adequacy and socioeconomic impacts.

Response
DOE has expanded the socioeconomic discussions in Chapter 3 to clarify the magnitude of the potential impacts described in Chapter 4. This discussion includes a projection of baseline parameters through 2035 based on the most recently available information and assumptions. The Final EIS provides a quantified estimate, to the extent possible, of school enrollment and changes in law enforcement and public service personnel requirements. Other socioeconomic impact discussions are included in Sections 6.1.2.7 (related to transportation of spent nuclear fuel and high-level radioactive waste), and 8.2.6 (related to cumulative impacts).

In the area of socioeconomic impacts, the primary uncertainties that could be analyzed are those associated with projections of population and economic growth. The Supplement to the Draft EIS and the Final EIS use Nevada population data that are consistent across technical areas and that directly reflect data developed by and received from county and State officials. In response to comments, DOE has updated its population estimates in the regions of influence to reflect the most recent State and local information, as well as the 2000 Census population summary data for Nevada. For the repository- and transportation-related regions of influence, DOE performed computer model simulations using a Regional Economic Models, Inc. (REMI) model to establish an updated population baseline by accounting for population estimates and projections provided by county governments. In the absence of county information, DOE used population estimates and projections from the Nevada State Demographer's Office. DOE used the updated population baselines to estimate populations for Clark, Nye, and Lincoln Counties and the rest of Nevada through the year 2035. These population projections were then compared and adjusted to the 2000

Census population summary data. In this way, model population projections were calibrated to reflect the best available information.

The Final EIS baseline used REMI model projections of population totals for each Nevada county until 2035. The Clark County projections correspond to those used by the University of Nevada, Las Vegas (DIRS 136698-Riddel and Schwer 1999), which also used the REMI EDFS 53-sector model. DOE based inputs to Nye County projections for the Final EIS on data identified in Nye County documents (DIRS 150996-Williams 2000; DIRS 148140-PIC 1998). The Nye County projections provided during the Draft EIS public comment period are based in part on a REMI 14-sector model. DOE used (1) Lincoln County and Rest of Nevada projections through 2018 by the Nevada State Demographer's Office (DIRS 107195-NSD 1999) as inputs to population projections for these areas; (2) county projections and Nye County source documents to project population distributions within the 84-kilometer (52-mile) radiological monitoring grid; and (3) California Department of Finance projections (DIRS 150294-CSDF 1998) for Inyo County as the basis for projecting population distributions for Inyo County sections of the grid (see Section 3.1.7).

The question of funding adequacy is beyond the scope of the EIS. The NWPA requires DOE to perform site characterization activities, determine whether to submit a site recommendation and then, if the site was designated, obtain a license, construct, operate, and close the repository. DOE believes that Congress, having directed the Federal Government to embark on this project, would continue to fund it adequately to protect the public health, safety, and welfare. Analysis of adequate funding levels would be based on expected funding levels over time and would be extremely speculative.

4.5 (12301)
Comment - EIS001000 / 0006
The Department of Energy has already spent billions of dollars trying to put a happy face on the nuclear waste problem. Specifically on the Yucca Mountain location, so that electric utilities can continue generating nuclear power and nuclear waste.

Response
As discussed in Section 1.3 of the EIS, Congress enacted the NWPA, which acknowledges the Federal Government's responsibility to provide for the permanent disposal of spent nuclear fuel and high-level radioactive waste to protect the public health and safety and the environment. DOE must comply with the provisions of this Act.

4.5 (12312)
Comment - EIS001887 / 0256
Page 4-98; Section 4.2.1 - Impacts from Retrieval Contingency
Because the NWPA requires DOE to maintain the ability to retrieve the waste for at least 50 years after the start of emplacement, DOE should have included this requirement in the Proposed Action. This is another example of the deficiency of the Draft EIS.

The Draft EIS should describe the manner in which the canisters would be removed in the event of a retrieval. These canisters will be hot and radioactive. Does DOE have the capability of retrieving the waste, if it becomes necessary?

The retrieval scenario used in the Draft EIS and the attendant assessment of impacts are inadequate. The retrieval scenario assumes that DOE would simply remove the waste from the repository and store it above ground at a site in Midway Valley. This scenario seriously understates the impacts and implications of having to remove spent fuel and HLW [high-level radioactive waste] after it has been emplaced. The scenario fails to assess what happens to the waste after it has been removed and appears to assume that it can be left indefinitely in above ground storage. This is an inaccurate assumption.

In the event DOE discovers problems with Yucca Mountain that are so serious as to warrant the retrieval of the emplaced waste, it will almost certainly mean that the site is unsuitable for long-term disposal. In that event, it is entirely inappropriate to assume that it will be safe to store the same materials above ground in the same area for an indefinite period or in lieu of a repository. Rather, the retrieval scenario should have assessed the full range of

implications, including the need to revisit a credible siting process for a disposal facility, the requirements for a shipping campaign to move the spent fuel and HLW to a more suitable site(s), and all the impacts associated with such a major, long-term undertaking.

Understanding the extraordinary problems that would be presented in having to remove waste from a repository, find a new disposal/storage site(s), and then transport the waste to the new site is important in order to assess the wide range of impacts associated with this aspect of the Proposed Action. The retrieval scenario and all its implications are important and integral aspects of the Yucca Mountain project and must be thoroughly understood and evaluated in the Draft EIS. This has not been done.

Response
Section 122 of the NWPA, requires retrievability at a repository. Federal regulations (10 CFR Part 63) require that the repository design preserve the option of waste retrieval on a reasonable schedule starting at any time up to 50 years after the start of emplacement. In accordance with these requirements, the operational plan for the proposed repository includes a design and management approach that would isolate wastes from the public while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This approach would maintain the ability to retrieve the waste to protect the public health and safety or the environment, or to recover resources from spent nuclear fuel for at least 100 years and possibly more than 300 years.

Because retrieval is not anticipated, DOE did not include it as part of the Proposed Action. However, the EIS evaluated retrieval as a contingency action, and describes the short-term impacts of that retrieval (see Section 4.2). The Department evaluated only actions it could predict with certainty (that is, removal of emplaced waste materials and subsequent onsite storage). Because future actions regarding the long-term management and ultimate disposal of these materials following retrieval would be at the direction of Congress, are highly speculative, and are unnecessary to support current decisionmaking, DOE believes it is inappropriate to evaluate impacts that could result from these actions.

4.5 (12647)
Comment - EIS002106 / 0001
From the testimonies that I've heard from citizens, people who are politicians or just plain simple, faithful folks, I could understand what you're saying because I'm from the Squaw Valley Indian Reservation in Utah, and our council is proposing to facilitate an independent spent fuel installation on our homeland, native land in Squaw Valley Reservation in Idaho County, and this facility would be constructed on 820 acres of our reservation land, and the high-level spent fuel rods are coming from seven power plants across the Eastern states, and we are to store 4,000 casks containing 40,000 metric tons, and that's half of what Yucca Mountain's going to be storing from what I hear. This facility is supposed to be temporary until Yucca Mountain becomes possible, but we feel that it's going to be a permanent situation. I am a chairperson of an organization opposing the nuclear waste to come on to our reservation because of the reasons that I have heard today.

Another issue that I want to bring up, too, is the MRS [monitored retrievable storage]. I heard a gentleman mention MRS. Monitored retrievable storage was first introduced to our tribe in '92. DOE had brought out the possibility of studying MRS and our tribe was accepted, and we went to the first, second and third stages of this. We've been to Switzerland, France, Great Britain and our council came back saying how safe it was, and I don't believe that. It took a third of the people of our members to pass a resolution to facilitate this facility on 840 acres of our homeland land. As I mentioned it has taken a third of us to oppose it. So if that's going to make that much of a difference to put it on our reservation, hopefully it will take a third of us to make it possible that it won't come.

Response
The scope of alternatives considered in the EIS is limited by the NWPA, which directs the Secretary of Energy to characterize only the Yucca Mountain site as a potential monitored geologic repository. As discussed in Section 1.5 of the EIS, the NWPA states that the EIS is not required to consider (1) the need for a geologic repository, (2) the time at which a repository could become available, and (3) alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository. DOE has no plans to develop an interim storage site, so the EIS does not evaluate interim storage. (However, as noted in the introduction to Chapter 7, continuing storage at existing sites and/or one or more centralized locations has been analyzed in other contexts).

Since the publication of the Draft EIS, the Nuclear Regulatory Commission has published the *Draft Environmental Impact Statement for the Construction and Operation of an Independent Spent Nuclear Fuel Storage Installation on the Reservation of the Skull Valley Band of Goshute Indians and the Related Transportation Facility in Tooele County, Utah* (DIRS 152001-NRC 2000). That EIS evaluates the potential construction of an interim storage facility that the Commission would license for storage of commercial spent nuclear fuel. DOE recognizes that interim storage at this facility is a reasonably foreseeable future action and has included this action as part of the cumulative impacts analysis in Chapter 8.

4.5 (12751)
Comment - 010455 / 0001
A Preliminary Site Suitability Evaluation is no substitute for an Environmental Impact Statement which covers all issues raised and this document will not be an adequate basis on which to make a recommendation to the Secretary, or the President.

Response
As discussed in Section 1.3.2.3 of the EIS, the NWPA establishes a process leading to a determination by the Secretary of Energy on whether to recommend that the President approve Yucca Mountain for development as a geologic repository. As part of this process, the Secretary is to:

- Undertake site characterization activities at Yucca Mountain to provide information and data required to evaluate the site.
- Prepare an EIS.
- Determine whether to recommend approval of the development of a geologic repository at Yucca Mountain to the President.

The Preliminary Site Suitability Evaluation (DIRS 155734-DOE 2001) and the Science and Engineering Report (DIRS 153849-DOE 2001) are documents that provide insight into the geologic setting gained from years of characterization studies and years of engineering design enhancements. The Secretary will consider these documents, together with the Final EIS, in making a determination whether to recommend the Yucca Mountain site to the President. In making that determination, the Secretary will consider the potential impacts identified in the EIS, among other factors (see Section 2.6 of the EIS).

4.5 (12853)
Comment - 010262 / 0006
An on-site aging facility is suggested that could have a capacity of as much as 40,000 MTHM [metric tons of heavy metal], which is essentially the existing commercial SNF [spent nuclear fuel] inventory. Citizen Alert views this facility as a defacto interim storage site, which facilitates the nuclear utilities objective of removing the SNF from the reactors sites as soon as possible. Given the published SNF receipt schedule (approximately 3,000 MTHM per year) at Yucca Mountain it is not clear why such a large facility would be needed; would not a capacity of 15,000 - 20,000 be sufficient? Is the DOE expecting that relatively young SNF will be shipped first; hence, a large capacity is required?

Response
DOE has indicated that 40,000 metric tons of heavy metal (MTHM) would be the maximum size of a surface aging facility at the Yucca Mountain site. Accordingly, the 40,000-MTHM facility was analyzed for the EIS to ensure that the impacts covered the total possible range. A surface aging facility as large as 40,000 MTHM might not be required when all aspects of the shipping scenarios have been defined, such as the age of the spent nuclear fuel to be shipped first.

4.5 (12969)
Comment - 010303 / 0001
Additionally, the DOE also released in May 2001, a separate report, the Nuclear Waste Fund Adequacy: An Assessment. The fee adequacy study shows that the Nuclear Waste Fund (NWF) is "fee adequate" over a broad range; however, it does not address the potential delay for the closure of the permanent repository.

Response
As reported in *Report on Assessment of Fee Adequacy Based on FY 1999 TSLCC [Total System Life-Cycle Cost] Update*), the Nuclear Waste Fund investments had a market value of $8.5 billion as of September 30, 1999 (DIRS 152076-CRWMS M&O 1999). The analysis in the report found that the current fee of 1 mil per kilowatt hour charged to generators of commercial spent nuclear fuel was adequate to cover projected disposal expenses (including costs associated with packaging and transportation) and recommended that the fee remain unchanged. Congress determines funding for Nuclear Waste Fund. DOE believes that Congress, having directed the Federal Government to undertake this project, will continue to fund it adequately to protect the public health and welfare.

4.5 (13270)
Comment - 010231 / 0004
Page 2-l 1, Section 2.3.1. This section describes repository closure, but provides no details on post-closure monitoring other than a reference to the NRC proposed rules. The final EIS should provide a more detailed description.

Response
A postclosure monitoring program is required by 10 CFR Part 63. This program would include the monitoring activities that would be conducted around the repository after the facility was closed and sealed. The regulations require that a license amendment be submitted for permanent closure of the repository [10 CFR 63.51(a)(1) and (2)]. This amendment must specifically provide an update of the assessment for the repository's performance for the period after permanent closure, as well as a description of the program for postclosure monitoring. This program would include continued oversight to prevent any activity at the site that posed an unreasonable risk of breaching the geologic repository's engineered barriers; or increasing the exposure of individual members of the public to radiation beyond allowable limits. The details of this program would be defined during the processing of the license amendment application for permanent closure. Deferring a description of this program until the closure period would allow for the identification of appropriate technology including technology that could become available in the future.

4.5 (13354)
Comment - 010182 / 0003
The SDEIS does not consider the potential for Yucca Mountain's geologic formation to accommodate spent fuel in amounts beyond that considered within the DEIS due to the closer spacing to be achieved through the flexible design. The SDEIS should provide a new estimate of the total potential spent fuel and other High-Level Radioactive Nuclear Waste (HLNW) that could be emplaced in Yucca Mountain. The SDEIS should consider what effect closer spacing of waste packages might have upon the probability and consequence of a volcanic dike encountering one or more waste packages.

Response
The current law allows the proposed action to emplace only 70,000 metric tons of heavy metal of waste in the proposed repository. Additional legislation would have to be passed to allow any additional canisters in the repository. Therefore, the additional canisters are not a planned action but rather a possible future action evaluated as a cumulative effect. Cumulative impacts were presented in the Draft EIS but were not discussed in the Supplement to the Draft EIS because the amount of change from the Draft EIS would be similar to the reported changes in the Proposed Action. However, this Final EIS details these cumulative effects in Chapter 8.

The Final EIS contains a detailed discussion of the analysis of such events and other related disruptive events in Chapter 5, Section 5.7.2

4.5 (13479)
Comment - 010260 / 0003
Georgians for Clean Energy requests answers on where the "nation's first geologic repository," and "second repository" are likely to be sited, assuming that Yucca Mountain will not be recommended--or at least a list of what locations are possible candidates. Additionally, we would like to know how funding will be secured for these additional repositories as many utilities, state public service commissions, and others are already in the midst of lawsuits objecting to their need to fund and the delay in having a national geologic repository available for the generated waste.

Response
Through the Nuclear Waste Policy Amendments Act of 1987, Congress directed the Secretary of Energy to perform site characterization activities only at the Yucca Mountain site.

If the Secretary determines the Yucca Mountain to be unsuitable for further development, consistent with the Nuclear Waste Policy Act, as amended, DOE would terminate activities at Yucca Mountain and prepare a report to Congress containing DOE's recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority, which could include changes to Section 302 of the Act related to funding of the Nuclear Waste Fund. However, future actions by Congress are uncertain. In addition, the Department cannot comment on how these decisions could be affected as a result of ongoing litigation.

Prior to 1987, DOE, in accordance with the Nuclear Waste Policy Act of 1982, had identified nine candidate sites and was engaged in the process of selecting some of these sites for technical study as potential geologic repository locations. As a result, DOE recommended three of the nine, of which Yucca Mountain was one, for possible study as repository site candidates. Therefore, if the Secretary determines the Yucca Mountain site to be unsuitable for further development, any of the other sites not previously selected could be recommended for further evaluation. However, the course that DOE, Congress, and the commercial utilities would take if Yucca Mountain did not receive a recommendation as a repository is uncertain.

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155108	Tichler, Doty and Lucadamo 1995	Tichler, J.; Doty, K.; and Lucadamo, K. 1995. *Radioactive Materials Released from Nuclear Power Plants, Annual Report 1993.* NUREG/CR-2907. Washington, D.C.: U.S. Nuclear Regulatory Commission. ACC: MOL. 20010721.0046.
150996	Williams 2000	Williams, R. 2000. Nye County Population Estimates Through the Fourth Quarter, 1999 Memorandum from R. Williams (Nye County) to Interested Parties TIC: 248428.
104630	YMP 1997	YMP (Yucca Mountain Site Characterization Project) 1997. *Summary of Public Scoping Comments Related to the 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.* Las Vegas, Nevada: Yucca Mountain Site Characterization Office. ACC: MOL. 19970731.0515.

5

Alternatives

5. ALTERNATIVES

5.1 Opposition to the Proposed Action

5.1 (27)
Comment - 606 comments summarized
Commenters expressed broad opposition to the Proposed Action to construct, operate and monitor, and eventually close a geologic repository for the disposal of spent nuclear fuel and high-level radioactive waste at Yucca Mountain. While many commenters did not identify specific deficiencies or problems with the Proposed Action and only stated their opposition to the proposal, other commenters expressed opposition to the Proposed Action by stating their support for the No-Action Alternative and the desire that the Nation discontinue development of the proposed Yucca Mountain Repository. A number of the commenters who expressed opposition to the repository through support of the No-Action Alternative did so because the Proposed Action would require transportation of spent nuclear fuel and high-level radioactive waste across the Nation. Specific issues cited included concerns for health and safety or economic impacts within the State of Nevada; treatment of Nevada as a "dumping ground" for the rest of the country; unfair influence of the nuclear power industry over the choice of Nevada for the repository location; safety for future generations; and concerns over specific repository performance issues, including the threat of earthquakes and groundwater contamination, and potential transportation problems. Many commenters cited more than one issue in their Comments.

Commenters citing specific repository performance issues provided Comments addressing several areas. Some commenters cited the potential for seismic activity. The site is on an active earthquake fault line in the Ghost Dance fault, earthquakes have been felt recently in Las Vegas, and Nye County is too unstable geologically to support a major nuclear waste repository. Some commenters cited the possible threat of volcanic activity. Commenters also stated that some studies have shown that the water table could rise into the repository in the future.

Other commenters expressed concerns over repository performance stated that the site is unsuitable because water seepage would cause nuclear waste to leak from the casks into groundwater and threaten water supplies, the repository could contaminate the groundwater in Amargosa Valley and Death Valley National Park, and the water supply for Las Vegas could be threatened. Some commenters stated that transportation accidents would be likely to happen and that transport across the country of hundreds of "Mobile Chernobyls" would be a severe health and safety threat. Others cited concerns over the possibility of developing cancer from exposures due to operations at the repository or from waste transportation operations to the repository. A few commenters stated that accumulating all of the Nation's nuclear waste in one place is "beyond engineering common sense." Others felt that such a concentration of waste would invite a terrorist attack.

Response
DOE acknowledges the commenters' opposition to the Proposed Action, its location in Nevada, and the range of concerns expressed about the safety and wisdom of transportation and repository operational plans. Because of the large number of comments received opposing the repository in general and/or for a range of specific reasons, DOE refers the commenters who have submitted comments summarized here to the discussion of issues in the introduction to this Comment-Response Document ("An Overview of Key Issues Raised in Comments") and to other comments and responses related to specific topics that cover the range of topics summarized here (see the Comment-Response Document Table of Contents).

5.1 (2005)
Comment - EIS000528 / 0002
I have known that the U.S. Government has been pursuing this venture for at least twenty years and I feel that the money spent could have been used to develop the plant, that was spoken of at the meeting, to neutralize the waste, but instead it appears that millions of dollars are being spent for salaries that do nothing for the nation but it appears to provide jobs and job security for a few. This I resent since it is our tax dollars that are being spent to ram this unacceptable storage incentive down the throats of a state that has limited input into the ultimate decision because of limited population and representation in government.

Response
DOE acknowledges the commenter's concern about funding of the Yucca Mountain Site Characterization Project. The commenter alludes to the fact that money could have been used to develop a waste neutralization facility. A National Academy of Sciences report to the Atomic Energy Commission (a DOE predecessor agency) in 1957 recommended burying radioactive waste in geologic formations (DIRS 100011-NAS 1957). In 1976, the Energy Research and Development Administration (another predecessor agency) began investigating geologic formations and different disposal concepts, including deep-seabed disposal, disposal in the polar ice sheet, and rocketing waste into the sun. In the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980), DOE evaluated alternatives to geologic disposal including very deep borehole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, space disposal, and no action. In 1979, a report was submitted to the President recommending the design of a repository in which the natural and engineered barriers work as a system, so no barriers would fail for the same reason or at the same time. This design strategy is known as "defense in depth" (DIRS 100149-Interagency Review Group on Nuclear Waste Management 1979). In a 1981 Record of Decision (46 *FR* 26677), DOE decided to pursue the mined geologic disposal alternative for the disposition of spent nuclear fuel and high-level radioactive waste.

Congress was aware of previous studies when it decided to pursue geologic disposal and enacted the Nuclear Waste Policy Act, which established the Federal Government's responsibility to provide permanent disposal of the Nation's spent nuclear fuel and high-level radioactive waste. Through the passage of the Nuclear Waste Policy Amendments Act of 1987, Congress amended the law, selecting only Yucca Mountain as a potential location for a geologic repository and directing DOE to determine whether Yucca Mountain would be suitable for a geologic repository.

DOE has an ongoing program of investigations and evaluations to assess the suitability of the Yucca Mountain site as a potential geologic repository and to provide information for the EIS. The program consists of scientific, engineering, and technical studies and activities. DOE has used information from this site characterization program, along with population data from the 2000 National Census, to prepare the EIS. Although the NWPA directs that DOE prepare an EIS to evaluate the potential environmental impacts associated with development of a geologic repository, the EIS is not required to consider the need for a geologic repository, the time at which a repository could become available, or alternatives to isolating spent nuclear fuel and high-level radioactive waste. In addition, the EIS does not have to consider any site other than Yucca Mountain for development of a repository. Under the Act, the EIS is one of many documents the Secretary of Energy will use in deciding whether to recommend Yucca Mountain to the President for development of a repository.

The ultimate decision on whether Yucca Mountain is developed and placed into operation lies with the President, the United States Congress, and the State of Nevada. As part of the process, Section 114 of the NWPA specifies that the State of Nevada has an opportunity to provide input to the Site Recommendation process for a repository. In addition, the State of Nevada can, if it so elects, file a notice of disapproval, which would require an Act of Congress to override. Sections 115 and 116 of the Act provide a description of the role and participation of states in the decisionmaking process for a repository.

5.1 (2953)
Comment - EIS000727 / 0001
The local chapter of the Sierra Club opposes the proposed Yucca Mountain Project for the following reasons. Our reasons fall into five areas of concern: site safety, alternatives considered, risk assessment, transportation issues, and issues with environmental justice and public participation.

Response
In preparing the EIS, the Department used the best currently available information to analyze potential environmental impacts and performed analyses in a conservative manner that tended to overestimate the impacts that could occur from the construction, operation and monitoring, and closure of the repository. DOE specifically evaluated a full range of issues in the EIS including health and safety, transportation, and environmental justice. Many of the analyses performed were based on risk assessments and the probabilities of certain events occurring.

In relation to public participation, DOE conducted the EIS process consistent with National Environmental Policy Act implementing procedures (10 CFR Part 1021). The process, as demonstrated by this Comment-Response Document, subjected EIS development to public scrutiny. As discussed in Section 1.5.1 of the EIS, public scoping meetings, public hearings, and public review of the Draft EIS and Supplement to the Draft EIS by stakeholders, government agencies, Native American tribes, and members of the public comprised an important part of the process. Commenters had the opportunity to send written comments by regular or electronic mail, provide facsimile comments over a toll-free telephone line, or provide comments at 21 public hearings around the country on the Draft EIS and 3 public hearings in Nevada on the Supplement.

In relation to alternatives, DOE has been considering various technologies for the management of spent nuclear fuel for a number of years, including very deep hole disposal, disposal in a mined cavity, island-based geologic disposal, transmutation, and disposal in outer space. Various studies including those on accelerator transmutation of waste are still ongoing (see Section 9.1.3 of the EIS). However, under the NWPA, DOE is authorized to characterize and evaluate geologic disposal only at Yucca Mountain in the EIS.

Regarding environmental justice, the results of the analysis show that the Proposed Action would not result in significant environmental or health and safety impacts to any segment of the population. Using available information, DOE evaluated the likelihood that circumstances unique to minority and low-income populations could create a potential for these populations to be exposed to disproportionately high and adverse impacts.

Chapter 4 of the EIS discusses health and safety impacts from repository operations and Chapter 6 discusses the impacts from transportation of spent nuclear fuel and high-level radioactive waste.

5.1 (4335)
Comment - EIS001202 / 0004
I am unalterably opposed to HB 45 and S1287, the Yucca Mountain High Level Waste Bills. I feel that the nuclear waste issue needs more current and open debate about what to do with the dangerous residues.

The spokesperson Wendy Dixon, was competent in explaining the process of the DOE mission. But only the Congress can explain why we are pursuing a 1980's agenda of dump it all in Yucca Mountain, an earthquake prone area sacred to the Western Shoshone, opposed by 70% of Nevada's citizens and all of its Congressional members.

Response
President Clinton vetoed the final version of the bill mentioned in the comment. DOE is considering the Yucca Mountain site pursuant to explicit direction from Congress in the NWPA.

5.1 (5904)
Comment - EIS000815 / 0003
Creation of geologic deposits of large quantities of accessible, weapons usable material and denial of an important energy resource are not responsible actions. The Proposed Action for disposal of spent fuel at Yucca Mountain should not be approved.

The proposed repository would provide acceptable long-term isolation from the biosphere of high-level radioactive waste - i.e., unwanted fission products that remain after recovery of fissionable materials. The United States needs a repository for isolation of these wastes.

The planned action for disposal of high-level radioactive wastes at Yucca Mountain should be approved, and shipments of these materials from DOE's Savannah River, South Carolina, and West Valley, New York, sites should begin as soon as possible. (However, vitrified waste which would contain embedded [briquettes] of excess weapons plutonium are not appropriate for permanent disposal at Yucca Mountain. John Ahearne, a member of your "Presidents Committee of Advisors on Science and Technology" (PCAST) and the National Academy of Sciences committee considering plans for disposition of excess weapons plutonium discussed this material at the 1999 Winter Meeting of the American Nuclear Society. He explained that plutonium contained in vitrified waste in this manner would not provide protection equivalent to that for plutonium in spent fuel. This plutonium in a permanent repository would also be a permanent diversion/proliferation threat. The plan to embed excess weapons plutonium in vitrified waste as a means to dispose of this material should be canceled.)

The United States needs responsible programs for long term isolation of unwanted, intensely radioactive fission products in spent fuel, but indefinite storage of spent fuel at nuclear power plant sites or at Yucca Mountain in Nevada is not such a program. At least 99.8% of the plutonium and other fissionable materials, and any valuable fission products in spent fuel must be removed prior to transfer of the unwanted fission products to a permanent repository. Facilities where this is carried out must be designed and operated so that there is no accumulation of weapons materials except in hardened areas between process steps. Recovered weapons usable materials would be immediately fabricated into mixed oxide fuels and destroyed and/or rendered inaccessible by irradiation in nuclear power plants. This is discussed further in "Nuclear Technology: Need for New Vision," a paper presented at the Global Foundation International Energy Forum in Washington DC on November 5, 1999.

Response
Congress has determined through passage of the NWPA, that the Federal Government has the responsibility to dispose of spent nuclear fuel and high-level radioactive waste permanently to protect the public health and safety and the environment. To this end, the Act directs DOE to characterize and evaluate the Yucca Mountain site and make a recommendation to the President on whether to approve the site for development as a repository. In accordance with the Act, the Department is proceeding toward a site recommendation determination; completion of this EIS is an important part of the process.

Because the United States does not reprocess commercial spent nuclear fuel, separation and subsequent isolation of weapons-usable materials or valuable fission products has not occurred. Therefore, most of the candidate material for the repository consists of commercial and DOE spent nuclear fuel. However, because Congress recognized that new technologies for waste management could be developed in the future and that spent nuclear fuel contains potentially valuable resources, the NWPA requires retrievability at the repository for at least 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the Yucca Mountain Repository provides for a design and management approach that isolates wastes from the public in the future while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly as long as 300 years in the event of a decision to retrieve the waste either to protect the public health and safety or the environment or to recover resources from spent nuclear fuel.

Regarding the possibility of removal of weapons-usable materials following closure of the repository, Congress developed the policy, defined in the NWPA, of deep geologic disposal for spent nuclear fuel and high-level radioactive waste with the intent of isolating the material from the accessible environment. DOE believes that placing the material 200 meters (660 feet) below the surface in a repository excavated from solid rock satisfies the intent of such isolation in relation to potential terrorist activity. To excavate to the repository level after closure would require a very large level of effort; it would require sophisticated excavation equipment, a large workforce, and a significant expenditure of funds—all unlikely to happen without being highly visible. For this reason, it is unlikely that such activity would ever take place. Even if terrorists were able to penetrate to repository depth, the spent nuclear fuel, immobilized plutonium, and high-level radioactive waste would be in waste packages weighing between 32 and 82 metric tons (35 and 90 tons) and made of solid metal. Without the ventilation systems and emplacement equipment that DOE would use to handle the waste packages remotely, terrorists would probably not survive the high temperatures and high radiation fields in the repository. Therefore, it is unlikely that terrorists could remove or significantly damage a waste package.

5.1 (7274)
Comment - EIS001957 / 0001
If the [Yucca Mountain] facility were built and operated as proposed, and never leaked into groundwater or elsewhere, it could be acceptable. Of course, if that were true, the facility could be built anywhere. A paramount concern underlying our Comments is that things that can go wrong sometimes do. Should something go awry at the top of the geologically active Yucca Mountain system, irreplaceable resources existing downstream will be affected. Thus, even if one accepts the as yet unproven premise that the possibility of leaks is small, the consequences of leakage would be catastrophic. And, unfortunately, such an incident is possible within decades, centuries, or even millennia of operational start-up.

Response
DOE acknowledges the National Park Service's opposition to the Proposed Action, its location at the Yucca Mountain site, and the range of concerns expressed over the safety of operational plans.

Other parts of this Comment-Response Document contain responses to comments related to specific resource areas, such as groundwater and seismic issues, or impact analyses addressing repository performance and nuclear material transportation. The decision to evaluate the use of a repository at Yucca Mountain is a national policy initiative embodied in the Nuclear Waste Policy Act, as amended. The Secretary of Energy will consider the results of the environmental analyses reported in this EIS, site suitability studies, and public input, as demonstrated in this Comment-response Document, in determining whether to recommend development of the Yucca Mountain site as a geologic repository.

5.1 (7289)
Comment - EIS001957 / 0003
Based on information available so far, the National Park Service must oppose the proposed action.

Response
DOE acknowledges the National Park Service's opposition to the Proposed Action, its location at the Yucca Mountain site, and the range of concerns expressed over the safety of operational plans.

Other parts of this Comment-Response Document contain responses to comments related to specific resource areas, such as groundwater and seismic issues, or impact analyses addressing repository performance and nuclear material transportation. The decision to evaluate the use of a repository at Yucca Mountain is a national policy initiative embodied in the Nuclear Waste Policy Act, as amended. The Secretary of Energy will consider the results of the environmental analyses reported in this EIS, site suitability studies, and public input, as demonstrated in this Comment-Response Document, in determining whether to recommend development of the Yucca Mountain site as a geologic repository.

5.1 (9133)
Comment - EIS001860 / 0003
Although an argument might be made that Yucca Mountain and its surroundings are already contaminated by proximity to the Nevada Test Site, it isn't sufficiently compelling when you consider the cultural resources which will be sacrificed, environmental justice considerations and the overwhelming failure of the plan to address transportation issues comprehensively or propose adequate monitoring of the site for the active life of nuclear waste. Subsidiary but essential issues are the need to reclassify radioactive wastes for storage and the impropriety of rushing to a premature solution to our nuclear waste disposal problems.

Response
Congress made the decision to focus on the Yucca Mountain site as a geologic repository through the passage of the Nuclear Waste Policy Amendments Act of 1987, directing the Secretary of Energy to perform site characterization activities at the Yucca Mountain site, and if the site was found suitable, to make a determination whether to recommend to the President the development of the site for a repository.

Land disturbances associated with the Proposed Action could have direct impacts on cultural resources around Yucca Mountain. Cultural resource documentation efforts at the repository site have been ongoing since 1982. None of the archaeological and historic sites identified in the immediate vicinity of the proposed surface facilities has been listed on the *National Register of Historic Places*, but 150 are potentially eligible. DOE would avoid such sites if possible or, if avoidance was not possible, would conduct a data recovery program in cooperation with tribal representatives and other appropriate officials and would document the findings.

The environmental justice methodology applies two tests in determining the potential for environmental justice impacts. The first test assesses the potential for impacts from the Proposed Action to affected populations to be high and adverse. The second test assesses the potential for high and adverse impacts to fall disproportionately on minority or low-income populations. Using these tests, impacts must be both adverse and high before there would be a potential for environmental justice impacts to occur. The EIS analyses determined that the impacts that could

occur to public health and safety would be small on the population as a whole for all phases of the Proposed Action, and that no minority or low-income populations would receive disproportionately high and adverse impacts.

DOE believes the EIS provides sufficient information on selection of transportation alternatives in the State of Nevada. Chapter 6 and Appendix J of the EIS discuss the transportation of spent nuclear fuel and high-level radioactive waste. It is premature at this time to analyze the hazards, vulnerabilities, and risks of specific routes and locations to identify preferred routes. The Department has acknowledged that additional investigations would be required for determining specific transportation alternatives.

A postclosure monitoring program is required by 10 CFR Part 63 as part of the Nuclear Regulatory Commission license, if the site is developed. DOE would submit a license amendment application that updated the assessment for the repository's performance for the period after permanent closure and described the postclosure monitoring program. This program would include continued oversight to prevent any activity at the site that posed an unreasonable risk of breaching the geologic repository's engineered barriers; or exposed individual members of the public to radiation that exceeded allowable limits. This program would be described at the time of closure to allow for the identification of emerging technology available in the future.

The concept of permanently disposing of nuclear waste in a deep geologic repository stems from studies initiated in the 1950s by the National Academy of Sciences. Continued studies in this country and abroad have concluded that deep geologic disposal isolates nuclear waste from the accessible environment in geologic formations known to have been stable for millions of years, thus providing a safe location for the waste to decay into a stable form. However, to allow a consideration of future technologies and resource recovery, Section 122 of the NWPA requires retrievability at a high-level radioactive waste repository. Federal regulations (10 CFR Parts 60 and 63) require that the repository be designed and operated to preserve the option of waste retrieval on a reasonable schedule for as long as 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the proposed Yucca Mountain Repository provides for a design and management approach that isolates wastes from the public in the future while allowing flexibility to preserve options for modifying emplacement and retrieving waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly as long as 300 years or more after the end of waste emplacement, if a decision was made to retrieve the waste either to protect the public health and safety and the environment or to recover resources from spent nuclear fuel. During this period, the repository would remain accessible for scientists to continue testing and monitoring while providing more flexibility for future generations who would ultimately determine the timing and methods of repository closure.

5.1 (10786)
Comment - EIS000273 / 0006
Georgia had an opportunity to get this repository in Georgia in 1986 when sites were identified by the Department of Energy in granite rock bodies in eastern states. But it was a political and not a technical decision by the Congress to target Yucca Mountain only for consideration for a repository. Now, we in Nevada might feel differently about all this if all the other sites had been appropriately evaluated the way the 1982 federal law said they would be. But then in 1986 all the eastern folks with all the electoral votes got very concerned about their backyards, and they decided to dump it in ours. And you need to understand that this whole debate since 1986 has been, unfortunately, in my opinion, unnecessarily adversarial because of the political decision. So it was political science and not earth science that chose Yucca Mountain as the candidate site.

Response
Thank you for your input. Sections 1.3.1 and 1.3.2 of the EIS discuss some of the background related to the management of spent nuclear fuel and high-level radioactive waste.

5.1 (11185)
Comment - EIS000252 / 0006
What's happening is the environmental justice piece of this is the politically weak states in the west that are not as populated are going to take the brunt of this particular radioactive waste that is going to Yucca Mountain and that is going all over the country, frankly.

So that is one of the aspects of environmental justice that I don't think is completely looked at within the EIS or within the Department of Energy's overall nuclear waste policy.

Frankly, it's just, like I said, without the Department of Energy taking a step back, and rethinking the entire nuclear waste policy, you are going to have these environmental justice problems because you are always going to have those folks that are out there wanting to do a quick and dirty political answer to a scientific problem. Yucca Mountain isn't the scientific answer to the problem for this high-level waste.

Don't dump it on the western states that are politically weak.

Response
DOE is evaluating the suitability of the Yucca Mountain site for a geologic repository because Congress has directed it to do so in the NWPA. This EIS does not analyze Congressional considerations that might have accompanied passage of the Act.

Environmental justice issues (see Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations") focus on the potential for proposed actions to have disproportionately high and adverse effects on minority and low-income populations. The analyses performed for the EIS found no such effects would occur. Further, these issues do not encompass political matters that might arise between states.

5.1 (11603)
Comment - EIS002237 / 0001
I want to make it very clear for the record that Nye County has always held a neutral position on Yucca Mountain; we neither favor nor oppose it because we are concerned about the health and safety of our citizens.

Response
DOE will continue to work with the appropriate representatives of Nye County to share information about potential health and safety issues associated with the operation of the proposed Yucca Mountain Repository.

5.1 (11667)
Comment - EIS002298 / 0001
WHEREAS, The people of the Western Shoshone Nation find the presence [of] radioactive materials, nuclear power facilities and nuclear weapons facilities within the lands, the watershed or airshed of the lands of the Western Shoshone Nation, known in the Shoshone language as Newe Sogobia, as set forth in the treaty of Ruby Valley of 1863, to be in conflict with the maintenance of the community's economic well-being, health, and general welfare; and,

WHEREAS, Nuclear weapons testing by the United States government on Western Shoshone lands, in direct conflict with Western Shoshone National Council law and policy, has left portions of Newe Sogobia scarred and permanently contaminated with radiation; and,

WHEREAS, The aforementioned nuclear weapons testing by the United States government on Western Shoshone lands has already caused widespread cancer, bringing illness and death to Western Shoshone, members of other Indian nations, and the non-Indian people of the Great Basins region; and,

WHEREAS, The United States government continues to contaminate Western Shoshone lands at the Nevada Test Site by importing and, dumping, radioactively and chemically contaminated soil and other waste products; and,

WHEREAS, The United States Geological Survey has found that the aquifer under the Beatty radioactive waste dump site is about to become contaminated with long-lived radionuclides, endangering drinking water on Western Shoshone lands; and,

WHEREAS, The government of the United States, against the expressed wishes of the Western Shoshone National Council, is proposing to store highly-irradiated fuel from commercial nuclear power plants, which will remain deadly for hundreds of thousands of years, at Yucca Mountain, within Western Shoshone lands; and,

WHEREAS, A high volume of truck transportation of radioactive wastes can be expected through the Western Shoshone Nation's lands and the surrounding region, increasing the likelihood of an accident and the rapid dispersal to the environment of deadly, long-lived radioactive wastes; and,

WHEREAS, The presence of radioactive waste dumps in the region, and the publicity surrounding it, will severely harm the economy of the Western Shoshone and neighboring peoples; and,

WHEREAS, Over 4,500 local communities throughout the world, 25 nations; and the regions of the Antarctic, Latin America and the South Pacific have been declared nuclear free zones; and,

WHEREAS, The National Council of the Western Shoshone encourages the development of clean, renewable energy resources in order to create jobs that maintain the traditional Native American values of care-taking and balance with natural creation; and,

WHEREAS, The National Council of the Western Shoshone encourages research into radioactive waste neutralization techniques and demands the stabilization and or clean up, if possible, of existing radioactive waste on the lands of the Western Shoshone Nation;

NOW, THEREFORE

SECTION 1. BE IT ORDAINED BY THE WESTERN SHOSHONE NATIONAL COUNCIL, That the following declaration be added to made a part of the laws of the Western Shoshone Nation:

NUCLEAR FREE ZONE

DEFINITIONS,

FOR THE PURPOSES OF THIS ARTICLE, THE FOLLOWING DEFINITIONS APPLY:

"RADIOACTIVE MATERIALS" ARE ANY RADIOACTIVE WASTE PRODUCTS OR MATERIALS GENERATED, REFINED OR MADE RADIOACTIVE BY ANY UNITED STATES GOVERNMENT AGENCY OR PURSUANT TO FEDERAL OR STATE GOVERNMENT CONTRACT OR LICENSE AND INCLUDING THAT WHICH THE UNITED STATES NUCLEAR REGULATORY COMMISSION CLASSIFIED AS LOW-LEVEL RADIOACTIVE WASTE AS OF JANUARY 1, 1989, BUT WHICH MAY BE CLASSIFIED AS BELOW REGULATORY CONCERN WASTE AFTER THAT DATE.

"NUCLEAR WEAPON" IS ANY DEVICE, THE PURPOSES OF WHICH IS THE USE AS A WEAPON, A WEAPON PROTOTYPE, OR A WEAPON TEST DEVICE, THE INTENDED DETONATION OF WHICH RESULTS FROM THE ENERGY RELEASED BY FISSION AND/OR FUSION REACTIONS INVOLVING ATOMIC NUCLEI. "NUCLEAR WEAPON" INCLUDES THE WEAPONS GUIDANCE AND PROPULSION SYSTEM AND TRIGGERING MECHANISM, I.E., THE MEANS OF TRANSPORTING, BUILDING, PROPELLING, TRIGGERING OR DETONATING THE WEAPON, PROVIDED THAT SUCH MEANS IS DESTROYED OR RENDERED USELESS IN THE NORMAL TRANSPORTING, PROPELLING, TRIGGERING, OR DETONATION OF THE WEAPON.

"PERSON" MEANS A NATURAL PERSON, AS WELL AS A CORPORATION, INSTITUTION, OR OTHER ENTITY.

PROHIBITION OF STORAGE, USE OR DISPOSAL OF RADIOACTIVE MATERIALS.

EXCEPT AS SPECIFICALLY EXEMPTED IN THIS ARTICLE, NO PERSON SHALL IMPORT, STORE, INCINERATE, TREAT, PROCESS, OR DISPOSE OF RADIOACTIVE MATERIALS, FOR ANY PURPOSE, WITHIN THE LANDS OF THE WESTERN SHOSHONE NATION, OR WITHIN LAND FILLS OR INCINERATORS OWNED OR LICENSED BY THE WESTERN SHOSHONE NATION.

PROHIBITION OF NUCLEAR WEAPONS WORK.

NO PERSON SHALL KNOWINGLY, WITHIN THE LANDS OF THE WESTERN SHOSHONE NATION, DESIGN, TEST, PRODUCE, LAUNCH, MAINTAIN, OR STORE NUCLEAR WEAPONS OR COMPONENTS OF NUCLEAR WEAPONS.

PROHIBITION OF NUCLEAR REACTORS.

NO PERSON SHALL CONSTRUCT, OPERATE, A NUCLEAR REACTOR WITHIN THE LANDS OF THE WESTERN SHOSHONE NATION.

PROHIBITION OF URANIUM AND MILLING.

NO PERSON SHALL CONSTRUCT OR OPERATE A URANIUM MINE OR MILLING OPERATION WITHIN THE LANDS OF THE WESTERN SHOSHONE NATION.

MIGRATION OF RADIOACTIVE MATERIALS.

NO PERSON OR OTHER NATION SHALL ALLOW THE MIGRATION OF RADIOACTIVE MATERIALS FROM NEIGHBORING LANDS INTO THE LANDS OF THE WESTERN SHOSHONE NATION.

NUCLEAR FREE ZONE SIGNS

THE WESTERN SHOSHONE NATIONAL COUNCIL SHALL POST AND MAINTAIN APPROPRIATE SIGNS AT ALL RECOGNIZED ENTRANCES TO THE LANDS OF THE WESTERN SHOSHONE NATION, AT ENTRANCES TO THE YUCCA MOUNTAIN FACILITY AND THE NEVADA NUCLEAR TEST SITE, AND THE NATIONAL COUNCIL OFFICE IN CACTUS SPRINGS, PROCLAIMING THE WESTERN SHOSHONE NATION'S STATUS AS A NUCLEAR FREE ZONE.

ENFORCEMENT

EACH VIOLATION OF THIS SECTION SHALL BE PUNISHABLE BY A $1,000,000 FINE. EACH DAY OF VIOLATION SHALL BE DEEMED A SEPARATE VIOLATION. ENFORCEMENT WILL BE BY A DULY AUTHORIZED AGENT OF THE WESTERN SHOSHONE NATION.

THIS DECLARATION IS HEREBY ENACTED ON THIS 2ND DAY OF DECEMBER 1995 BY CONSENSUS OF THE WESTERN SHOSHONE NATIONAL COUNCIL.

RAYMOND D. YOWELL, CHIEF

ATTACHMENTS: BOUNDARY DESCRIPTION AND MAP OF NEWE SOGOBIA AS DEFINED BY THE WESTERN SHOSHONE NATIONAL COUNCIL.

Response
DOE acknowledges the concerns and position taken by the Western Shoshone National Council. The Department appreciates this participation.

5.1 (12586)
Comment - 010432 / 0002
I also believe that this is very likely to turn into permanent storage, because people do not want this stored around them.

Response
Although the spent nuclear fuel and high-level radioactive waste that would be placed in Yucca Mountain could be retrieved for more than 300 years, the repository is proposed as a permanent disposal site.

5.2 Support for the Proposed Action

5.2 (26)
Comment - 236 comments summarized
Commenters expressed broad general support for the Proposed Action to construct, operate and monitor, and eventually close a geologic repository at Yucca Mountain for the disposal of spent nuclear fuel and high-level radioactive waste. Commenters stated that they were in favor of the repository or that they did not want to burden future generations, or they cited one or more examples from a range of positive attributes associated with the repository. Other commenters expressed support for the Proposed Action by stating their opposition to the No-Action Alternative and the need to move forward with the proposed Yucca Mountain Repository. Commenters also expressed support for a Yucca Mountain Repository because utility companies need DOE to remove existing inventories of spent nuclear fuel from temporary storage at their powerplants--a process that ratepayers and utilities have been supporting with payments into the Nuclear Waste Fund. In addition, some commenters expressed support for a Yucca Mountain Repository and favored monitored retrievable storage as part of the operations at the Yucca Mountain site.

Response
DOE acknowledges that there is support for, as well as opposition to, the proposed repository at Yucca Mountain and the associated analyses presented in the EIS. Because of the large number of comments received in general support of the repository, DOE refers the commenters who have submitted comments summarized here to the discussion of issues at the beginning of this Comment-Response Document and to other comments and responses related to specific topics of interest (see the Comment-Response Document Table of Contents).

DOE considers the Proposed Action to be consistent with its responsibilities under the NWPA.

5.2 (10936)
Comment - EIS000479 / 0003
South Carolina has done its share for both the defense of the country and ensuring the safe disposal of most of the nation's commercial low-level radioactive waste. Failure to develop the site at Yucca Mountain could have an adverse effect on the work carried out at the Savannah River Site, as South Carolina is hesitant to continue accepting waste that has no clear path for final disposition.

Response
In accordance with the NWPA, DOE is conducting site characterization activities only at Yucca Mountain to determine its suitability as a potential repository for the Nation's spent nuclear fuel and high-level radioactive waste. The Department is carrying out the requirements of the Act in preparing this EIS, and in doing so, is also pursing the resolution to the problem of management of the existing and expected future inventory of spent nuclear fuel and high-level radioactive waste. The Department has allocated all Savannah River Site spent nuclear fuel and high-level radioactive waste to the Yucca Mountain Site if it is approved for development.

DOE is proceeding toward a site recommendation determination. Assuming that both the Secretary of Energy and the President recommend Yucca Mountain as the repository site, and Congress, if necessary, passes a resolution of repository siting approval, DOE would submit a License Application to the Nuclear Regulatory Commission and would expect to begin accepting spent nuclear fuel in 2010.

5.3 Support for the No-Action Alternative

5.3 (164)
Comment - 303 comments summarized
Commenters stated that spent nuclear fuel and high-level radioactive waste should be left where it is stored now or stored and disposed of in a manner that eliminates the need to transport it to a repository at Yucca Mountain. Many commenters support a No-Action Alternative that would keep spent nuclear fuel at the commercial reactor sites and in the states where the spent nuclear fuel and high-level radioactive waste is produced. Some commenters expressed a preference for monitored retrievable onsite storage. Other commenters expressed the belief that technological

advances in the future will allow better alternatives to a repository at Yucca Mountain and that radioactive waste should be left where it is until these technologies are available. Commenters also suggested that requiring the commercial generators to store spent nuclear fuel onsite would serve to stop production while forcing DOE and the utilities to find viable alternatives for energy production and safe disposal methods. Other commenters felt that leaving the material where it is would prevent taxpayers from bearing costs associated with the transportation and disposal of spent nuclear fuel and high-level radioactive waste.

Some commenters said that, because the EIS states that onsite storage is safe for hundreds if not thousands of years, spent nuclear fuel can remain at the sources until more definitive approaches to waste management are proven. These commenters believe that this would eliminate transportation risks. The commenters expressing support for leaving the waste where it is now stated the following: If spent nuclear fuel is safe left on the sites for the next 100 years, and the national waste management program is intended to protect human health and safety, then leaving the waste at the generator sites and pursuing other management options have merit; keep wastes on the sites until the consequences of operating a repository are completely understood; it is better if wastes are in peoples' backyards so it is not "out of sight, out of mind"; DOE should take possession of and manage the waste on the generator sites; the No-Action Alternative is preferable because it is too risky to transport spent nuclear fuel and high-level radioactive waste across the country; nothing bad has happened storing it where it is now, so why add the risk of transportation to Yucca Mountain; if the casks for Yucca Mountain are so safe, they can be used at the generator sites instead; entomb radioactive waste where it was created; and make the cooling ponds bigger at the nuclear powerplants. Other commenters stated that generator sites are already contaminated, so removing wastes from the generators would still leave radioactive sites; storing spent nuclear fuel and high-level radioactive waste at the scattered locations represented by the 77 separate commercial and DOE facilities decreases the severity of possible problems from storage accidents; and DOE should spend the money obligated for Yucca Mountain to build safe storage facilities on the sites where the property is already contaminated, thus avoiding the expense and dangers of transporting spent nuclear fuel and high-level radioactive waste across the country.

Commenters in favor of leaving wastes in place in monitored above-ground storage provided such Comments as the following: onsite storage locations already have trained personnel; above-ground storage can be monitored for the foreseeable future; if something happened to radioactive wastes stored above ground, it would be more convenient than an underground repository to make needed repairs or clean up leaks; the generally low population density surrounding the commercial powerplants would minimize accident consequences; DOE should accept responsibility for above-ground storage at the generator sites; spent nuclear fuel should be stored on site in the containers designed for use at Yucca Mountain; and above-ground storage would allow time to conduct research for better long-term plans, as well as time for wastes to cool and short-lived radionuclides to decay, thereby reducing the radioactive content of waste to be managed. A few commenters suggested storing spent nuclear fuel in the reactor containment building after closure of the powerplant.

Response

DOE acknowledges that onsite storage systems, such as spent nuclear fuel storage pools, have been operated for several decades without undue risk to the general public or nuclear powerplant personnel. The majority of these systems are wet and, by design, active systems. Such storage systems require continuous technical and management oversight of process equipment (such as water-cooling, water-treatment, and leak-detection systems). More recently, some commercial utilities have constructed dry storage facilities. While these facilities do not require active cooling systems, they must be routinely monitored to ensure compliance with regulatory environmental protection standards. In addition, 24-hour security measures must be provided to safeguard the stored material.

While commenters are correct that the present storage sites can continue to store spent nuclear fuel and high-level radioactive waste safely in the short term, the NWPA requires DOE to evaluate the Yucca Mountain site for long-term disposal of these materials and then to proceed with disposal if the site was recommended and approved for development of a repository. Although the NWPA does not direct DOE to examine continuing storage at existing sites, DOE provided the No-Action Alternative in the EIS as a basis for comparison with the Proposed Action. In the event the Yucca Mountain site was not approved, DOE would prepare a report to Congress, as required by the NWPA, with its recommendations for further action to ensure safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for any new legislative authority. Under any future course that would include continued storage, DOE would have an obligation to continue managing DOE spent nuclear fuel and high-level radioactive waste in a manner that protects public health and safety and the environment. The issues and

concerns expressed by the commenters represent the range of factors that would be considered in future recommendations, including transportation requirements. However, the course that Congress, DOE, and the commercial utilities would take if Yucca Mountain was not approved for repository development is uncertain.

Chapter 7 of the EIS provides a discussion of the No-Action Alternative and estimates of the potential environmental impacts of continued storage at the generator sites (for example, see Section 7.2.1.7.3 for the expected radiation exposure from continued long-term storage). Chapter 6 of the EIS provides estimates of transportation-related impacts. These assessments include a range of scenarios that include "cooler," or aged spent nuclear fuel. It is true that, as spent nuclear fuel and high-level radioactive waste age, the radioactivity of these materials decreases. However, most of the 72 commercial nuclear facilities could continue to accumulate freshly irradiated spent nuclear fuels for decades into the future. DOE has no authority over the operation of the Nation's commercial nuclear powerplants. The role the nuclear powerplants will play in the future of the Nation depends on the relicensing of such powerplants by the NRC and future power generation decisions made by each commercial utility. DOE recognizes, as do the commenters, that as nuclear powerplants continue to operate, they will continue to produce spent nuclear fuel.

With regard to possible redirection of monies contained in the Nuclear Waste Fund for development of alternative sources of energy or development of new technologies for waste management, expenditures from the Nuclear Waste Fund are exclusively for the purposes specified in the Nuclear Waste Policy Act of 1982, such as site characterization.

Congress has directed DOE to study accelerator transmutation of radioactive waste, although such research is not funded by the Nuclear Waste Fund. However, even if transmutation becomes a practical technology, a repository would still be an essential element of the nuclear fuel cycle because significant quantities of highly radioactive, long-lived materials would remain. Therefore, the Department does not recommend abandoning the Nation's current waste management strategies.

5.3 (6523)
Comment - EIS001380 / 0001
The absolute most compelling reason why I favor the NO ACTION option is that I, as a citizen should not have to bear additional costs to transport and store at Yucca Mountain, NV commercial nuclear power plant wastes. These costs could easily have been anticipated and budgeted for by the industry. It seems that having the spent fuel rods kept on site in relatively small amounts (compared to concentrating everything at Yucca Mountain), where they can be monitored, makes good sense. I believe there was a rush to judgment by Congress, probably based on nuclear power industry and governmental agency lobbying, for the central U.S. site.

Response
The "Findings" section of the Nuclear Waste Policy Act of 1982 states that "while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel."

Section 302 the Nuclear Waste Policy Act of 1982 states that "in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste or spent nuclear fuel involved as provided in this subtitle." Since the passage of the Act in 1982, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for high-level waste and spent nuclear fuel. By the end of Fiscal Year 1999 (September 30, 1999), the program had spent approximately $6 billion for the specified purposes. As reported in the *Report on Assessment of Fee Adequacy Based on FY 1999 Total System Life Cycle Cost Update* (DIRS 152076-CRWMS M&O 1999), the Nuclear Waste Fund investments had a market value of $8.6 billion by September 30, 1998, due to accrued interest on the funds.

DOE periodically assesses the adequacy of the Nuclear Waste Fund, and to date has always found that the fund is adequate to pay for investigations, design, licensing, operating, monitoring, and closing a repository. Taxpayers would bear some of the cost of the repository because approximately 30 percent of the cost of the repository is attributed to disposal of spent nuclear fuel and high-level radioactive waste from National defense and research programs.

In passing the NWPA, Congress established that the Federal Government is responsible for the permanent disposal of spent nuclear fuel and high-level radioactive waste. To that end, Congress directed the Secretary of Energy to determine whether to recommend to the President that the Yucca Mountain site be approved for development of a repository for the permanent disposal of these materials. This Act makes it the policy of the U.S. Government to determine whether geologic disposal at Yucca Mountain is safe. The Act does not direct DOE to examine any other methods of storage or disposal, nor does it direct DOE to examine continuing storage at existing sites.

5.4 Cost of Proposed Action or No-Action Alternative

5.4 (219)
Comment - 56 comments summarized
Commenters stated that this project is, at best, very expensive and risky, and question why the Federal Government is taking the responsibility for commercial spent nuclear fuel, "bailing out" the nuclear power industry. Commenters stated that utilities were trying to get taxpayers to shoulder the cost of disposal of spent nuclear fuel, and that they are pressuring Congress to avoid the cost burden and responsibility for their radioactive waste. Commenters called the use of taxes to pay for the development of a repository a subsidy for the utility industry, and they do not believe that taxpayers should get "stuck" with the bill that the nuclear industry, utility shareholders, municipalities, and others that directly benefit from nuclear power generation should pay. Other commenters stated that the responsibility for the waste should return to the states. Commenters expressed a concern that the money be spent wisely. Commenters also expressed concerns that taxpayers would have to accept cost and liability for accidents or other impacts that could occur in relation to transportation of spent nuclear fuel and high-level radioactive waste or operation of the repository. Commenters stated it was not clear why utilities should be allowed to continue to produce waste if they are not able to safely store the waste they have already produced.

Response
As described below, approximately 70 percent of the estimated repository-related costs would be funded by commercial nuclear power generating utilities via the Nuclear Waste Fund. The Nuclear Waste Fund would cover the costs associated with disposal of commercial spent nuclear fuel. The remaining 30 percent would be funded by taxpayers, which would cover the Federal Government's portion of the costs related to the disposal of high-level radioactive waste, spent nuclear fuel from the Naval Nuclear Propulsion Program, and spent nuclear fuel from defense and research reactors.

In the "Findings" section of the Nuclear Waste Policy Act of 1982, Congress stated that "...while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel..." Since the passage of the Act, nuclear power generating utilities and their ratepayers have paid about $9.8 billion into the Nuclear Waste Fund to pay for development of a repository. Expenditures from the Fund have been used exclusively for the purposes specified in the Act, such as site characterization, facility design, and site recommendation studies.

Section 302 of the Nuclear Waste Policy Act of 1982 specifies that funding for disposal of commercial spent nuclear fuel is provided by payment of fees to the Secretary of Energy by the generators of electricity from nuclear power plants. Equivalent amounts are paid by the Federal Government to cover costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States. Utility fees and Federal appropriations are required to be sufficient to offset expenditures associated with repository studies, transportation, and operations and closure of a repository, as determined by an annual review by the Secretary of Energy. The utility fees and Federally funded share are subject to change based on a required annual review of adequacy. The utility fees go into the Nuclear Waste Fund, which is administered by the Secretary of the Treasury. Excess funds for any given year, as determined by the Secretary of Energy, are invested in obligations of the United States and earn interest. The Secretary of Energy makes expenditures from the Nuclear Waste Fund subject to appropriations by Congress. Congress also appropriates the funds from taxpayer revenues to cover the cost of disposing spent nuclear fuel (including spent nuclear fuel from foreign countries subject to the conditions of the Nuclear Non-Proliferation Act of 1978 or with Presidential approval) and high-level radioactive waste generated or owned by the United States. These materials were produced primarily at DOE defense production facilities. As noted above,

taxpayers fund only the management and disposal of DOE produced and owned materials; disposal of commercial spent nuclear fuel is funded by the generators. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. This percentage is based on the space required to dispose of defense-related spent nuclear fuel and high-level radioactive waste. Thus, the commercial utilities are "paying their fair share" of repository program costs along with taxpayers.

As reported in *Nuclear Waste Fund Fee Adequacy: An Assessment*, the nuclear waste fund investments had a market value of $8.5 billion as of September 30, 1999 (DIRS 153257-DOE 2001). The analysis in the report found that the current fee of 1 mil (one-tenth of one cent) per kilowatt-hour charged to generators of commercial spent nuclear fuel is adequate to cover projected disposal expenses (including costs associated with packaging and transportation) and recommended that the fee remain unchanged.

With regard to what has been accomplished to date, characterization activities at the Yucca Mountain site have yielded sufficient data to determine the suitability for a recommendation for further development. DOE is proceeding as expeditiously as possible toward making a determination on whether to recommend that the President approve the site. If the site is recommended and the President accepts the recommendation and Congress passes a resolution of repository siting approval, if necessary, DOE plans to submit a License Application to the NRC to begin accepting spent nuclear fuel and high-level radioactive waste in 2010.

As discussed in Section 9.1.3 of the EIS, DOE continues to evaluate new technologies (such as accelerator transmutation of waste) to reduce the potential effects of the repository project. However, DOE cannot expend any funds not authorized and appropriated by Congress. The broader effort advocated by the some commenters would require appropriation of funds by Congress, and except on a limited basis, funds for investigation of alternative methods of management of spent nuclear fuel and high-level radioactive waste have not been appropriated.

In 1988, the Price-Anderson Act was amended to provide liability coverage to DOE activities (including transportation) involving spent nuclear fuel, high-level radioactive waste, and transuranic waste. The Price-Anderson Act provides liability coverage for DOE and commercial activities operating under a license from the Nuclear Regulatory Commission by establishing a system of private insurance and Federal indemnification that generally ensures that up to $9.43 billion is available to compensate for damages suffered by the public, regardless of who causes the damage. Payment would be from Federal Government funds or, if public liability arose out of nuclear waste activities funded by the Nuclear Waste fund (for example, activities at a geologic repository), from the Nuclear Waste Fund. Appendix M of the Final EIS contains more information.

With regard to continued production of spent nuclear fuel, commercial nuclear powerplants currently produce approximately 20 percent of the total electric power generated nationwide. The role nuclear powerplants will play in the future of the Nation depends in part on the relicensing and future power generation decisions made by each commercial utility, pursuant to the regulations of the Nuclear Regulatory Commission. As long as nuclear powerplants continue to operate, they will continue to produce spent nuclear fuel. If a repository becomes operational and meets its volume limitation, the issues of where and how to manage additional spent nuclear fuel would require decisions on the national level.

With regard to safe storage, the Nuclear Regulatory Commission determined, through extensive safety reviews prior to issuance of operating licenses, that commercial nuclear powerplants have adequately designed facilities and implementing procedures to ensure safe onsite storage of spent nuclear fuel. In addition, with the Waste Confidence Findings (10 CFR 51.23), the Commission determined " ... that, if necessary, spent nuclear fuel generated at any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license of that reactor) at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations."

5.4 (248)

Comment - 4 comments summarized

Commenters recommended that the alternatives presented in the Draft EIS should focus on a comparative presentation of benefits (such as risk minimization) and cost of various alternatives for repository and related transportation system development and operation to aid DOE and congressional decisionmakers. Commenters also

suggested that the presentation include a discussion of risk management benefits and the costs of the use alternative construction materials. Another commenter suggested that additional information be provided related to the cost associated with the waste staging facility.

Response
With regard to estimated project costs, DOE believes it appropriate to provide the details of the cost estimates in reference documents; therefore, the cost discussions in the EIS are brief. The estimated cost information presented in Final EIS Section 2.1.5 was provided as a point of comparison between the Proposed Action and the No-Action Alternative. The cost estimate presented in this Final EIS has been revised to reflect design updates (including various construction options and the staging facility). The transportation information presented is independent of design updates and is the highest estimated cost factoring in mode and route options. Differences in Nevada transportation cost estimates were presented in Draft EIS Section S.4.2.2. These cost estimates have been updated and incorporated in Sections S.4.2.2 and 6.3 of the Final EIS.

The discussion in the EIS with regard to potential impacts (environmental and economic) that could result from either the Proposed Action or the No-Action Alternative provides information for the Secretary of Energy so that a determination can be made whether to recommend Yucca Mountain as the site for the Nation's first monitored geologic repository. In making that determination, the Secretary would also consider not only the environmental impacts and the costs and benefits of not only the Proposed Action identified in the EIS, but also other technical, economic, and national policy factors and provided in the Science and Engineering Report (DIRS 153849-DOE 2001) and as dictated by the NWPA.

With regard to the risk management benefits and costs associated with alternative construction materials, commenters are referred to Section 10.3.1 of the EIS, which discusses irreversible or irretrievable commitments of resources including construction materials. Commenters are also referred to Section 10.2 of the EIS, which describes and compares the relationship of resource use to long-term productivity.

5.4 (427)
Comment - EIS000103 / 0001
My report is on transportation. In the summary of the EIS and the VA [Viability Assessment], you mention that there will not only be one repository but two, cost 25 billion for the first and 35 I put in for the record, but people do not realize that these numbers do not represent anything more than the cost for the repositories.

It doesn't state how much transportation, how much this, how that will do, and that must be made clear.

Response
DOE believes the comment refers to Section S.2.2.3 in the EIS Summary, which notes that the Nuclear Waste Policy Act, as amended, directs that the amount of spent nuclear fuel and high-level radioactive waste for repository disposal cannot exceed 70,000 metric tons of heavy metal (MTHM) until a second repository is in operation. This is why DOE structured the Proposed Action of the EIS to analyze the disposal of 70,000 MTHM, while disposal of additional reasonably foreseeable waste inventories exceeding 70,000 MTHM are analyzed as part of cumulative impacts (see Chapter 8 of the EIS). Legislative action would be necessary before DOE could dispose of more than 70,000 MTHM in a Yucca Mountain Repository unless a second repository was in operation. At present, there are no plans or ongoing activities associated with a second repository site. The NWPA limited ongoing characterization and consideration to the Yucca Mountain site. Section 161(a) of the NWPA states, "The Secretary [of Energy] may not conduct site-specific activities with respect to a second repository unless Congress has specifically authorized and appropriated funds for such activities."

Section 2.1.5 of the EIS presents cost estimates for the proposed Yucca Mountain Repository (including costs for transportation, repository development, construction, operation and monitoring, and closure). It also includes costs of waste acceptance, storage, and national transportation; Nevada transportation; program integration (quality assurance, human resources and administration, Nuclear Regulatory Commission fees, and Nuclear Waste Technical Review Board funding); and program institutional costs (payments-equal-to-taxes, benefits payments to the State of Nevada, transportation training assistance, and other financial assistance payments). Section 2.2.3 presents cost estimates for the No-Action Alternative. DOE based these estimates on the best available data and standard cost-estimating techniques.

DOE developed these estimates for comparative purposes and to aid decisionmakers in discriminating between the Proposed Action and the No-Action Alternative discussed in the EIS. The estimates do not include costs before early 2002, when DOE anticipates a decision on repository development, or the costs for siting and characterization of Yucca Mountain. The No-Action estimate includes only costs that differ from those of the Proposed Action estimate. For example, it does not include storage costs until 2010, when a repository (if approved) would first accept spent nuclear fuel and high-level radioactive waste because storage would be necessary until then under both the Proposed Action and the No-Action Alternative. The No-Action estimate is based on and consistent with industry experience for dry storage of spent nuclear fuel and high-level radioactive waste.

5.4 (1671)
Comment - EIS000461 / 0005
They came out with the idea it was too cheap to meter. That's because they never thought about opposition. They never asked the general public what they would think about having this stuff for and thousands of years to take care of high-level radioactive waste out there. But now you've got it. Now you're worried about it going up. That's too bad. You should have thought about that ahead of time. You are chasing the almighty dollar. It's not our fault you're spending too much damn money on something nobody really wants. That's the idea you have to take into account.

Response
Thank you for your comment.

5.4 (1738)
Comment - EIS001837 / 0031
The only funds that should have been spent are with regard to this project are, perhaps, the funds to assess the health and safety risk of producing nuclear waste. This study would have shown that nuclear plants must be immediately replaced by safe forms of energy production such as hydrogen fuel from green algae, wind and solar.

Response
Under the Nuclear Waste Policy Act of 1982, the policy of this country is for DOE to dispose of spent nuclear fuel and high-level radioactive waste by geologic disposal. Section 114(f)(1) of the Act specifically requires the EIS, stating in part that "A final environmental impact statement prepared by the Secretary under such Act shall accompany any recommendation to the President to approve a site for a repository." In addition, the Act requires the commercial generators of spent nuclear fuel (that is, utilities) to pay the costs of disposal through a fee of 1 mil (one tenth of one cent) for every kilowatt-hour of electricity generated at commercial nuclear plants. Equivalent amounts are paid by the Federal Government to cover similar costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States. In short, preparation of and funding for this EIS, as well as other activities of the Yucca Mountain Project, are specified by and consistent with the NWPA. Speculation regarding the phaseout of nuclear power and replacement with alternative energy sources is beyond the scope of this EIS.

5.4 (2257)
Comment - EIS001256 / 0010
In cost-benefit analyses, the DEIS fails to include all the cost to the affected populations and to the environment due to potential failures of control. If control is not maintained, how would people and the environment be affected?

Response
DOE assumes that this Comment, when referring to "failures of control," means a loss of institutional control. Chapter 5 of the EIS addresses potential human-health impacts from radioactive and nonradioactive materials that the proposed repository at Yucca Mountain could release to the environment during the first 10,000 years after closure. As indicated in Section 2.4, DOE does not expect the long-term consequences to the public and the environment after repository closure and decommissioning (50 to more than 300 years after waste emplacement) to be significant.

Section 2.1.2.3 of the EIS and Science and Engineering Report Sections 2.5, 4.1.5, and 4.6 discuss repository closure activities, including the use of institutional controls such as land and warning systems to limit or prevent intentional and unintentional activities in and around the closed repository. Monuments would be designed,

fabricated, and placed to be as permanent as practicable. The analysis of potential environmental impacts contained in the EIS did not take credit for the effectiveness of these institutional controls. Section 5.7.1 of the EIS examines the potential environmental impacts that might result from an involuntary human intrusion into the repository (such as by a drilling operation). After closure, DOE would have the responsibility of maintaining institutional control over the repository, as required by the Energy Policy Act of 1992. Neither the extent nor the length of this regulatory requirement is well defined at present. However, consistent with the Nuclear Regulatory Commission regulations [10 CFR Part 63, particularly Section 63.102(k)], DOE would maintain appropriate institutional controls for as long as possible. However, as the Nuclear Regulatory Commission has also noted, although designs could attempt to warn potential intruders or mitigate effects associated with intrusion that does occur, they could not remove the potential for intrusion to occur.

Cost estimates of the No-Action Alternative are presented in Section 2.2.3 of the EIS and estimates of the Proposed Action are presented in Section 2.1.5. However, a specific cost-benefit analysis has not been performed because it is not necessary to support current decisionmaking. It is the Department's opinion that sufficient information about potential impacts to the public health, safety, and the environment is provided in the EIS to support current decisionmaking.

5.4 (2406)
Comment - EIS000674 / 0007
Finally, remember my comments about costs this morning. What's really bogus about the treatment of heavy-haul here, is it's probably the case that heavy-haul is a lot more expensive and has a lot more adverse impacts than a rail spur. If DOE had done their job here, I'd be here today having an honest debate with them on the issue that's pressing Mike Baughman. Which of those rail spurs looks more valid? Which has lower risk? But in fact, because the DEIS has thrown out all this garbage to make heavy-haul trucks look feasible, we need to work on that one first.

Response
Sections 6.3.2 and 6.3.3 of the Draft EIS discussed estimated impacts associated with Nevada rail transportation implementing alternatives (five rail corridors) and heavy-haul truck transportation implementing alternatives (five heavy-haul truck routes), respectively. Section S.4.2.2 in the Draft EIS Summary described estimated impacts and costs for the rail and heavy-haul truck implementing alternatives. Depending on the corridor or route selected, estimated rail and heavy-haul truck corridor costs would range from $258 million to $801 million and from $358 million to $619 million, respectively. DOE has noted the commenter's preference for rail over heavy-haul truck. Revised cost estimates are provided in Sections S.4.2.2 and 6.3 of the Final EIS for rail and heavy-haul truck.

5.4 (3102)
Comment - EIS000361 / 0004
The cost to ensure that the rural areas would be able to transport the radioactive waste would probably exceed the no-action alternative. Urban areas are too populated to transport it through and around.

Taking care of the radioactivity exposed would be costly. Finding alternative ways, although costly initially, would probably be less costly in the long run for two reasons: (1) The money that the commercial reactors set aside could pay for most of the cost; and, (2) When new uses are found, new money would be brought in and eventually the alternative pays for itself.

Finally, the cost of cleanup at the nuclear test site; cost to build new routes, rail or roads; and cost to clean up a radioactive accident would probably far exceed finding alternative ways to reuse this radioactive waste.

Response
The cost of transportation is included in the Proposed Action cost estimate in Section 2.1.5 of the EIS. Section 2.2.3 discusses the estimated cost of the No-Action Alternative.
The passage of the Nuclear Waste Policy Act of 1982 defined the Nation's policy for the disposition of spent nuclear fuel and high-level radioactive waste to be geologic disposal. Section 113 of the Act states that the EIS need not consider the need for a repository or alternatives to geologic disposal. Therefore, this EIS analyzes neither the environmental impacts nor the costs of alternative ways to reuse spent nuclear fuel or high-level radioactive waste. Section 2.1.5 of the EIS discusses estimated costs of the Proposed Action, including the costs of transportation, repository development, construction, operation and monitoring, and closure. As discussed in Section 4.1.8 in

relation to potential accidents at the repository and in Section 6.2.4 in relation to potential transportation accidents, the probability of release of significant quantities of radioactive materials would be very low. Therefore, cleanup costs of such accidents are not a factor in the cost estimates.

5.4 (4278)
Comment - EIS001160 / 0086
Page 2-58: It is not clear whether the costs shown in [Section 2.1.5] include expenditures on the Yucca Mountain Project to date. The table should explicitly show expenditures to date and projected expenditures in the future.

Response
The estimated costs of the Proposed Action listed in Section 2.1.5 of the EIS and the estimated costs of the No-Action Alternative listed in Section 2.2.3 are for comparative purposes only and cover the period from 2002 when a decision on whether to proceed with a Yucca Mountain Repository is expected. DOE anticipates before that time, activities for both the Proposed Action and the No-Action Alternatives will continue simultaneously. In addition, the No-Action costs do not include continued storage of spent nuclear fuel and high-level radioactive waste from the period from 2002 until shipments to a potential repository would begin in 2010 because continued storage would occur during that period under both the Proposed Action and the No-Action Alternative. DOE has clarified the text and tables to indicate that the cost estimates are for comparative purposes only.

DOE has estimated the total system life-cycle cost of a Yucca Mountain Repository flexible design in its report *Life-Cycle Cost Analysis for Repository Flexible Design Concepts* (DIRS 156900-DOE 2001). Historic costs (in 2001 dollars) from 1983 through 2001 were $8.8 billion. Future costs (in 2001 dollars) are estimated to range from $42.8 billion to $57.4 billion (see Section 2.1.5 of the EIS).

5.4 (4319)
Comment - EIS001210 / 0002
Since enactment of the Nuclear Waste Policy Act of 1982, the nation's ratepayers have paid more than $16 billion into the Nuclear Waste Fund for DOE to construct, operate and monitor a repository for high-level nuclear waste from commercial power plants across the nation. Thus far, DOE has spent more than $6 billion of these ratepayer contributions to characterize a geologic repository at Yucca Mountain.

Response
Thank you for your Comment.

5.4 (4320)
Comment - EIS001210 / 0003
Under either Scenario 1 or Scenario 2, the estimated cost of the No-Action Alternative, which ranges from $51.5 billion to approximately $5 trillion, greatly exceeds the estimated cost of $28.8 billion for DOE to fulfill its obligations. Furthermore, DOE's estimates in the DEIS do not take into account the total costs resulting from the No-Action Alternative. The potential costs of the premature shutdown of nuclear power plants and the consequent loss of 22 percent of the nation's electric supply should also be considered.

It would be inconceivable for DOE to pursue a No-Action Alternative and indefinitely strand high-level nuclear waste at plant sites at such high cost to the nation's ratepayers and potentially to the environment.

Response
The Department agrees with the commenter that costs associated with continued long-term storage of spent nuclear fuel and high-level radioactive waste at the generator sites would likely exceed the currently projected costs for design, construction, and eventual closure of the proposed repository. The Department also agrees with the commenter and the Nuclear Regulatory Commission that failure to develop a viable repository could result in the shutdown of operating commercial nuclear reactors before operating license expiration due to the lack of adequate spent nuclear fuel storage capacity, with an attendant loss of electric power generation for that area or region. While the Department recognizes that many environmental impacts could result from shutting down commercial nuclear reactors, a full evaluation of such impacts (such as generation of additional air pollution from a replacement sources of electricity) would be highly speculative because the choice of a replacement power source (importation, solar, gas, coal, etc.) would be regionally dependent and the utilities would make the ultimate decision. Because the

determination of local and regional impacts resulting from the loss of electric generating capacity for the shutdown reactors, including the potential for increased prices, would be speculative, the EIS does not include a detailed discussion.

By including long-term onsite storage as part of the No-Action Alternative, DOE is not positing conditions that would actually occur, nor is DOE suggesting that continued onsite storage represents an acceptable alternative to a repository at Yucca Mountain. In fact, DOE believes that both No-Action scenarios are unlikely, even though continued onsite storage of high-level radioactive waste and spent nuclear fuel would be necessary for some time if the Yucca Mountain site did not receive approval. If DOE did not recommend Yucca Mountain, it would, as directed by the NWPA [Section 113(c)(3)], prepare a report to Congress with its recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority.

5.4 (4605)
Comment - EIS001430 / 0002
I support the Preferred Alternative to proceed with the Proposed Action for 70,000 metric tons of heavy metal as described in section 2.6 of the draft EIS. This is partly because the short-term (about 100 years) impacts are small and the cost of the Proposed Action ($28.8 billion) is less than that of the No-Action Alternative ($51.5 to $56.7 billion).

Response
Thank you for your comment. The Final EIS provides updated cost information in Section 2.1.5.

5.4 (4638)
Comment - EIS001396 / 0003
The burden of paying for the mess made by nuclear waste generators will fall on American taxpayers. The Nuclear Waste Fund was created to pay for permanent storage of this waste when a suitable technology is found. The backup storage plan would allow for the absolutely needless and terribly risky transportation of nuclear waste before final approval of a permanent repository. Further, the costs associated with transporting the waste and cleaning up the accidents will be borne by taxpayers. Continued industry pursuit of interim storage schemes could leave a funding gap of many billions of dollars, leaving taxpayers holding the bag for the far more expensive job of permanent storage.

Response
The commenter implies that the Yucca Mountain Repository is a backup or interim plan for the disposition of spent nuclear fuel and high-level radioactive waste. The intent of the NWPA is to establish a geologic repository as a permanent disposal site. Consequently, this EIS does not characterize or analyze Yucca Mountain as an interim storage site.

5.4 (4698)
Comment - EIS001438 / 0002
Decades ago, DOE studies concluded that storing spent nuclear reactor fuel away from individual reactors would be fifty six percent more expensive than keeping the radioactive wastes on site. These billions of dollars might better be spent on research to improve reactor safety and towards the development of controlled fusion – in this century.

Response
The comparative cost estimate in Section 2.1.5 of the Final EIS indicates that the cost of constructing, operating and monitoring, and closing a repository at Yucca Mountain would range from approximately $42.8 billion to $57.4 billion (in 2001 dollars) from 2002 forward. The comparative No-Action Alternative cost estimate for the period from 2002 through 2110 would be between $55.7 billion to $61.3 billion; No-Action costs thereafter would be as much as $570 million per year. Common costs for the Proposed Action and No-Action Alternative are not included in either estimate (for example, the cost of continued storage of spent nuclear fuel from 2002 until initial receipt at a repository in 2010).

Congress determined through passage of the NWPA that the Federal Government has the responsibility to dispose of spent nuclear fuel and high-level radioactive waste permanently to protect the public health and safety and the

environment. To accomplish this objective, the Act directed the Department to characterize and evaluate the Yucca Mountain site and determine whether it is appropriate to make a recommendation to the President to develop the site as a repository.

The Nuclear Waste Policy Act of 1982 specifies that the generators and owners of spent nuclear fuel and high-level radioactive waste should pay for its disposal. Since the Act's passage, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for disposal of spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999 (September), the program had spent approximately $6 billion. DOE has used these expenditures exclusively for the purposes specified in the NWPA; they are not available for other research such as development of controlled fusion.

Regarding evaluation of new technologies, DOE acknowledges that new technologies for waste management could be developed in the future. In fact, at the direction of Congress, DOE is studying accelerator transmutation of radioactive waste. The accelerator transmutation process involves state-of-the-art principles, some of which are not yet proven. However, even if this technology becomes feasible, a repository is an essential element of the nuclear fuel cycle because significant quantities of highly radioactive, long-lived materials would remain (see the discussion in Section 9.1.3 of EIS).

5.4 (4745)
Comment - EIS001450 / 0006
The question of long-term funding for stewardship of the site should also be addressed in the final EIS.

Response
As described below, approximately 70 percent of the estimated repository-related costs would be funded by commercial nuclear power generating utilities via the Nuclear Waste Fund. The Nuclear Waste Fund would cover the costs associated with disposal of commercial spent nuclear fuel. The remaining 30 percent would be funded by taxpayers, which would cover the Federal Government's portion of the costs related to the disposal of high-level radioactive waste, spent nuclear fuel from the Naval Nuclear Propulsion Program, and spent nuclear fuel from defense and research reactors.

The Nuclear Waste Policy Act of 1982 states that "...while the Federal Government has the responsibility to provide for the permanent disposal of high-level radioactive waste and such spent nuclear fuel as may be disposed of in order to protect the public health and safety and the environment, the costs of such disposal should be the responsibility of the generators and owners of such waste and spent fuel...." Since passage of the Act, nuclear power generating utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for high-level radioactive waste and spent nuclear fuel. Taxpayers, however, also bear some of the costs of the repository, since approximately 30 percent of the cost of the repository is attributed to disposal of spent nuclear fuel and high-level radioactive waste from the United States' defense and research programs. Congress annually appropriates funds from taxpayer revenues to cover costs of disposing of this spent nuclear fuel and high-level radioactive waste. DOE periodically assesses the adequacy of the Nuclear Waste Fund and has always found that the fund is adequate to pay for investigating, designing, licensing, operating and monitoring, and closing a repository. This would include costs associated with long-term stewardship of the site. DOE believes that our elected representatives, having directed the Federal Government to embark on this project, would continue to fund it adequately to protect the health and safety of the public and the environment.

5.4 (4865)
Comment - EIS000337 / 0003
This DEIS attempts to paint a picture that the proposed action is the less costly by use of smoke and mirrors. A few months ago the reported costs for this project was over 60 billion, not including the cost of monitoring for thousands of years. The report now states the costs are 28.8 billion and would vary somewhat (pg. 2-59 1st par.) How much is "somewhat"? What is the track record for DOE in bringing projects within budget. They speak to all other areas of this project but have no data on how well they have managed past projects. DOE, as expected, priced the No-Action Alternative in the 50 billion range for the first 100 years. In this cost they included the decommissioning of Yucca Mountain.

Response
DOE based the cost estimates for development of a Yucca Mountain Repository in Section 2.1.5 and for the No-Action Alternative in Section 2.2.3 on the best available data and analysis techniques. The estimates are, however, for comparative purposes and as such do not include costs up to early 2002 when DOE anticipates a decision regarding future development of a Yucca Mountain Repository. Costs up to that point would be the same for both the Proposed Action and the No-Action Alternative.

DOE is unaware of a cost estimate of more than $60 billion for the project. However, *Life Cycle Cost Analysis for Repository Flexible Design Concepts* (DIRS 156900-DOE 2001) projected a total system life-cycle cost (in 2001 dollars) ranging from approximately $43 billion for the higher-temperature operating mode and from approximately $49 billion to $57 billion for the range of lower-temperature operating modes. Refer to Section 2.1.5 of the EIS for additional information.

The variation of costs mentioned in the comment would be due primarily to differences among the thermal load scenario selected for the repository design. Going from high thermal load to low thermal load would have increased the estimate by approximately 13 percent (DIRS 104980-CRWMS M&O 1999). The cost of decommissioning in the No-Action Alternative is not the cost of decommissioning a finished repository but rather the cost of dismantling current facilities associated with scientific studies to characterize the site and for reclamation of the site.

DOE has updated the EIS repository cost estimate in Section 2.1.5 of the EIS based on the latest information available for a flexible repository design (range of operating modes from higher- to lower-temperature) that includes features such as drip shields, a more robust waste package, and blending of commercial spent nuclear fuel to create a more uniform heat output from waste packages. Details of the updated cost estimates are available for review in the latest EIS cost report. In addition, clarification has been added that this cost estimate is only for comparison to the No-Action Alternative cost estimate. Costs prior to 2002 are reported for completeness.

5.4 (5428)
Comment - EIS001887 / 0127
Page 2-67; Section 2.2.3 - No-Action Alternative Costs

This cost analysis is of no substantive value because, as stated above, neither of the No-Action Alternative scenarios would ever be implemented. Therefore, any cost analysis or comparison in this Draft EIS is not relevant.

Response
As discussed in Chapter 7 of the EIS, DOE agrees that neither of the No-Action scenarios would be likely to occur if there was a decision not to construct a repository at Yucca Mountain. DOE disagrees, however, that the No-Action cost estimate is of no substantive value. Just as the environmental impact analysis provides an environmental impact basis for comparison to the Proposed Action, the cost estimate provides a basis for cost comparison.

5.4 (5439)
Comment - EIS001887 / 0134
Page 2-74; Section 2.4.2 - Short-Term Impacts of Repository Construction, Operation and Monitoring, and Closure

The Draft EIS states that the "estimated short-term (to 100 years) costs for the Proposed Action would be about $29 billion, and those for the No-Action Alternative would be as much as $57 billion for the same period." This statement is not only inaccurate, but gratuitous. As shown in Attachment T, the actual costs for implementing the Proposed Action will be almost $54 billion, even without many of the costly engineered fixes and alternatives that DOE has added to the project in the past two years. Furthermore, the analysis of the unrealistic No-Action Alternative scenarios provides no basis for comparison with the Proposed Action. The cost of storing spent fuel and HLW at generator sites, in the absence of a repository or central storage facility, would be closer to $4 to $5 billion (see discussion of on-site storage in Attachment T).

Response
DOE based the repository and No-Action cost estimates in Sections 2.1.5 and 2.2.3 of the EIS, respectively, on the best available information. It based the revised repository cost estimate in the Final EIS on 2001 dollars and added design features, which resulted in an overall estimate of approximately $42.8 billion to $57.4 billion. DOE updated the No-Action cost estimate to 2001 dollars, and estimated that the first 100 years of the No-Action Alternative would cost $55.7 billion to $61.3 billion.

5.4 (5560)
Comment - EIS001660 / 0048
The cost of clean up at the Nevada Test Site, cost to build new routes (rail or roads), cost to ensure precautions are being taken, cost to train emergency response staff, cost to clean up a radioactive accident, and cost to mitigate would probably far exceed finding alternative ways to reuse this radioactive waste. The EIS has an inadequate analysis of the costs. It should include analysis of the eventuality of the waste at Yucca Mountain; funds to monitor it, costs of drip shields, back fill, leaks and repair, and mitigation costs.

Response
The cost estimate in Section 2.1.5 of the EIS does consider transportation costs (including any new roads or rail lines) including the costs of reasonable precautions and training of emergency response staff. It also includes funds to monitor the waste until repository closure and any mitigation or repairs through closure. DOE has updated the Final EIS cost estimates to include the cost of drip shields because that feature is now part of the repository reference design. Because backfill of the emplacement drifts is not part of the reference design, it is not a part of the cost estimate. Although DOE would be responsible for the cost of accident cleanup, the annual probability of an accident that could release significant quantities of radioactivity is extremely small (less than 2 chances in 10 million for either truck or rail transport). Because the probability is so extremely low and the number of variables defining accident scenarios is large and therefore speculative, the cost of cleanup is not factored into the cost estimate. However, for information, DOE has presented the potential costs associated with cleanup of transportation accidents that could occur in Section J.1.4.2.5 of the EIS.

5.4 (5926)
Comment - EIS001619 / 0008
I also fear that the money invested, the billions of dollars already poured into this project, will be too much incentive to pull out of the program at this point. I think instead the money used for this project should be going to research on alternatives and education and outreach to the citizens of the United States, everyone.

Response
With the passage of the NWPA, Congress defined this country's policy for the disposition of spent nuclear fuel and high-level radioactive waste to be geologic disposal. Section 113 of the Act states that the EIS need not consider the need for a repository or alternatives to geologic disposal; therefore, DOE did not analyze either the environmental impacts or costs of alternative ways to reuse high-level radioactive waste or spent nuclear fuel in this EIS.

DOE is following the mandate of the NWPA to characterize the Yucca Mountain site and make a recommendation to the President regarding the suitability of Yucca Mountain as the location for a spent nuclear fuel and high-level radioactive waste repository. The results of DOE's characterization studies and the results of the environmental impact analysis in this EIS will form the basis for DOE's recommendation to the President.

5.4 (6134)
Comment - EIS001654 / 0039
The DEIS is required to address environmental impacts of the repository to satisfy the legal requirements of NEPA [National Environmental Policy Act]. Decision makers will have to also weigh the financial considerations of the alternatives to a far greater extent than this document provides. Section S.3.1.4 provides a cost estimate for the construction, transportation, operations and monitoring for the first 100 years of $28.8 billion.

The No-Action Alternatives would both cost between $51.5-56.7 billion for the same period. Scenario 1, however, would also require an additional $480-529 million annually for the remaining 9,900 years. In 1998 dollars, that amounts to about $5 trillion. That passes a monumental obligation to future generations, representing poor public

policy totally contrary to the underlying principle of inter-generational equity stated by national leaders since the 1970's.

Response
DOE agrees that costs will play a major role in shaping future decisions related to geologic disposal. However, most of the detailed cost information summarized in the EIS has been supplied by supporting documentation [for example, *Nuclear Waste Fee Adequacy: An Assessment* (DIRS 153257-DOE 2001) and *Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program* (DIRS 102031- DOE 1998)]. DOE prepared this EIS, consistent with the NWPA and Council on Environmental Quality regulations to provide information on environmental impacts that could result from the Proposed Action and a basis for comparison to the No-Action Alternative. The purpose of this information is support the Secretary of Energy's determination whether to recommend that the Yucca Mountain site be developed as the Nation's first monitored geologic repository. In making that determination, the Secretary will consider not only the potential environmental impacts identified in the EIS, as provided by the National Environmental Policy Act and the Nuclear Waste Policy Act, but also other factors such as technology, economics, and national policy.

5.4 (6231)
Comment - EIS001560 / 0003
All that I've been hearing today sounds vastly expensive. And this is expensive for a source of power that was originally called too cheap to meter. Well, it's far from it and we Clevelanders are very aware of cost overruns, especially lately. So all the costs from things like all the trucks and the trains, the armed escorts, all the workers that are required every step of the way, all the equipment, all the construction, the casks, all the everything, is amazingly expensive and we need to move away from it.

Response
DOE notes the commenter's concern about the expenses associated with the repository and appreciates your participation.

5.4 (6442)
Comment - EIS001632 / 0015
Page 2-58, Section 2.1.5: The discussion of "estimated costs" provides broad cost categories without an explanation of how these were derived. Also, there is no indication of how costs occur over time; no indication of the discount rate used to present all costs in 1998 dollars; and no indication of whether these are all direct costs of construction or if they include indirect costs such as that for siting the repository. TRW 1999e, the draft EIS cost summary report, is cited, but the final EIS should provide the reader more detail on costs.

Page 2-67, Section 2.2.3: The Comments for section 2.1.5 apply here also. In addition, Table 2-6 provides only limited information and leaves out how storage costs were developed and how these compare to industry estimates.

Response
The EIS focuses on analyses of potential environmental impacts, including impacts to human health and safety. DOE provided the estimated cost information as a point of comparison between the Proposed Action and the No-Action Alternative. The cost estimates in the Draft EIS were in 1998 dollars with no escalation or discount rates. The reference cited in the comment (DIRS 104980-CRWMS M&O 1999) provides the basis for the Proposed Action cost estimate for the period from 2002 to 2116. As stated in that reference, most of the detailed information came from existing cost estimates for the 1999 to 2116 period in the *Viability Assessment of a Repository at Yucca Mountain* (DIRS 101779-DOE 1998) and from the *Analysis of the Total System Life Cycle Cost of the Civilian Radioactive Waste Management Program* (DIRS 102031-DOE 1998), which both provide detailed year-by-year cost estimates. The EIS estimates include all costs from 2002 forward (when DOE anticipates a decision regarding development of a repository at Yucca Mountain). Costs for the Proposed Action and the No-Action Alternative would be the same up to that time. Costs for siting and characterization of the Yucca Mountain site were not included in the Draft EIS estimates. Section 2.1.5 of the Final EIS provides revised cost estimates for the repository flexible design.

The No-Action Alternative cost estimate in Section 2.2.3 of the EIS is a comparative cost estimate and only includes costs different from the costs of the Proposed Action. For example, the No-Action costs do not include storage costs

until 2010 when a repository would first accept spent nuclear fuel and high-level radioactive waste because storage until that point would be required under both the Proposed Action and the No-Action Alternative. The No-Action cost estimate is based on, and consistent with, existing industry experience for dry onsite storage of spent nuclear fuel and high-level radioactive waste. Section 2.2.3 of the Final EIS provides revised cost estimates for the No-Action Alternative.

5.4 (7012)
Comment - EIS000402 / 0006
As a taxpayer, I am curious who is going to pay for the long term medical physical and mental problems. Who will be ultimately responsible, morally and financially for the damage done?

Response
In the vicinity of the repository—the area within 80 kilometers (50 miles)—DOE estimates that no individual would receive more than a few millirem (a thousandth of a rem) per year during the preclosure period (see Sections 4.1.2 and 4.1.7 of the EIS) or during the 10,000-year period following repository closure (see Section 5.4). At these low levels of exposure—which are below current and proposed regulatory limits—DOE expects that no radiation-related adverse health effects would occur. DOE would be responsible for any actual damage it caused.

5.4 (7188)
Comment - EIS001337 / 0078
Page 2-58 Section 2.1.5. It is not clear whether Table 2-5 includes costs already incurred by DOE for the Yucca Mountain site. The text and table should so indicate. The costs already incurred should be specifically identified in the text and on the table.

Response
The costs in Section 2.1.5 were developed for comparison to the No-Action Alternative costs and therefore include only costs from 2002, because that is when a decision is scheduled to be made about a repository at Yucca Mountain. Project costs up to that time would be the same regardless of whether a Yucca Mountain Repository was actually developed.

5.4 (7190)
Comment - EIS001337 / 0080
Page 2-61 Section 2.2.2.1. The text here should indicate for how long waste could be safely stored in dry-cask storage. What do the terms long-term and long periods mean? The cost and risk management benefits of on-site storage need to be introduced here and assessed in detail within the EIS. Ultimately, a simple comparison of the costs and risk management benefits of the Preferred and No-Action alternatives should be provided somewhere in the DEIS. This section should also discuss issues such as institutional control and sabotage and terrorism. Introduction of these concepts here is critical to subsequent analysis contained in latter sections to the DEIS.

Response
The purpose of this section of the EIS is to describe how nuclear utilities are currently managing spent nuclear fuel, not to present conclusions regarding safety and environmental impacts. Sections 2.2.2.2 and 2.2.2.3 of the EIS contain more detailed discussion of the No-Action Alternative scenarios. Chapter 7 describes a complete analysis of the potential environmental impacts, including human health and safety, associated with the No-Action Alternative scenarios. DOE's analysis assumes that all Nuclear Regulatory Commission safety regulations could be met as long as dry storage facilities continue to be monitored and maintained. In the context used in the Comment, "long-term" means more than a few years and is simply a recognition that utilities have constructed dry storage facilities in lieu of wet storage for spent nuclear fuel in almost every instance once their reactor pools were filled to capacity.

The EIS discusses cost estimates of the No-Action Alternative in Section 2.2.3 and environmental impacts in Chapter 7. Cost estimates of the Proposed Action are presented in Section 2.1.5 and environmental impacts of the Proposed Action are presented in Chapter 4 for preclosure impacts, in Chapter 5 for postclosure impacts, and in Chapter 6 for transportation impacts. Tables in Sections S.11.1 and 2.4.1 in the body of the EIS present a comparison of the impacts from the Proposed Action and the No-Action Alternatives.

The Department has clarified the descriptions of the Proposed Action and No-Action Alternative in Chapter 2 in relation to the concept of institutional controls. Since sabotage and terrorism are not part of the Proposed Action, it would be inappropriate to discuss such in Chapter 2; however, Section 4.1.8.3 includes analysis of potential sabotage events in relation to preclosure repository operations, and Section 6.2.4.2.3 discusses sabotage in relation to transportation.

5.4 (7452)
Comment - EIS001912 / 0030
Section 2.1.5. How can DOE estimate the cost of the proposed action when specific transportation modes have not been selected?

Response
The overall cost estimate of the Proposed Action in Section 2.1.5 of the EIS estimated $800 million as the cost of Nevada transportation, which would be for the most costly of the alternative modes and routes considered. Therefore, the cost estimates might be higher than actual costs that would occur. DOE has modified this section in the Final EIS to make this clarification and present the costs in 2001 dollars.

5.4 (7483)
Comment - EIS000817 / 0015
The costs and exposures of hauling this waste across the country and attempting to bury it will be way beyond what you expect -- expect the unexpected!

Response
DOE has used the best available information to estimate the costs and radiological risks of the Proposed Action.

5.4 (7840)
Comment - EIS001653 / 0029
Pg. 2-67 No-action alternative costs. How do these cost compare to other potential no-action alternatives such as reprocessing?

Response
The reprocessing of spent nuclear fuel is not a No-Action Alternative in the context of this EIS. The NWPA specifies geologic disposal of spent nuclear fuel and high-level radioactive waste as the policy of this country. It also specifies that this EIS need not consider alternatives to geologic disposal. Therefore, DOE has not analyzed the costs of reprocessing spent nuclear fuel and disposing of the resultant high-level radioactive waste.

5.4 (8034)
Comment - EIS000817 / 0078
P. 2-69 -- I also do not foresee that you won't have to replace some containers -- or even a lot of them -- at Yucca Mountain. Your "low cost" is based on not replacing containers, but if everything does not go as planned, they will need replacing.

Response
DOE has designed the waste packages with materials estimated to last thousands of years. Laboratory testing of the waste package materials, continued data gathering, and testing at the Yucca Mountain site is ongoing to confirm the estimates made by DOE. Under the current design, DOE does not expect any need to replace waste packages.

5.4 (8048)
Comment - EIS002001 / 0002
Money won't help us if we get sick, we'll have to pay our medical bills out of our own pocket. Think of all the people who can get sick.

Response
The estimated environmental impacts associated with the Proposed Action are presented in Chapter 4 of the EIS for preclosure impacts, Chapter 5 for postclosure impacts, and Chapter 6 for transportation impacts. Preclosure impacts, including transportation impacts, are estimated to be comparable to other industrial activities. Potential postclosure

human health impacts would result from very small chronic radiation doses. This EIS presents estimates of these potential human health impacts (latent cancer fatalities) to both individuals and the population to enable comparison of alternatives in this EIS. DOE believes that these impact estimates are conservatively high; in fact, the uncertainties are such that the actual level of impact could be zero (see Section F.1). However, the estimates of impacts present a common basis for comparison among the various alternatives so that the appropriate decisionmakers can make an informed decision regarding potential impacts.

In relation to the cost of treating potential cancers that could result from activities discussed in the EIS, even under the most hazardous transportation scenario (mostly truck) the estimated incremental increase in cancer fatalities (about 18 deaths over the 24-year shipping campaign) represents an increase over the natural occurrence of cancer fatalities from all causes of only 0.001 percent in the exposed population of 7.2 million. Further, the cost associated with treating this small number of additional cancers would be minuscule in comparison to the health care cost for the 7.2 million potentially exposed individuals and, therefore, would not provide useful information for the decisionmakers. Therefore, because DOE did not want to speculate on the health care costs associated with a highly uncertain and small estimated increase in cancer fatalities, the EIS does not include estimates of potential health care costs.

5.4 (8055)
Comment - EIS000391 / 0015
The cost of cleanup at the Nevada Test Site, cost to build new routes (rail or roads), and cost to clean up a radioactive accident would probably far exceed finding alternative ways to reuse this radioactive waste.

Response
The passage of the NWPA defined this Nation's policy for the disposition of spent nuclear fuel and high-level radioactive waste to be geologic disposal. Section 113 of the Act states that the EIS need not consider the need for a repository or alternatives to geologic disposal. Therefore, the EIS analyzes neither the environmental impacts nor the costs of alternative ways to reuse radioactive waste. Section 2.1.5 of the EIS discusses estimated costs of the Proposed Action, including costs for transportation, repository development, construction, operation and monitoring, and closure. As discussed in Section 4.1.8 in relation to potential accidents at the repository operations area, and in Section 6.2.4 in relation to potential transportation accidents, the probability of a release of significant quantities of radioactive materials would be very low. Also, the number of variables defining potential accident scenarios is large and therefore speculative. Therefore, cleanup costs of such potential accidents are not factored into the cost estimates. However, for information, DOE has presented the potential costs associated with cleanup of transportation accidents that could occur in Section J.1.4.2.5.

5.4 (8076)
Comment - EIS001653 / 0058
Pg. 4-2. How long will it take to construct the repository including all the emplacement tunnels? What is the total estimated cost of construction?

Response
Initial construction, assuming that the site is recommended, approved, and licensed, would begin in 2005, with initial emplacement of waste in 2010. Continuing emplacement drift construction would be concurrent with emplacement for approximately 22 years, and emplacement would continue for about 2 more years until 2034. Assuming closure began 50 years after the initial emplacement of waste (2060), the cost of the entire program, from 2002 through closure, would be between $42.8 billion and $57.4 billion in 2001 dollars. Of that amount, between $31.5 billion and $43.1 billion would be for construction and operation of a monitored geologic repository; $4.3 billion would be for waste acceptance, storage, and transportation; $800 million would be for Nevada transportation; up to $2.2 billion to $3.7 billion would be for program integration; and up to $3.9 billion to $5.4 billion would be for institutional programs. In addition, costs through 2001 would be approximately $9 billion. The cost estimate in Section 2.1.5 of the EIS has been updated to reflect this information. More detail is provided in *Life-Cycle Cost Analysis for Repository Flexible Design Concepts* (DIRS 156900-DOE 2001).

5.4 (8133)
Comment - EIS001842 / 0002
The life-cycle cost of the Yucca Mountain nuclear waste dump has been projected by the Department of Energy to be 150 billion dollars. I ask you, the DOE and the American people, to agree that the Yucca Mountain project is a monumental waste of time and money.

Response
DOE is not aware of an estimate of $150 billion. The NWPA specifies geologic disposal of high-level radioactive waste and spent nuclear fuel as the policy of this country. In addition, it requires commercial utilities to fund the cost of commercial spent nuclear fuel disposal and the Federal Government to fund the costs of disposing waste generated or owned by the United States. Section 2.1.5 discusses the costs for the Yucca Mountain Repository, and Section 2.2.3 discusses No-Action Alternative costs for comparison purposes.

5.4 (8351)
Comment - EIS001627 / 0003
There are also economic reasons why construction of a permanent repository is needed. Storing spent nuclear fuel at the reactor site, as the "no-action alternatives" indicate, is an expensive proposition. If DOE does not build the repository facilities soon, utilities will incur additional costs through the fact that they will have to store more spent fuel for a longer period of time. The DEIS shows that the construction of a repository at Yucca Mountain is by far the least expensive alternative.

If the Proposed Action plan is followed, the construction, operation and eventual closing of a permanent storage facility will cost $28.8 billion in 1998 dollars over the life of the project. Under the two scenarios set forth in the no-action alternative, the cost would be between $51.5 billion and $56.7 billion during the first 100 years. The estimated cost for the remaining period (9,900 years) of the first scenario would run between $480 million and $529 billion per year. The relatively low cost of building the Yucca Mountain repository, when compared with the alternatives, makes sense.

Response
Thank you for your comment.

5.4 (8370)
Comment - EIS001873 / 0055
P. 4-100. Waste retrieval should be included with costs of the Proposed Action.

Response
The need for retrieval of spent nuclear fuel and high-level radioactive waste from a repository at Yucca Mountain is not anticipated. However, the capability to retrieve would be maintained in accordance with the Nuclear Waste Policy Act of 1982 and applicable Nuclear Regulatory Commission regulations. Cost estimates include monitoring and the capability to retrieve the emplaced material, if necessary.

5.4 (8480)
Comment - EIS001568 / 0001
It's very frustrating when you see the costs involved with these projects. And I'm especially concerned with the Department of Energy that, you know, all your energy seems to be going into dealing with the problem after it exists. And I don't know if you're as frustrated with it as I am. But I'm just wondering, if we only have an eight percent net gain with nuclear energy in this country, why are we spending $30 billion just to deal with the high-level waste? Actually $15 billion on the waste that we will generate in only the next 10 years. Where are we spending money on developing energy efficiency policy in this country? Is there anyone in your office who has any budget for that? That's a question. I wonder if anyone can answer it.

Response
The Nuclear Waste Policy Act of 1982 establishes geologic disposal of spent nuclear fuel and high-level radioactive waste as a national policy. The generators of the waste are responsible for the costs associated with waste disposal through the Nuclear Waste Fund. Commercial utilities pay a fee of 1 mil (one tenth of 1 cent) per kilowatt-hour of electricity generated by nuclear energy to cover disposal costs for commercial spent nuclear fuel. The Federal

Government, through taxpayer revenues, pays for disposal of spent nuclear fuel and high-level radioactive waste generated and owned by the United States. The utility fees go into the Nuclear Waste Fund where unused portions earn investment income. Both the utility and Federally funded shares are subject to revision based on a required annual review of adequacy. The latest review found that the current 1 mil per kilowatt-hour would be adequate to cover projected disposal expenses and recommended that the fee remain unchanged. That review also showed that approximately 70 percent of disposal-related costs would be paid from the Nuclear Waste Fund and the remaining 30 percent is the only amount that would be paid from federal tax revenues.

Although not within the scope of this EIS, DOE has active and ongoing programs regarding energy efficiency policy. DOE's Office of Energy Efficiency and Renewable Energy is assigned that specific responsibility. Areas of focus include industrial technologies, transportation technologies, power technologies, and Federal energy management. Budgets for the four fiscal years from 1998 to 2002 for energy efficiency and renewable energy activities have averaged about $1 billion per year. More information regarding DOE's efforts in energy efficiency and renewable energy can be found on the Internet at http://www.eren.doe.gov.

5.4 (8543)
Comment - EIS002286 / 0002
I'd like to see in the final EIS the DOE addressing all the monies saved, gained, and lost by the nuclear industry opening Yucca Mountain.

Response
It would be inappropriate for DOE to label the payments made by utilities for spent nuclear fuel disposal, or the cost of other actions taken by the utilities to store spent nuclear fuel until a repository is in operation, as money saved, gained, or lost. DOE cannot make judgments on the net monetary impact that speculative actions could have on the nuclear industry, and such matters are outside the scope of this EIS.

The EIS considers the potential environmental impacts and costs associated with the Proposed Action and the No-Action Alternative. Section 2.1.5 of the EIS presents the estimated costs of the Proposed Action and Section 2.2.3 presents the estimated costs of the No-Action Alternative. Under the Nuclear Waste Policy Act of 1982, the policy of this country is for DOE to dispose of spent nuclear fuel and high-level radioactive waste by geologic disposal. Commercial utilities are responsible for the costs of disposal of commercial spent nuclear fuel and the Federal Government is responsible for the costs of disposing of waste generated or owned by the United States. The utility fees are currently specified under the Act to be 1 mil (one-tenth of one cent) for each kilowatt-hour of electricity generated by a civilian nuclear power reactor. The utility fees go into the Nuclear Waste Fund, which is administered by the Secretary of the Treasury. Congress also appropriates the funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the Federal Government. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. Thus, the private commercial utilities are "paying their fair share" of repository program costs along with taxpayers.

5.4 (8566)
Comment - EIS001837 / 0001
People Against Radioactive Dumping (PARD) opposes further expenditures of public funds to enable the proposed Yucca Mountain nuclear dumping project to proceed. Both the Draft Environmental Impact Statement (DEIS) and the proposed rulemaking on 10 CFR 963 are enabling the Yucca Mountain project to continue while spending public funds without a vote of the people.

Response
DOE activities regarding this EIS and the issuance of revised site suitability regulations in 10 CFR Part 963 are in compliance with the NWPA. The EIS is specifically required under Section 114(f)(1) of the Act: "A final environmental impact statement prepared by the Secretary under such Act shall accompany any recommendation to the President to approve a site for a repository."

The DOE site suitability determination for a repository at Yucca Mountain is required by Section 113 of the NWPA. DOE site suitability regulations, promulgated in 10 CFR Part 963, establish the criteria and methodology by which DOE would determine whether the Yucca Mountain site is suitable as a location for a geologic repository. The site

suitability criteria and evaluation methods in 10 CFR Part 963 have been structured to be consistent with the Environmental Protection Agency environmental radiation protection standards in 40 CFR Part 197 and with the Nuclear Regulation Commission repository licensing requirements in 10 CFR Part 63. DOE's site suitability guidelines are based on the application of a Total System Performance Assessment to forecast potential repository-related releases. Under these guidelines, DOE could find that the Yucca Mountain site is suitable if specific criteria are satisfied and the results of the performance assessment show that the repository is likely to meet the applicable radiation protection standards for the preclosure and postclosure periods. These criteria are consistent with a longstanding policy to conform DOE regulations to the Environmental Protection Agency performance standard and comparable regulations of the Nuclear Regulatory Commission for the nuclear waste repository program.

As described below, approximately 70 percent of the estimated repository-related costs would be funded by commercial nuclear power generating utilities via the Nuclear Waste Fund. The Nuclear Waste Fund would cover the costs associated with disposal of commercial spent nuclear fuel. The remaining 30 percent would be funded by taxpayers, which would cover the Federal Government's portion of the costs related to the disposal of high-level radioactive waste, spent nuclear fuel from the Naval Nuclear Propulsion Program, and spent nuclear fuel from defense and research reactors.

Section 302 of the Nuclear Waste Policy Act of 1982 specifies that funding for disposal of commercial spent nuclear fuel is provided by payment of fees to the Secretary of Energy by the generators of electricity from nuclear powerplants. The Federal Government pays similar costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States, but would not be responsible for the costs associated with the disposal of commercial spent nuclear fuel. The utility fees go into the Nuclear Waste Fund, which is administered by the Secretary of the Treasury. The Secretary of Energy makes expenditures from the Nuclear Waste Fund subject to appropriations by Congress. Congress also appropriates the funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the United States. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and 30 percent from taxpayer revenues.

Like all other Federal projects, Yucca Mountain activities are directed by applicable laws as enacted by the officials and representatives elected to office by the voting public, not by national referendum, and signed by the President.

5.4 (8670)
Comment - EIS001837 / 0030
We object to any further public fund allocations or promises associated with the Yucca Mt. DEIS or proposed project including funding for the Alameda Corridor. The DOE needs to go back to the drawing board, and get out of the business of nuclear waste dumping. Let the Nuclear Regulatory Commission manage the problem of existing waste and let them force the industry to clean up their own act.

Response
Under the Nuclear Waste Policy Act of 1982, the policy of this country is for DOE to dispose of spent nuclear fuel and high-level radioactive waste by geologic disposal. The commercial generators of spent nuclear fuel (that is, utilities) are responsible for paying the costs of disposal through a fee of 1 mil (one-tenth of 1 cent) for every kilowatt-hour of electricity generated at commercial nuclear plants. Equivalent amounts are paid by the Federal Government to cover similar costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States. The utility fees go into the Nuclear Waste Fund, which is administered by the Secretary of the Treasury. The Secretary of Energy makes expenditures from the Nuclear Waste Fund subject to appropriations by Congress. Congress also appropriates the funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level nuclear waste generated or owned by the United States.
The NWPA specifies the roles of several organizations to carry out the ultimate disposal of spent nuclear fuel and high-level radioactive waste. DOE must characterize the Yucca Mountain site and determine whether it is appropriate to recommend that it be approved for repository development. The Environmental Protection Agency establishes the regulatory standard for a repository at Yucca Mountain and the Nuclear Regulatory Commission must apply this standard as part of its licensing process for a repository. DOE is not aware of any ongoing activities or funding associated with the Alameda Corridor.

5.4 (9337)
Comment - EIS001888 / 0053
EIS Statement (pg. 2-67) 2.2.3 - The estimated cost of both Scenarios 1 and 2 for the first 100 years ranges from $51.5 billion to $56.7 billion, depending on whether the dry storage canisters have to be replaced every 100 years. The estimated cost for the remaining 9,900 years of Scenario 1 ranges from $480 million to $529 million per year. There are no costs for Scenario 2 after the first 100 years because the scenario assumes no effective institutional control.

Clark County Comment - Because of the faulty scenarios put forth in the DEIS, the cost data in section 2.2.3 has no basis. DOE should provide a No Action set of scenarios that at least are protective of the public health and safety. The scenarios should also incorporate both institutional and passive controls at the current storage sites that are comparable to what DOE intends to use at the proposed repository. NEPA Regulation: Sec. 1502.14 Alternatives including the proposed action; Sec. 1502.16 Environmental consequences.

Response
Through passage of the NWPA, Congress not only established a requirement that DOE prepare an EIS but modified certain requirements for complying with the National Environmental Policy Act. The NWPA does not require the EIS to consider the need for a geologic repository, the time at which a repository could become available, and alternatives to isolating spent nuclear fuel and high-level radioactive waste in a repository. In addition, the EIS does not have to consider any site other than Yucca Mountain for development as a repository. For these reasons, this EIS does not analyze alternatives other than the Proposed Action and No-Action Alternative.

Congress based its decision to pursue geologic disposal, in part, on the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980). In that EIS DOE evaluated alternatives to geologic disposal including very deep borehole disposal, disposal in a mined cavity that resulted from rock melting, island-based geologic disposal, subseabed disposal, ice sheet disposal, well injection disposal, transmutation, space disposal, and no-action. In its 1981 Record of Decision on that EIS, DOE decided to pursue the mined geologic disposal alternative for the disposition of spent nuclear fuel and high-level radioactive waste (46 *FR* 26677; May 14, 1981).

DOE analyzed the No-Action Alternative, or maintenance of the status quo, to serve as a baseline for comparing the magnitude of environmental impacts of the Proposed Action. Under the No-Action Alternative, and consistent with the NWPA, as amended, DOE would terminate activities at Yucca Mountain and undertake site reclamation to mitigate any significant adverse environmental impacts. Spent nuclear fuel and high-level radioactive waste would continue to be stored onsite at commercial reactors and DOE sites. In addition, DOE would prepare a report to Congress with its recommendations for further action to ensure the safe, permanent disposal of spent nuclear fuel and high-level radioactive waste, including the need for new legislative authority. Under any future course that would include continued storage, commercial and DOE sites would have an obligation to continue managing spent nuclear fuel and high-level radioactive waste in a manner that protected public health and safety and the environment. However, the future course that Congress, DOE, and the commercial utilities would take if Yucca Mountain did not receive a recommendation as a repository is uncertain.

In light of these uncertainties, DOE decided to illustrate one set of possibilities by focusing the analysis of the No-Action Alternative on the potential impacts of two scenarios—long-term storage of spent nuclear fuel and high-level radioactive waste at the current sites with effective institutional control for at least 10,000 years, and long-term storage with no effective institutional control after about 100 years. Although neither of these scenarios is likely, DOE selected them for analysis because they provide a baseline for comparison to the impacts of the Proposed Action and because they reflect a range of the impacts that could occur. No-Action Scenario 1 (continued institutional controls) shows that spent nuclear fuel and high-level radioactive waste can continue to be stored with proper monitoring and maintenance and be protective of the public health and safety. Scenario 2 (no effective institutional controls after 100 years) makes the same assumptions regarding institutional control that are made for the Proposed Action. The National Environmental Policy Act regulations cited in the Comment do not indicate a need to redefine the No-Action Alternative just because the impacts associated with No-Action may be undesirable.

5.4 (9991)
Comment - EIS001888 / 0496
[Clark County summary of comments it has received from the public.]

The EIS should provide estimates of the total life-cycle cost under each alternative (including No-Action and if Yucca Mountain becomes unacceptable). Cost should be a factor in the decision making process. The EIS should analyze cost impacts on a nationwide scope, not just the cost impacts at Yucca Mountain. Costs should be provided for all studies associated with site characterization; construction, operation, and closure of the repository; transportation; and post-closure. Costs associated with both routine and accident scenarios should be discussed. For accident scenarios the EIS should discuss financial responsibilities- An accident occurs at a utility, who pays for the clean up? During transportation, who pays? During operation of the repository, who pays? During postclosure, who pays? The EIS should include an analysis of costs associated with health impacts (sterilating miscarriage [sic], cancer, etc.), losses of tourism and business (including farming commodities value), loss of property value, loss of environmental opportunities because funding that has to be spent on the repository program will not be available to fund other environmental projects, and lack of distributed capital available to local economies. The analysis also should discuss factors that might influence the accuracy of cost estimates.

Response
Section 2.1.5 of the EIS presents cost estimates for a Yucca Mountain Repository (including costs for transportation, repository development, construction, operation and monitoring, and closure). Section 2.2.3 presents cost estimates for the No-Action Alternative. DOE based these estimates on the best available data and standard cost estimating techniques. The preparation of detailed cost estimates as suggested by this Comment, would require a level of information that is currently not available.

DOE developed these estimates for comparative purposes and to aid decisionmakers in discriminating between the No-Action Alternative and the Proposed Action discussed in the EIS. The estimates do not include costs before early 2002, when DOE anticipates a decision on repository development, or the costs for siting and characterization of Yucca Mountain. The No-Action estimate includes only costs that differ from those of the Proposed Action estimate. For example, it does not include storage costs until 2010 when a repository (if approved) would first accept spent nuclear fuel and high-level radioactive waste because storage would be necessary until then under both the Proposed Action and the No-Action Alternative. The No-Action estimate is based on, and consistent with, industry experience for dry storage of spent nuclear fuel and high-level radioactive waste.

As discussed in Section 4.1.8 of the EIS on potential accidents in the repository operations area, and in Section 6.2.4 on potential transportation accidents, the probability of release of significant quantities of radioactive materials would be very low. Furthermore, cost estimates of evacuation and cleanup in the unlikely event of an accident would be highly uncertain and require speculation to develop. Therefore, cleanup costs are not considered in the cost estimates. Other potential health risks from the Proposed Action would also be very low, as discussed in Chapter 4 on repository construction, operation and monitoring, and closure; in Chapter 5 on postclosure repository performance; and in Chapter 6 on transportation risk. In the unlikely event of an accident, the Price-Anderson Act establishes a system of financial protection for persons who might be injured by a nuclear accident or incident (see Section M.8).

Assessing impacts from perceived risks such as losses of tourism and other business or loss of property value does not depend on the actual physical effects or risks of a Proposed Action, but the negative perception of those effects or risks by the public. The extent of the impacts from such perceptions is extremely speculative, and the National Environmental Policy Act requires analysis of potential impacts that are reasonably foreseeable, not speculative.

However, DOE has assessed the state of research into perception-based impacts and stigma effects, including the independent reviews conducted by the Nuclear Waste Technical Review Board and others, and identified and assessed relevant published studies since the publication of the Draft EIS (see Appendix N of the Final EIS). DOE recognizes that while in some instances risk perceptions could result in adverse impacts to portions of a local economy, there are no methods whereby such impacts can be predicted with a reasonable degree of certainty. While stigmatization and resulting adverse impacts can be envisioned under some scenarios, it is not inevitable or measurable, and any such stigmatization would likely be an aftereffect of unpredictable future events, such as a

serious accident. Consequently, DOE addressed but did not attempt to quantify potential impacts from risk perceptions or stigma in the EIS.

Cost accuracy and variations can occur due to differences in the design features selected for repository design, operational assumptions, and time-value-of-money components. DOE based the updated repository cost estimate in Section 2.1.5 of the EIS on the latest information available, including an updated design concept that includes features such as drip shields, a more robust waste package, and blending of commercial spent nuclear fuel to create a more uniform heat output from waste packages. To provide the public with updated information on the design concept for the proposed repository, DOE issued a Supplement to the Draft EIS in May 2001. In a companion document (DIRS 153849-DOE 2001), DOE provided additional technical information, including updated design information, to support consideration of a Site Recommendation.

5.4 (10240)
Comment - EIS001888 / 0589
We have reviewed the Environmental Impact Draft Study (EIDS), and have found many areas have been completely over looked.

There were no studies or surveys done in the following areas:

Cost Effectiveness

Existing Storage - versus - the cost of encasement, trucking, roadway repair, etc.

Response
Sections 2.1.5 and 2.2.3 of the EIS discuss the repository and No-Action cost estimates, respectively. The repository cost estimate includes the costs of loading the spent nuclear fuel for shipment and shipping (including all required fees). These two estimates are for comparative purposes and as such provide one measure of cost effectiveness.

5.4 (10251)
Comment - EIS002115 / 0012
The cost of clean-up at the Nevada Test Site and cost to build new routes, rail or roads, cost to ensure precautions are being taken, cost to train emergency response staff and costs to clean up radioactive accidents would probably far exceed finding alternative ways to reuse this radioactive waste. The EIS has an inadequate analysis of the cost. It should include analysis of the eventuality of the waste at Yucca Mountain and funds to monitor it, costs of drip shields, backfill, lease and repair.

Response
With the passage of the NWPA, Congress defined this Nation's policy for the disposal of spent nuclear fuel and high-level radioactive waste to be geologic disposal. Section 113 of the Act states that the EIS need not consider the need for a repository or alternatives to geologic disposal. Therefore, this EIS analyzes neither the environmental impacts nor costs of alternative ways to reuse spent nuclear fuel or high-level radioactive waste. Estimated costs of the Proposed Action presented in Section 2.1.5 of the EIS include the costs for transportation, repository development, construction, operation and monitoring, and repository closure. As discussed in Section 4.1.8 regarding potential accidents at the repository operations area and in Section 6.2.4 regarding potential transportation accidents, the probability of release of significant quantities of radioactive materials is very low. However, DOE has presented the potential costs associated with cleanup of transportation accidents that could occur (see Section J.1.4.2.5). The cost of the other actions mentioned in the comment is included in Section 2.1.5.

5.4 (10401)
Comment - EIS002192 / 0007
Now the one thing we did get at the end of our TRB [Nuclear Waste Technical Review Board] meeting, and this was on the cost of the drip shields, and the first time it ever came out, and that was they wanted 5,000 to a hundred drip shields.

These are the things that are going over the canisters, and Judy and David were there so they can corroborate this, and they would not order them until 2060 and the cost would be three billion dollars in today's moneys.

Now that's not only unacceptable, but you heard the date 2060, and I want the public to know that, because whether they're considering whether this will be lengthened because of all the suits and so on, including my own for fraud and color of office, I don't know.

Response
Drip shields are one of the current design features discussed as a partial barrier to divert infiltrating water away from waste packages in an emplacement drift (see Section 2.1.2.2.4). DOE has updated the environmental impact and cost estimates to reflect the incorporation of drip shields in the reference design. Because the purpose of drip shields would be to prevent dripping water from contacting the waste packages and dripping water could not occur until closure of a repository at Yucca Mountain, there would be no need to purchase and install them until immediately before repository closure. If repository closure occurred 50 years after the projected initial emplacement of waste in 2010, drip shields would be installed in approximately the beginning of 2060. If closure took place later, the procurement and installation of drip shields would also take place later.

5.4 (10426)
Comment - EIS001927 / 0033
There are some other very important questions that the DEIS needs to answer. How is it that the State of Nevada estimates the Yucca Mountain Project costing $54 billion, while DOE projects $28 billion?

Response
DOE has updated the cost estimate in the Final EIS based on refinements to the design of the facility and now estimates costs to range from $42.8 billion to $57.4 billion in 2001 dollars (see Section 2.1.5 of the EIS). The cost estimate includes only the projected costs from 2002 forward. That is when a decision regarding development of Yucca Mountain as a repository site is currently anticipated. DOE has clarified the discussion to describe the forward-looking basis of the estimate. The costs up to 2002 have been added for completeness as well. DOE is confident that the best available information was used for making its cost estimate. The basis for the DOE cost estimate is included in Section 2.1.5 and the associated reference document.

5.4 (10580)
Comment - EIS002131 / 0004
September 1, New York City Times article: "'The Energy Department has spent 23 billion dollars during the last five years to clean up nuclear waste, but little cleanup resulted, partly because of resistance to new technology,' a government audit said today." So by law, by the Nuclear Waste Policy [Act], the government or the DOE cannot even look at alternatives like this. This was released in 1979 after Three Mile Island happened, and in 1982, they installed a new energy -- nuclear waste policy making burial, so that buries are. For twenty years, it's been here waiting to be used, and nuclear waste can be eliminated and generate power from it. Something's rotten in Denmark, folks.

Response
Since passage of the Nuclear Waste Policy Act of 1982, utilities and their ratepayers have paid approximately $9.8 billion into the Nuclear Waste Fund to pay for development of a repository for spent nuclear fuel and high-level radioactive waste. By the end of Fiscal Year 1999 (September 30, 1999), the program had spent approximately $6 billion. DOE has used these expenditures exclusively for the purposes specified in the Nuclear Waste Policy Act as amended (NWPA); they are not available for other research such as development of new waste technologies.

However, Congress recognized that new technologies for waste management could be developed in the future and that spent nuclear fuel contains potentially valuable resources. Section 122 of the NWPA requires DOE to maintain the ability to retrieve the materials emplaced in the repository in the event that a decision was made to retrieve them to protect public health and safety or the environment or to recover constituent parts of spent nuclear fuel. This retrievability requirement is also reflected in the Nuclear Regulatory Commission's disposal regulations [10 CFR 63.111(e)]. In accordance with these requirements, the operational plan for the Yucca Mountain Repository provides for a design and management approach that would isolate wastes from the public in the future while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly as long as 300 years in the event of a decision to retrieve the waste either to protect the public health and safety or the environment, or to recover resources from spent nuclear fuel (see discussion in Section 4.2 of the EIS).

In addition, at the direction of Congress, DOE is studying transmutation of radioactive waste. The transmutation process involves state-of-the-art principles, some of which are not yet proven. However, even if transmutation becomes a feasible technology, a repository is still an essential element of the nuclear fuel cycle because significant quantities of highly radioactive, long-lived materials would remain (see additional discussion in Section 9.1.3 of the EIS). In addition, and although not within the scope of this EIS, DOE's Office of Energy Efficiency and Renewable Energy has active and ongoing programs regarding energy efficiency policy. Areas of focus include industrial technologies, transportation technologies, power technologies, and Federal energy management. Budgets for the four fiscal years from 1998 to 2002 for energy efficiency and renewable energy activities have averaged about $1 billion per year. More information regarding DOE efforts in energy efficiency and renewable energy can be found on the Internet at http://www.eren.doe.gov.

5.4 (10668)
Comment - EIS001966 / 0008
The "No Action Alternative" does not address fully the costs of nuclear waste storage, which is not included in decommissioning costs. Monitoring costs and cask maintenance and replacement costs would be significantly higher than those stated, based upon dry cask storage experience.

Response
DOE based the No-Action cost estimates on the best available information related to the current cost of storage at many commercial and DOE nuclear facilities.

5.4 (10813)
Comment - EIS000280 / 0007
Based on the Department's own analysis, moving spent nuclear fuel to a central location where it can be more effectively managed and monitored results in cost saving ranging from 25 billion to 4.8 trillion dollars.

Response
Thank you for your comment.

5.4 (10891)
Comment - EIS000451 / 0003
It could be concluded that the cost of inaction and maintaining the status quo is unacceptable. DOE estimates costs at Yucca Mountain, which includes construction, transportation and monitoring of the site for 100 years, 28.8 billion dollars.

In contrast, DOE's cost estimates for leaving spent fuel where it is now in temporary storage facility at 72 commercial sites and five DOE sites nearly doubled to between 15.5 and 36.7 billion dollars over 100 years. But these estimates are only the tip of the iceberg. They do not include costs incurred by the utilities to build and maintain temporary storage facilities now, tentatively scheduled to start in 2010. Taxpayers will bear these costs one way or another.

For example, should any of the utilities be forced to decommission their power plants before DOE takes the spent fuel, they will have to replace that power. The courts could slap the department with damages for these kinds of costs. The utilities estimate that such costs for temporary storage could reach 8 billion dollars. That's above and beyond the 16 billion dollars already collected for the Nuclear Waste Trust Fund.

Response
DOE presents updated cost estimates in Sections 2.1.5 of the Final EIS for the Proposed Action (from $42.8 billion to $57.4 billion in 2001 dollars) and Section 2.2.3 for the No-Action Alternative ($55.7 billion to $61.3 billion for the first 100 years, and $519 million to $572 million per year for the remaining 10,000-year analysis period).

As stated in Chapter 7, the future course that Congress, DOE, and the commercial utilities would take if there was no development of a repository at Yucca Mountain is uncertain. Speculation on the consequential costs of that uncertain course is beyond the scope of this EIS.

5.4 (10896)
Comment - EIS000447 / 0004
There's a cost savings to the nation, somewhere between 25 million and 4.8 trillion dollars as a result of moving the fuel from around the 72 facilities to one facility.

Response
Thank you for your comment.

5.4 (10937)
Comment - EIS000479 / 0004
It is significantly more cost efficient to dispose of materials at one site. The draft EIS estimates the cost at 28.8 billion dollars for construction, transportation, emplacement, operation, and 100 years of monitoring. It would cost 51.5 to 56.7 billion dollars to dispose of HLW [high-level radioactive waste] on-site in dry storage canisters at reactors across the country for the first 100 years. Costs rise to $480 million to $529 million per year for the remaining 9,900 years of storage under Scenario 1.

- South Carolina utilities, at a cost passed on to consumers, have already contributed 1.05 billion dollars into the Nuclear Waste Fund.

- The extra cost to utilities and consumers under no-action Scenarios 1 and 2 are simply unacceptable, especially given the increased risk of environmental damage that will likely occur after the first 100 years of storage.

Response
Thank you for your comment. Sections 2.1.5 and 2.2.3 of the EIS present updated cost estimates for the flexible design (from $42.8 billion to $57.4 billion in 2001 dollars) and the No-Action Alternative ($55.7 billion to $61.3 billion for the first 100 years and $519 million to $572 million per year for the remaining 10,000-year analysis period).

5.4 (11098)
Comment - EIS002135 / 0004
Spending lots of money on a hole in the ground creates political pressure to open the repository. They say that they're studying Yucca Mountain by digging a hole, but because they're doing that, they are creating that political pressure to fill that hole with the nuclear waste that's currently generated. This nuclear waste approach is out of sight, out of mind, and that is not going to work.

Response
DOE is following the mandate of the NWPA to characterize the Yucca Mountain site and make a recommendation to the President regarding the suitability of Yucca Mountain as the location for a spent nuclear fuel and high-level radioactive waste repository. The results of the Department's characterization studies and the results of the environmental impact analysis in this EIS will form the basis for the Department's recommendation to the President.

5.4 (11118)
Comment - EIS001207 / 0007
It seems rather obvious that "recycling" has economic advantage to the agency program-wide budget, as well as commercial nuclear utility interests. What parties are responsible for the disposal costs of MOX [mixed-oxide] spent fuel projected to be generated from recycling of 37 metric tons of surplus weapons Grade plutonium? Is the cost of disposition to be paid by the utility companies using the MOX fuel, the U.S. taxpayer (as part of indirectly to electricity consumers supplied by nuclear utilities? It is worth mention that consumers presently purchasing electricity from nuclear generating plants pay more for their electricity than consumers supplied by other fuels. One-time plutonium recycling via MOX fuel requires some means to pay disposal costs of spent fuel, how is the cost to be assessed and what parties are to pay for it?

The logic, as expressed, in DOE ROD [Record of Decision] of 1/4/00 requires explanation. Contention that security measures and safeguards with goal of keeping 50 metric tons of weapons surplus plutonium with considerable (hundreds of millions of dollars in monetary value) are best served by transferring it to private industries for processing and accounting requires considerably more consideration and details!

Response
As alluded to in the comment, converting weapons-usable plutonium to fuel for commercial nuclear reactors serves the purpose of using a valuable energy resource to produce electricity as well as serving the nonproliferation purpose of putting the plutonium in a non-weapons-usable form. The contract that DOE has with a private firm specifies that the utility that has irradiated the fuel it owns and is responsible for the costs for its disposal. The spent mixed-oxide fuel would be disposed of like any other commercial spent nuclear fuel under the provisions of the NWPA. A fee is assessed to utilities, currently set at 1 mil (one-tenth of a cent), for each kilowatt-hour of electricity generated from the fuel.

Conversion of the plutonium oxide rendered from surplus weapons to mixed-oxide fuel would be done pursuant to a contract between DOE and a private firm. The conversion facility would be located at the Savannah River Site and licensed and regulated by the Nuclear Regulatory Commission. Safety and security of the mixed-oxide fuel used by utilities would be ensured in the same manner as other nuclear fuel pursuant to individual nuclear plant licenses from the Nuclear Regulatory Commission. The monetary value of the surplus weapons-usable plutonium would be realized by utilization of the material to produce electricity while at the same time putting it in a form that is not suitable for weapons use.

5.4 (11297)
Comment - EIS001814 / 0026
DEIS Page 2-58: The costs would total about $29 billion. This is representative and would vary somewhat, depending on the thermal load, packaging, and transportation scenarios and on the Nevada transportation alternative selected.

The estimated cost of the proposed action given in the EIS is not consistent with cost estimates prepared for DOE. The estimated cost for rail construction could be significantly higher than the $800 million shown in Table 2-5. For example, DOE contractor cost estimates for rail options are as high as $1.055 billion ("Nevada Potential Repository Transportation Strategy, Study 2", Volume 1, TRW, February 1996). These costs do not include the cost of rolling stock. In addition, the "costs associated with or supporting DOE program level activities, including national and Nevada transportation (emphasis added) program integration, etc." are not included (Environmental Impact Statement Cost Summary Report, TRW, June 1999, p. 6).

Response
The 1996 study cited in the comment (DIRS 101214-CRWMS M&O 1996) is not the most up-to-date source of information on cost estimates for rail options to the proposed Yucca Mountain Repository. The source for the most up-to-date data is *Nevada Transportation Study Construction Cost Estimate* (DIRS 154822-CRWMS M&O 1998) and is consistent with the $800 million stated in the EIS Proposed Action cost estimate. For the Final EIS, DOE adjusted the costs to 2001 dollars. The material quoted from the *Environmental Impact Statement Cost Summary Report* (DIRS 104980-CRWMS M&O 1999) is in error. The Proposed Action cost estimate in Section 2.1.5 of the EIS includes national transportation costs under "Waste acceptance, storage, and transportation," Nevada transportation costs under "Nevada transportation," and program integration costs under "Program integration."

Thank you for pointing out the error in the reference. DOE has corrected the reference citation in the Final EIS.

5.4 (11406)
Comment - EIS002251 / 0004
I see no economic analysis for the costs to citizens of the no-action versus having the Yucca Mountain dump.

Response
Section 2.1.5 of the EIS discusses the estimated costs of the Proposed Action and Section 2.2.3 discusses the estimated costs of the No-Action Alternative. DOE based these estimates on the best available data and standard cost estimating techniques. The estimated cost information does not serve as justification for a repository, but provides a point of comparison between the Proposed Action and the No-Action Alternative. Commercial utilities are responsible for the costs of disposal of commercial spent nuclear fuel and the Federal Government is responsible for the costs of disposing of waste generated or owned by the United States. The utility fees are currently specified to be 1 mil (one-tenth of one cent) for each kilowatt-hour of electricity generated by a commercial nuclear power reactor. The utility fees go into the Nuclear Waste Fund, which is administered by the Secretary of the Treasury.

Congress also appropriates the funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the Federal Government. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. Thus, the commercial utilities are "paying their fair share" of repository program costs along with taxpayers. However, the cost estimates in the EIS do not consider and are not sensitive to the source of funding.

5.4 (12342)
Comment - 010170 / 0016
The Proposed Yucca Mountain Repository is a very poor use of taxpayer funds - for the money already spent, irradiated fuel rods could already be contained. According to the "Total System Life-Cycle Cost of the Civilian Radioactive Waste Management Program" DOE document, suitable containers for onsite storage can be fabricated for $100,000 per metric ton of irradiated fuel. When calculated for the 77,000 tons of irradiated fuel estimated for disposal in the next 30 years, the cost would be 7.7 billion dollars. Assuming that mass production would reduce the cost farther, the $6.7 billion already spent on Yucca Mountain could have provided safe containers on site already.

Response
The NWPA directs the Secretary of Energy to perform site characterization activities at the Yucca Mountain Site and, if the site is found suitable make, a recommendation to the President on whether to approve the site for development of a repository. As stipulated by the NWPA, while the Federal Government has the responsibility to provide for the permanent disposal of spent nuclear fuel and high-level radioactive waste, the costs of such disposal should be the responsibility of the generators and owners. The Nuclear Waste Fund was established to pay for the actions specified in the NWPA, such as site characterization, repository design, site recommendation, and licensing. DOE does not have the discretion to use the funds for other purposes such as the purchase of waste storage containers for onsite use.

5.4 (12691)
Comment - EIS001887 / 0121
Page 2-58; Section 2.1.5 - Estimated Costs Associated with the Proposed Action

The cost of the repository program should include the whole program, including a breakdown for each thermal load, each packaging scenario, and all transportation scenarios. Given the broad uncertainty in the design of the repository in the Draft EIS, the cost estimate for the monitored geologic repository lacks any substantive basis. The same is true for waste acceptance, storage, and transportation.

The costs estimates associated with the Proposed Action contained in the Draft EIS are grossly understated. The State of Nevada commissioned an independent study of program costs in1998 (see Attachment T, "An Independent Cost Assessment of the Nation's High-Level Nuclear Waste Program"). The study found that DOE's proposed program, as it was then conceptualized, would cost $53.9 billion (in 1996 dollars). The study also found that, at most, the Nuclear Waste Fund could be expected to generate $28.1 billion (in 1996 dollars), leaving a taxpayer liability of at least $25.8 billion. The study did not take into account many of the costly "design features and alternatives" DOE now considers essential for the Yucca Mountain facility. It also did not analyze the effect of probable early power plant closures that could significantly reduce the amount of funds generated by the fee imposed on nuclear-generated electricity, the primary source of the Nuclear Waste Fund.

The Draft EIS fails to assess the impact of the projected revenue shortfall on DOE's ability to implement the Proposed Action. By understating the real costs of the project and failing to reconcile costs with available revenues, DOE obscures a major issue that goes to the heart of the viability of the entire project.

Response
The cost estimate for the Proposed Action (see Section 2.1.5 of the Draft EIS) assumed the high thermal load scenario used in the Draft EIS. The transportation information is independent of the thermal load and is the highest estimated cost, factoring in mode and route options. The reference in the Draft EIS for the estimated costs was the *Environmental Impact Statement Cost Summary Report* (DIRS 104980-CRWMS M&O 1999). The report contains the cost estimates for the various thermal loads and inventory modules described in the Draft EIS. For instance, the report's overall cost estimate under the low thermal load scenario was about 13 percent higher than the estimate in

the Draft EIS (DIRS 104980-CRWMS M&O 1999). The cost estimate for the Final EIS (Section 2.1.5) reflects the current flexible design.

DOE developed these estimates for comparative purposes and to aid decisionmakers in discriminating between the Proposed Action and the No-Action Alternative. The estimates do not include costs before early 2002, when DOE anticipates a decision on repository development, or the costs for siting and characterization of Yucca Mountain. The No-Action estimate (Section 2.2.3 of the EIS) includes only costs that differ from those of the Proposed Action estimate. For example, it does not include storage costs until 2010, when a repository would first accept spent nuclear fuel and high-level radioactive waste, because storage would be necessary until then under both the Proposed Action and the No-Action Alternative. The No-Action estimate is based on, and consistent with, industry experience for dry storage of spent nuclear fuel and high-level radioactive waste.

The State of Nevada report noted in the comment, *An Independent Cost Assessment of the Nation's High-Level Nuclear Waste Program* (Attachment to this comment document), contains the higher cost estimate of $53.9 billion associated with total system life-cycle costs (historic as well as future costs) of a Yucca Mountain Repository. The latest DOE total system life-cycle cost estimate as presented in the Final EIS for a repository flexible design provides an estimate of total system costs from $42.8 billion to $57.4 billion (see Section 2.1.5 of the Final EIS).

Section 302 of the Nuclear Waste Policy Act of 1982 specifies that funding for disposal of commercial spent nuclear fuel would be provided by payment of fees to the Secretary of Energy by the generators of electricity from nuclear powerplants. Equivalent amounts paid by the Federal Government would cover similar costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States. Utility fees and Federal appropriations are required to be sufficient to offset expenditures associated with repository studies, transportation, and operation and closure of a repository as determined by an annual review by the Secretary of Energy. The utility fees are currently specified to be 1 mil (one-tenth of 1 cent) for each kilowatt-hour of electricity generated by a commercial nuclear power reactor. The utility fees and Federally funded share are subject to change based on a required annual review of adequacy. The utility fees go into the Nuclear Waste Fund, which is administered by the Secretary of the Treasury. Excess funds for any given year, as determined by the Secretary of Energy, are invested in obligations of the United States and earn interest. The Secretary of Energy makes expenditures from the Nuclear Waste Fund subject to appropriations by Congress. Congress also appropriates the funds from taxpayer revenues to cover the cost of disposing of high-level nuclear waste and spent nuclear fuel generated or owned by the United States. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and 30 percent from taxpayer revenues.

As reported in the *Report on Assessment of Fee Adequacy Based on FY 1999 Total System Life Cycle Cost Update*, the Nuclear Waste Fund investments had a market value of $8.5 billion as of September 30, 1999 (DIRS 152076-CRWMS M&O 1999). The analysis in the report found that the current 1-mil-per-kilowatt-hour fee charged to generators of commercial spent nuclear fuel was adequate to cover projected disposal expenses and recommended that the fee remain unchanged.

The question of funding adequacy and analysis of projected revenue shortfalls are beyond the scope of this EIS. Congress passed the Nuclear Waste Policy Act of 1982 directing DOE to perform site characterization activities, prepare a potential site recommendation, and then license, construct, operate and monitor, and eventually close a repository if the site was approved. DOE believes that Congress, having directed the Federal Government to embark on this project, would continue to fund it adequately to protect the public health, safety, and welfare. Analysis of adequate funding levels would necessarily be based on expected funding levels over time and would be extremely speculative. DOE believes sufficient information regarding the potential impacts and costs associated with the Proposed Action and No-Action Alternative is included in the EIS to support current decisionmaking.

5.4 (12701)
Comment - EIS001380 / 0002
Regarding costs: I note that one international option being considered is to establish a commercial nuclear waste storage deposit in the Australian outback, a project that might generate as much as $5 billion in revenue. It certainly seems fair that the nuclear power industry should be charged a hefty fee for the storage of their nuclear waste if the Yucca Mountain Action is enacted.

Sections 2.1.5 on page 2-58 and 2.2.3 on page 2-67 of Volume 1 deal with projected costs of the action and no-action options:

Section 2.1.5 is one short paragraph to justify a staggering $28.8 billion cost! The section gives no rationale supporting the validity of the data except a study by TRW [TRW Environmental Safety Systems Inc.], a biased DOE contractor. DOE should at least assure the public the cost figures have some validity and reliability through cross-referencing other cost estimates and sources of this type of data. Instead, there is no analysis of the costs - shouldn't data from several sources have been considered and analyzed in the report itself? The brevity of this critical section is ludicrous and invites incredulity that this data represents reality. This section is unacceptable as it stands and needs to be dramatically expanded. The paragraph needs to address who pays for Yucca Mountain in clear English, if it is the taxpayer, say so. The draft EIS should state explicitly how much of the Yucca Mountain bill and transportation costs taxpayers, industry and federal agencies will pay.

Section 2.2.3 dealing with the costs of the no-action alternative is one paragraph 10.5 lines long and indicates the cost of the no-action alternative is 2-30 times higher but, again, no rationale or cost justification is given. In short sections 2.1.5 and 2.2.3 are worthless and should be completely revised and presented in a more responsible format where the cost-sharing formula is presented.

Response

Section 2.1.5 of the Final EIS presents updated cost estimates for the proposed Yucca Mountain Repository (including costs for transportation, repository development, construction, operation and monitoring, and closure). It also includes costs of waste acceptance, storage, and national transportation; Nevada transportation; program integration (quality assurance, human resources and administration, Nuclear Regulatory Commission fees, and Nuclear Waste Technical Review Board funding); and program institutional costs (payments-equal-to-taxes, benefits payments to the State of Nevada, transportation training assistance, and other financial assistance payments). Section 2.2.3 presents cost estimates for the No-Action Alternative. DOE based these estimates on the best available data and standard cost estimating techniques.

The estimated cost information does not serve as justification for a repository, but provides a point of comparison between the Proposed Action and the No-Action Alternative. The reference cited in the Comment provides the basis for the Proposed Action cost estimate for the period from 2002 to closure.

The NWPA specifies geologic disposal for spent nuclear fuel and high-level radioactive waste. Section 302 of the Act specifies that funding for disposal of commercial spent nuclear fuel is provided by payment of fees to the Secretary of Energy by the generators of electricity from nuclear powerplants. Equivalent amounts are paid by the Federal Government to cover similar costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States. The utility fees are currently specified to be 1 mil (one tenth of 1 cent) for each kilowatt-hour of electricity generated by a commercial nuclear power reactor. The utility fees go into the Nuclear Waste Fund, which is administered by the Secretary of the Treasury. Congress also appropriates the funds from taxpayer revenues to cover the cost of disposing of spent nuclear fuel and high-level radioactive waste generated or owned by the United States. The most recent estimates show that approximately 70 percent of repository-related costs would be paid from the Nuclear Waste Fund and about 30 percent from taxpayer revenues. Thus, the private commercial utilities are "paying their fair share" of repository program costs along with taxpayers. However, the cost estimates in the EIS do not consider and are not sensitive to the source of funding. The estimates do not include costs before early 2002, when DOE anticipates a decision on repository development, or the costs for siting and characterization of Yucca Mountain. The No-Action estimate includes only costs that differ from those of the Proposed Action estimate. For example, it does not include storage costs until 2010 when a repository would first accept spent nuclear fuel and high-level radioactive waste because storage would be necessary until then under both the Proposed Action and the No-Action Alternative. The No-Action estimate is based on and consistent with industry experience for dry storage of spent nuclear fuel and high-level radioactive waste.

DOE has updated the cost estimates in the EIS, including clarification that the cost estimates are comparative in nature and include costs from 2002 through repository closure. For the Proposed Action, the EIS now includes costs up to 2002 for informational purposes. DOE believes that it is appropriate to provide the details of the cost estimates in reference documents; therefore the cost discussions in the EIS are brief.

5.4 (13281)
Comment - 010231 / 0014
Page 22 of the Executive Summary of the Yucca Mountain Science and Engineering Report.

Under Performance Confirmation and Monitoring is stated, "Performance confirmation and monitoring activities would continue throughout the preclosure period, which could extend up to 300 years." Does DOE have confidence in such a long performance-monitoring period particularly in light of the statement on page 2-31 of the Supplement about "uncertain funding" for even the relatively shorter term construction of the disposal system and transporting of the waste?

Response
As reported in *Nuclear Waste Fund Fee Adequacy: An Assessment* (DIRS 153257-DOE 2001), the nuclear waste fund investments had a market value of $8.5 billion as of September 30, 1999. The analysis in the report found that the current fee of 1 mil (one tenth of 1 cent) per kilowatt hour charged to generators of commercial spent nuclear fuel was adequate to cover projected disposal expenses (including costs associated with packaging and transportation) and recommended that the fee remain unchanged.

Section 302 of the Nuclear Waste Policy Act of 1982 specifies that funding for disposal of commercial spent nuclear fuel is provided by payment of fees to the Secretary of Energy by the generators of electricity from nuclear power plants. Equivalent amounts are paid by the Federal Government to cover similar costs associated with disposal of spent nuclear fuel or high-level radioactive waste generated or owned by the United States. Utility fees and Federal appropriations are required to be sufficient to offset expenditures associated with repository studies; transportation; and operations and closure of a repository, as determined by an annual review by the Secretary of Energy. In the event that future generations decide that the potential repository should remain open for an extended period (up to 300 years or more), the fee structure could require modification. The statement, about "uncertain funding," was intended to be in the context of funding requirements for those activities (in the relative near-term leading up to the ability to receive and emplace waste (if the site was recommended and approved), and was not intended to reflect doubt about funding once the facility, if approved, became operational.

5.4 (13350)
Comment - 010296 / 0010
Also, increased size of the footprint and additional protection requirements could mean diversion of resources and funds to certain aspects of the project such as additional excavation and drip shield requirements. The funds could be used in other aspects of the project to improve performance and/or safety. Such improvement could be along the transportation routes, or development of a better ventilation system.

Response
In 1987, Congress amended the Nuclear Waste Policy Act of 1982, directing the Secretary of Energy to perform site characterization activities at the Yucca Mountain Site and, if the site is found suitable make a recommendation to the President on whether to approve the site for development of a repository. As stipulated by the Nuclear Waste Policy Act of 1982, while the Federal Government has the responsibility to provide for the permanent disposal of spent nuclear fuel and high-level radioactive waste, the costs of such disposal should be the responsibility of the generators and owners. The Nuclear Waste Fund was established to pay for the actions specified in the Nuclear Waste Policy Act of 1982, such as site characterization, repository design, site recommendation, and licensing. All funds spent by DOE on site characterization and repository design, including the elements of the flexible design, including drip shields and repository ventilation systems, are for the purpose of ensuring that the repository could perform safely and within regulatory guidelines.

5.5 Alternatives Suggested by Commenters

5.5 (29)
Comment - 147 comments summarized
Commenters asked that DOE study more options to a repository at Yucca Mountain and conduct more research into alternative disposal methods. The focus of these comments ranged from statements that the Department needs a new approach so it is not "in a rush" to open a Yucca Mountain Repository, to statements that the Nation needs a

"huge research program" with the "level of commitment, intelligence and ingenuity that was required by the Manhattan Project." Commenters who expressed their belief that DOE is in a rush to approve a Yucca Mountain Repository stated that DOE should take the time to "think this thing through very carefully." Several commenters stated that the Nation would be better off spending the money designated (or already spent) for work on the Yucca Mountain site to fund new research on better ways to dispose of spent nuclear fuel and high-level radioactive waste or programs to promote research on relevant new technologies.

Commenters faulted DOE for its focus on Yucca Mountain and its current research program for spent nuclear fuel through such comments as the following: DOE is "pushing the Yucca Mountain plan"; slow down and take a better, longer look at alternatives; it is time to remove nuclear waste issues from the political arena and allow scientists to create new solutions; and a quick fix is unsuitable to such a big problem. Commenters also criticized geologic disposal as akin to "going back to the early 1900s" when the country used outhouses to put human waste underground.

Commenters pointed out that technology has advanced enormously over the last 100 years, so it is reasonable to assume that advances, including ways to neutralize nuclear wastes, will continue to emerge during the next 100 years. Some commenters referred to specific technologies that they feel would allow continued onsite storage and waste management, including accelerated transmutation of radioactive waste, the "Roy Process" (a transformation process), further reprocessing techniques, and "radiation eating fungus" for high-level radioactive waste. Other Commenters mentioned waiting for development of outer space disposal technology and subseabed disposal.

Two commenters stated that Senator Domenici of New Mexico has proposed a bill that would create an office of spent nuclear fuel research within DOE to focus research efforts on spent nuclear fuel processing and disposal technologies. Commenters emphasizing the development of new technologies expressed their expectation that future technology will enable processing of spent nuclear fuel into harmless materials, reusable components, or waste with reduced radioactivity or volume. On this subject, many commenters mentioned accelerator transmutation of waste as a technology that should have a high level of research priority, believing that transmutation has the potential to greatly reduce the period of time that wastes remain a danger to the environment and the public. Commenters expressed the belief that technological advances would provide an alternative to geologic disposal. Several comments encouraged DOE to "hold off for 50 years" to see what new technologies develop through the funding of new research programs or from the inevitable evolution of science.

Response

In the late 1970s, DOE evaluated numerous alternatives to geologic disposal of spent nuclear fuel and high-level radioactive waste and published its findings in October 1980 as part of the *Final Environmental Impact Statement on Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980). Among the specific technologies evaluated were deep hole disposal, rock melt disposal, island-based disposal, subseabed disposal, well-injection disposal, and disposal in outer space. DOE considered the benefits, impacts, and costs of these alternatives and concluded in its 1981 Record of Decision (46 *FR* 26677; May 14, 1981) that the mined geologic disposal alternative should be pursued (see Section 1.3.1 of the EIS).

While the NWPA does not provide for alternatives to geologic disposal, Congress has separately directed DOE to study accelerator transmutation of radioactive waste and to prepare a plan for developing that technology. Congress appropriated $4 million to develop the accelerator transmutation plan, which includes a science-based research program, a description of an operational accelerator transmutation system, and other information specifically requested by Congress. DOE submitted the report, *A Roadmap for Developing Accelerator Transmutation of Waste (ATW) Technology* (DIRS 110625-DOE 1999), to Congress on November 1, 1999. (DOE has modified Section 9.1.3 of the EIS to include the results of this report.)

In the accelerator transmutation process, long-lived radionuclides could be difficult both to isolate and to transmute. Moreover, even if accelerator transmutation becomes a practical technology, a repository would still be an essential element of the nuclear fuel cycle because significant quantities of highly radioactive, long-lived materials would remain.

In the past, DOE has reprocessed spent nuclear fuel to reclaim various useful materials. Reprocessing produces several waste streams, however, which require their own waste- or resource-management technologies, including disposal of high-level radioactive wastes in a repository. DOE has halted routine spent nuclear fuel reprocessing.

DOE agrees that new technologies for waste management could be developed in the future, but at this point, DOE does not recommend abandonment of current waste management strategies.

The operational plan for the proposed repository provides for a design and management approach that isolates wastes from the public in the future while allowing flexibility to preserve options for modifying emplacement or retrieving the waste. The repository would remain accessible for scientists to continue testing and monitoring. By taking a modular or sequential approach to design and construction, more flexibility would be provided for the future generation of scientists and engineers to continue evaluating repository performance while maintaining the capability to retrieve spent nuclear fuel and high-level waste emplaced in the repository.

5.5 (30)
Comment - 47 comments summarized
Commenters stated that DOE should use a location other than Yucca Mountain for the disposal of spent nuclear fuel and high-level radioactive waste. Some commenters favored the repository concept but asked DOE to build it in their states to bring jobs to their communities. Overall, however, most commenters suggesting the use of an alternative location criticized the Proposed Action. Several commenters asked for a repository to be located in another state, preferably in the Eastern United States near the majority of nuclear powerplants. Other commenters suggested it would be safer to build multiple repositories in various regions or in each state that has a nuclear powerplant, thus reducing transportation distances.

Other commenters suggested that the Department use existing DOE sites, including the Nevada Test Site, for both DOE high-level radioactive waste and commercial spent nuclear fuel. Several commenters suggested that DOE should rely on the private sector through the licensing of private independent spent nuclear fuel storage facilities. In addition, commenters suggested that alternatives to a Yucca Mountain Repository site could be found by using tribal facilities, deep ocean disposal, an island in the Pacific Ocean, or a different repository built in a granite formation or salt dome.

Response
With the passage of the NWPA, Congress established and defined this Nation's policy for the disposal of spent nuclear fuel and high-level radioactive waste to be geologic disposal. Under the provisions of the NWPA, Congress also directed DOE to prepare this EIS as information for the possible recommendation to the President to approve the development of the Yucca Mountain site for a geologic repository. Congress' intent was to implement a permanent Federal solution to the Nation's problem of accumulated spent nuclear fuel and high-level radioactive waste to avoid passing the problem unaddressed to future generations. As discussed in Section 1.5 of the EIS, the NWPA states that the EIS need not consider alternatives to geologic disposal or any site other than Yucca Mountain for repository development.

In the late 1970s, DOE evaluated numerous alternatives to geologic disposal of spent nuclear fuel and high-level radioactive waste and published its findings in October 1980 as part of the *Final Environmental Impact Statement on Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980). Among the specific technologies evaluated were very deep hole disposal, rock melt disposal, island-based disposal, subseabed disposal, well injection disposal, and disposal in outer space. Only deep geologic disposal demonstrated an acceptable combination of benefits and risks.

Under the Nuclear Waste Policy Act of 1982, DOE evaluated several sites in different geologic media for disposal of spent nuclear fuel and high-level radioactive waste. Pursuant to that Act, DOE identified nine candidate sites. The Secretary of Energy nominated five of the nine sites for further consideration and study. In May 1986, DOE issued environmental assessments for each of the five sites. Based on DOE's recommendations, President Reagan approved three of the five sites as candidate sites for a repository. The three sites were Deaf Smith County, Texas; Hanford, Washington; and Yucca Mountain, Nevada. In 1987, Congress amended the Nuclear Waste Policy Act to designate one of the three candidate sites, Yucca Mountain, as the only site to be studied as a potential location for a repository.

5.5 (183)
Comment - 90 comments summarized
A number of commenters believe that the best alternative is to terminate production of nuclear waste and eliminate nuclear power. The majority of these commenters called simply for the utilities to stop producing nuclear waste, which in the context of the Comments means commercial spent nuclear fuel. Commenters stated that production must stop because the Nation needs a safe means of disposal, which is not a repository; nuclear waste production must end and the nuclear industry should have solved the waste problem before it began production. If the Yucca Mountain Repository became a reality, the problem of nuclear waste production would continue because the utilities would continue to produce waste.

Response
DOE and the commercial nuclear industry have long been aware of the issues associated with the disposal of spent nuclear fuel and high-level radioactive waste. There has been a concerted effort to determine the most appropriate means of disposal. The Yucca Mountain site characterization studies and this EIS are a continuation of these efforts.

At present, commercial nuclear powerplants produce approximately 20 percent of the total electric power generated nationwide. The role nuclear powerplants will play in the future of the Nation depends, in part, on the relicensing by the Nuclear Regulatory Commission and future power generation decisions made by each commercial utility, pursuant to Commission regulations. Even if the Nation's utilities ceased the production of commercial spent nuclear fuel, the waste generated in the past would still require long-term disposition, as directed by the NWPA. If nuclear powerplants continue to operate, they will continue to produce spent nuclear fuel. If the repository became operational and met its volume limitation, the issues of where and how to manage additional spent nuclear fuel would require decisions on the national level.

5.5 (1517)
Comment - EIS000442 / 0003
Alternative scenarios for implementing the NWPA, including the mitigation provisions of Section 116 are not included. No -- only no -- the full range of the alternatives to implement repository construction, operation transportation closure should include scenario one, no mitigation measurements. Scenario 2, financial mitigation measurements only and Scenario 3, physical -- No. 4 would be the mix of financial and physical mitigation measures.

Response
Chapter 9 of the EIS provides DOE's initial list of mitigation considerations identified at this time and describes management actions that DOE would consider to reduce or minimize adverse impacts to the environment. Chapter 9 also states that, apart from the requirements of the National Environmental Policy Act, Section 116 of the NWPA requires the Secretary of Energy to provide financial and technical assistance to mitigate impacts of the development of a repository and the characterization of the site. The Section 116 mitigation assistance review process and the EIS process are distinct from one another and the implementation of one does not depend on the implementation of the other.

DOE believes that the presentation of mitigation actions in the EIS is consistent with the requirements of both the NWPA and the National Environmental Policy Act. DOE would furnish assistance under Section 116(c) of the NWPA as a result of procedures separate from the site evaluation process that includes this EIS. The Section 116(c) procedures establish specific steps outside the National Environmental Policy Act for grants, requests, and agreements on compensation, and payments in lieu of taxes. Nevertheless, DOE would evaluate requests for assistance submitted by the potentially affected units of local government.

5.5 (3050)
Comment - EIS001048 / 0005
What the nuclear power companies should do instead of pressuring the DOE to rid their states of nuclear waste, after they have made the monetary profits, is to spend a small percentage of those profits in research to discover economical ways to neutralize the waste and then dump it in their own states. The nuclear power companies provide power to residents. At what cost???? They make the money, they should fund the intense research needed to make the discovery.

Focus your energy, dollars and efforts on research into ways to neutralize the waste.

Response
Through the NWPA, Congress has affirmed that the Federal Government is responsible for the permanent disposal of spent nuclear fuel and high-level radioactive waste. To accomplish this objective, Congress directed the Secretary of Energy to determine whether to recommend to the President that the Yucca Mountain site be approved for development of a repository for the permanent disposal of these materials.

Although DOE continues to focus on the development of a geologic repository as required by Congress, DOE also continues to fund research and development of other technologies that could prove useful in the management of spent nuclear fuel and high-level radioactive waste. One such technology is accelerator transmutation of waste. This technology could eventually result in the elimination or reduction of certain radionuclides in the inventory and thus could add flexibility to the design of a repository and reduce uncertainties about performance. Section 9.1.3 of the EIS provides additional details.

5.5 (3173)
Comment - EIS001194 / 0004
Rather than store spent nuclear fuel in a Nevada salt cavern, it might prove less hazardous and more cost effective to load the stuff atop an old 'Saturn 5' booster and blast it into the sun. We would still have that pesky transportation problem, however. Perhaps it would be best therefore, to simply bury nuclear waste on site. A public outcry against such practice could easily be prevented by buying up all housing within a reasonable proximity to the facility, then selling it off to the families of power plant owners, their lobbyists, politicians eager to support their programs, and all the so called "experts" who keep trying to sell us on the addle headed notion that, in their hands, atomic waste is safer than baby powder. This solution may also prove more cost effective than shipping the waste cross-country to a hollowed-out mountain. While quite sure that your office would dismiss this suggestion out-of-hand, I am just as certain your position there would be wholly untenable.

Response
In the Record of Decision (46 *FR* 26677; May 14, 1981) for the *Final Environmental Impact Statement, Management of Commercially Generated Radioactive Waste* (DIRS 104832-DOE 1980), DOE determined that a monitored geologic repository was the best available method for the disposal of spent nuclear fuel. Under the provisions of the NWPA, Congress directed DOE to prepare an EIS to evaluate the Yucca Mountain site for its use as a geologic repository and, as such, a permanent solution to the national problem of the disposal of spent nuclear fuel and high-level radioactive waste. The Act states that this EIS need not evaluate alternatives to geologic disposal at Yucca Mountain. As a consequence, the EIS does not include alternatives such as deep space disposal, onsite storage or burial, or other approaches.

5.6 Other Comments on Alternatives

5.6 (1934)
Comment - EIS000478 / 0002
In addition to creating a permanent repository for nuclear materials at Yucca Mountain, the federal government should continue to generously fund research into alternative methods of dealing with radioactive waste. The storage facilities at Yucca Mountain are currently projected to hold only the amount of waste that the U.S. will produce by 2015. If alternative methods for dealing with this waste are not found by then, more permanent deep geologic repositories will need to be constructed. It is very much in the interest of the American people and the federal government to do everything necessary to see that such an alternative or alternatives are found.

Response
In passing the Nuclear Waste Policy Act of 1982, Congress affirmed that the Federal Government is responsible for the permanent disposal of spent nuclear fuel and high-level radioactive waste. To accomplish this goal, Congress envisioned the possibility of more than one repository—prohibiting the Nuclear Regulatory Commission from approving a license for the emplacement of more than 70,000 metric tons of heavy metal (MTHM) in the first repository until such time that a second repository is in operation [Section 114(d)]. The total projected inventory of spent nuclear fuel and high-level radioactive waste is more than 70,000 MTHM. Emplacement in excess of

70,000 MTHM at Yucca Mountain would require legislative action by Congress unless a second repository was in operation.

It is reasonably foreseeable for Congress to take such a legislative action, or that the first repository at Yucca Mountain would be approved for disposal of greater than 70,000 MTHM, once a second repository was in operation. Chapter 8 of this EIS analyzes cumulative impacts from the disposal at Yucca Mountain of all spent nuclear fuel and high-level radioactive waste projected to be produced through 2046 for which DOE will retain ultimate responsibility. Chapter 8 also considers the disposal of Greater-Than-Class-C waste and Special Performance Assessment Required waste at Yucca Mountain.

In the NWPA [Section 114(f)(2)], Congress directed that DOE need not consider alternatives to geologic disposal in preparing this EIS (see Section 2.3.1 of the EIS). The future course that Congress, DOE, and the commercial utilities would take if Yucca Mountain did not receive a recommendation as a repository site is highly uncertain. Chapter 9 discusses the development of new technologies (such as accelerator transmutation of waste) as one possibility. DOE does have an ongoing investigation of accelerator transmutation of waste as a potential technology for reducing the volume of waste ultimately requiring geologic disposal.

As discussed in Chapter 9 of the EIS, DOE continues to evaluate new technologies (such as accelerator transmutation of waste) to reduce the potential effects of the repository project. However, the Department cannot expend any funds not authorized and appropriated by Congress. The broader effort advocated by the Commenter would require appropriation of funds by Congress; except on a limited basis, funds for investigation of alternative methods of management of spent nuclear fuel and high-level waste have not been appropriated.

5.6 (2420)
Comment - EIS000511 / 0005
In conclusion, I guess a lot of comments -- not tonight, but more so earlier -- really dealt with this as if it was a referendum on nuclear power, which it is not. High-level waste exists and must be dealt with in a safe and conscientious manner. We have to do this and deal with the waste that's out there. Stopping the repository does nothing to deal with the waste.

I don't think the DOE is any way is rushing into this. Earlier today there was a lot of people concerned about rushing into this. If I remember right, we started the program in Congress in 1982. The earliest, now the Department of Energy thinks it could accept fuel at Yucca Mountain, is 2013. I don't think that meets anybody's definition of a rush project. In fact, it's one of the longest running federal projects in the history of the United States. I don't think there's any basis to say this is rushing. I think they have proceeded in a definitely very cautious and deliberate manner.

Response
DOE acknowledges this point of view and appreciates the commenter's participation in the National Environmental Policy Act process.

5.6 (12712)
Comment - EIS002133 / 0008
There's been talk about this radioactive recycling. I just want to put that out. This is another thing that - that these folks are trying to do is slip one past us and recycle metals into the marketplace. All right. We're talking you go to the store, you get a new set of dishes and some new silverware and some spoons and stuff and it's radioactive, but you'll never know, because as soon as it leaves that power plant, as soon as it leaves the nuclear industry, it - the regulation of it stops. And so we have - we have the right to stop that from happening. We have the right to protect our future generations.

I mean, we're talking about nuclear waste that for the next 700 generations, 700 generations. Can you fathom 700 generations? I have a hard time thinking two generations ahead let alone 700 generations. This process, the DEIS process, I think you guys - I know you've worked really hard and I appreciate that you are doing the best you can, but, hey, you could start it over. You could all find new jobs. Talk to me. I'll see what I can do. I know a couple people here in Vegas. Maybe we could hook you up with some other kind of work, because there are other things you can be doing besides bringing this contamination here.

Response
Within the scope of this EIS, there is no contemplation of recycling spent nuclear fuel or high-level radioactive waste for uses of any kind in the marketplace.

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6

Spent Nuclear Fuel and High-Level Radioactive Waste

6. SPENT NUCLEAR FUEL AND HIGH-LEVEL RADIOACTIVE WASTE

6 (1091)
Comment - EIS000217 / 0003
Waste should be reclassified to reflect longevity and hazard. Wastes that threaten to exacerbate environmental contamination in the short- and medium- term should be stabilized and retrievably stored, pending long-term disposal.

Response
The Final EIS includes a new "representative" commercial fuel for the purposes of calculating impacts of repository and transportation accidents. The representative fuel is based on a Hazard Index approach, which considers the relative hazard of all commercial spent nuclear fuel to be received at the repository. This fuel is younger and has higher burnup than the "typical" commercial fuels used in the Draft EIS. DOE has revised Section J.1.4.2 in the Final EIS to be consistent with the Appendix A numbers for "representative" commercial pressurized-water reactor fuel. Regarding longevity, these materials are too similar in how long they are hazardous (well beyond any regulatory period) to provide for reasonable differentiation.

All spent nuclear fuel and high-level radioactive waste would be required to meet acceptance criteria prior to receipt at the proposed repository. One of these requirements is that the waste be inherently stable.

6 (1327)
Comment - EIS000268 / 0001
The DEIS provides insufficient information on the radiological characteristics of spent nuclear fuel (SNF) and high-level radioactive waste (HLW). During the scoping process in 1995, Nevada recommended that the DEIS provide technical data on each type of SNF and HLW shipped to the repository, especially "Key radiological characteristics: total radioactivity, radionuclide composition, surface dose rate, thermal output, and changes over time in each of these characteristics.

The DEIS identifies appropriate typical fuel types for pressurized-water reactor (PWR) and boiling water reactor (BWR) SNF, [p. A-14] typical HLW canister types, [Pp. A-38 to A-42] waste forms representative of eleven DOE SNF categories [p. A-23] and commercial greater-than-Class-C waste [Pp. A-57 to A-58]. The DEIS provides adequate information on the projected inventories, physical dimensions, and thermal characteristics for most, but not all, of these waste forms.

In sharp contrast, the DEIS provides insufficient and inconsistent technical data on the radiological characteristics of the designated "typical" waste forms. The DEIS inexplicably fails to provide such critical information as the total activity (in curies) and the surface dose rate (in rems per hour) for the "typical" PWR and BWR SNF assemblies, and for mixed-oxide (MOX) SNF fuel, as a function of initial enrichment burnup history, and cooling times. Where the DEIS attempts to provide useful information on the radioactive material content of loaded rail casks in Table J-14, the data on commercial SNF is either incorrect or in conflict with the data presented in Table A-8. The DEIS makes no attempt to provide comparable data on the radiological characteristics of truck casks loaded with various waste types.

Response
The level of radiological information provided in Appendix A of the EIS is sufficient to assess the environmental impacts both of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository and of No-Action Alternative. Appendix A provides a substantial amount of information on the types and amounts of radioactivity involved in each waste form. The waste inventory information in Appendix A includes the final waste form, physical characteristics, mass, volume, amount and nature of radioactivity, chemical composition, thermal output, and canister data.

For dose and dose rate information, see Section F.2.2.3 of the EIS for radiological exposure data from shielded waste packages used to determine human health impacts for normal repository operations. Appendix H provides individual and collective doses for repository accident scenarios. For transportation dose information, Appendix J

indicates that the maximum dose rate permitted by regulation on a transportation cask is very conservatively assumed.

Table J-14 of the Draft EIS has an error in footnote (a); specifically, the source is actually estimated based on 26, not 36, pressurized-water reactor fuel assemblies. The Final EIS includes a new "representative" commercial fuel for the purposes of calculating impacts of repository and transportation accidents. The representative fuel is based on a Hazard Index approach, which considers the relative hazard of all commercial spent nuclear fuel to be received at the repository. This fuel is younger and has higher burnup than the "typical" commercial fuels used in the Draft EIS. DOE has revised Section J.1.4.2 in the EIS to be consistent with the Appendix A numbers for "representative" commercial pressurized-water reactor fuel.

6 (2289)
Comment - EIS000594 / 0001
We're going to be consolidating the waste from 77 sites into one site. And I question whether or not those 77 sites are going to be radioactive free.

Are those 77 sites no longer going to be considered hazardous sites? Is all the radiation going to be cleaned up from those sites? That is going to take a really long time. I think it's a spin on information, and I don't think it's accurate.

Response
The Proposed Action would not provide any decontamination services to either utilities or DOE sites. The responsibility for actual cleanup of each of the 77 sites described in the EIS would remain with the facility owners. The Nuclear Regulatory Commission requires cleanup and remediation of commercial nuclear reactor sites after operations cease. DOE is actively remediating its nuclear sites to meet its own program requirements within schedule and funding constraints.

6 (5903)
Comment - EIS000815 / 0002
The major flaw in this DEIS is the failure to clearly distinguish between "Spent Nuclear Fuel," which contains large quantities of weapons and energy usable material, and "High Level Radioactive Waste," which does not. Most Americans are not aware of the difference, because the program initiated by Atomic Energy Commission Chairman Glenn Seaborg during the Administration of President John Kennedy to provide full and accurate information about nuclear technology to Americans was discontinued by the Energy Research and Development Administration and the Department of Energy.

Disposal of spent nuclear fuel would create a virtually permanent proliferation/diversion threat and deny any energy resource that could provide all of the electricity needs of the US for more than 10,000 years. This action should not be approved.

Disposal of high level radioactive waste would not create a proliferation threat nor deny an important energy resource. Moreover, its shipment to and disposal at Yucca Mountain would not result in significant danger to present or future populations. This action should be approved.

The DEIS fails to explain that spent fuel being considered for disposal at Yucca Mountain would contain enough plutonium for 100,000 nuclear weapons. This plutonium would become accessible for easy recovery after a few hundreds year decay of intensely radioactive fission products. Thus the proposed action for disposal of spent fuel would lead to a virtually permanent proliferation/diversion threat that could not be safeguarded.

The DEIS also fails to explain that materials in this spent fuel could be used to produce electricity needs for the U.S. for more than 10,000 years, without the pollutants that poison our atmosphere and greenhouse gasses that threaten catastrophic climatic changes.

Response
DOE agrees that spent nuclear fuel contains weapons-usable materials. In relation to the possibility of a proliferation or diversion threat following closure of the proposed repository, however, Congress, in the Nuclear

Waste Policy Act of 1982, mandated the development of deep geologic disposal for spent nuclear fuel and high-level radioactive waste to isolate the material from the accessible environment. DOE believes that placing the material an average of approximately 300 meters (1,000 feet) below the surface in a repository excavated from solid rock satisfies the intent of such isolation in relation to potential terrorist activity. To excavate to the repository level after closure would take a very large level of effort, with sophisticated excavation equipment, a large workforce, and significant expenditure of funds – all unlikely without being highly visible to authorities and the public. Therefore, such activity would be unlikely. Even if terrorists were able to penetrate to repository depth, the spent nuclear fuel and high-level radioactive waste would be in waste packages weighing between 32 and 82 metric tons (35 and 90 tons), each made of solid metal (stainless steel and Alloy-22) approximately 8 centimeters (3 inches) thick. Without the ventilation systems and emplacement equipment that DOE would use to handle waste packages remotely, terrorists would probably not survive the high temperatures and high radiation fields in the repository. Therefore, it is unlikely that terrorists could remove or significantly damage a waste package.

DOE also agrees that the significant quantity of fissionable material in spent nuclear fuel could be used as an energy source. However, for reuse in commercial nuclear reactors to generate electricity, the spent nuclear fuel would have to undergo chemical reprocessing. At present, the United States does not reprocess spent nuclear fuel for either nuclear power generation or nuclear explosive purposes. President Carter announced the policy in 1977 to defer such reprocessing indefinitely. On September 27, 1993, President Clinton announced to the United Nations that "the U.S. would seek to eliminate where possible the accumulation of stockpiles of highly enriched uranium or plutonium, and to explore means to limit stockpiling of plutonium from civil nuclear programs." He explained that the United States "does not encourage the use of civil plutonium and, accordingly, does not itself engage in plutonium reprocessing for either nuclear power or nuclear explosive purposes."

However, to protect future options, including recovery and reuse of the waste materials, Section 122 of the NWPA requires retrievability at a repository. Federal regulations (10 CFR Part 63) require the repository design to include the option of retrieval on a reasonable schedule for as long as 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the proposed Yucca Mountain Repository includes a design and management approach that would isolate wastes from the public, and incorporates options to modify emplacement and retrieve the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly as long as 300 years in the event of a decision to retrieve the waste either to protect the public health and safety or the environment or to recover resources from spent nuclear fuel.

6 (6251)
Comment - EIS001972 / 0002
President Carter's Presidential Executive Order preventing the reprocessing of high-level radioactive nuclear waste should be rescinded. The premise for this Order is no longer valid.

The high-level radioactive nuclear waste is a very valuable resource, and with the future advance of technology, the option of reprocessing this material for the benefit of our society should remain open.

Yucca Mountain should be characterized as a "storage site," and not a "disposal site" for high-level radioactive nuclear waste.

With Yucca Mountain as a high-level radioactive nuclear waste "storage site," and in the future the reprocessing of this material, this would provide Nevada with business diversification, development of a technology center, and significant economic benefits.

Response
While materials disposed of in the repository could have the potential to be an economic resource, it has been a long-standing policy of the United States to promote international nonproliferation efforts by not reprocessing nuclear material. This policy, initiated by President Carter in 1977, called for deferral of commercial reprocessing in the United States and called on other nations not to proceed with reprocessing programs. In 1993, President Clinton reemphasized U.S. policy, stressing the need to avoid increasing the accumulation of material that has the potential for use in nuclear weapons. Our national security policy places a high priority on nonproliferation and makes it an integral element of relations with other countries.

The potential use of a permanent repository is critical to the U.S. nonproliferation policy. Section 122 of the NWPA requires retrievability at a high-level radioactive waste repository. Federal regulations at 10 CFR Part 63, *Disposal of High-Level Radioactive Wastes in a Proposed Geological Repository at Yucca Mountain, Nevada*, require DOE to design the repository to preserve the option of waste retrieval on a reasonable schedule for as long as 50 years after the start of waste emplacement. In accordance with these requirements, the operational plan for the proposed repository includes a design and management approach that isolates wastes from the public in the future while allowing flexibility to preserve options for modifying emplacement and retrieving the waste. This design would maintain the ability to retrieve emplaced materials for at least 100 years and possibly as long as 300 years in the event of a decision to retrieve the waste either to protect the public health and safety or the environment or to recover resources from spent nuclear fuel.

6 (6778)
Comment - 010141 / 0005
And our government, when we talk about money, they have no transportation. And in my report I did calculations that transport for the 77,000 metric tons, of which more than 7,000 is very arbitrary, this is DOD stuff, which is very hot and it's not pedigreed as are the rods from the nuclear power plants. And there will be more than 10,000 metric tons of this very disputable stuff.

Response
The EIS, in accordance with the NWPA evaluated the Proposed Action to construct, operate and monitor, and eventually close a repository at Yucca Mountain that would contain 70,000 metric tons of heavy metal (MTHM). The 70,000 MTHM would consist of 63,000 MTHM of commercial spent nuclear fuel and 7,000 MTHM of defense-related materials (10 percent of the total). The 7,000 MTHM of defense-related materials would consist of 2,333 MTHM of spent nuclear fuel, primarily from DOE production reactors, and 8,315 canisters of solidified high-level radioactive waste, primarily from the production of nuclear weapons materials. Appendix A of the EIS contains detailed descriptions of these materials, and Chapters 4 and 5 describe the short- and long-term impacts of repository disposal, respectively. Chapter 6 describes impacts related to the transportation of these materials to the proposed repository.

All waste accepted for disposal would meet the repository waste acceptance criteria as well as the packaging requirements. DOE would be responsible for ensuring that the waste is in a form that met approved acceptance and design criteria. Section A.1.1.3 of the EIS describes the steps to meet the disposal criteria. As part of the process, the Department would conduct inspections, audits, and quality assurance checks pursuant to a range of DOE Orders (see Section 11.3).

6 (6779)
Comment - 010141 / 0006
They play politics with it and our lives because they give it to DOE to service, but it is classified. And I have stated at every meeting I have ever been to that you cannot put classified waste in the mountain, and they know it.

Response
Appendix A of the EIS provides an inventory of all candidate materials for disposal in the repository. All waste accepted for disposal would meet the repository waste acceptance criteria and the packaging requirements, regardless of the classification of the material. These requirements would ensure that the repository could meet the long-term performance objectives.

6 (7923)
Comment - EIS000817 / 0039
In the first section you talk of vitrification and MOX [mixed-oxide] fuel use as if they are "done deals." They are not. Vitrification has problems and MOX hasn't even gone to Canada yet to be tested as far as I know. How can you predict anything about them at this stage?

Response
The more than 1,000 canisters of high-quality borosilicate glass produced to date at the high-level radioactive waste vitrification facilities at the West Valley Demonstration Project in New York and the Defense Waste Processing Facility at the Savannah River Site in South Carolina are evidence of the vitrification process as a proven

technology. Other documents (DIRS 103191-DOE 1994; DIRS 101729-DOE 1996; DIRS 103214-DOE 1996; DIRS 101816-DOE 1997) evaluated vitrification, so DOE has not included its process impacts in this EIS (see Section 1.5.3).

In the *Record of Decision for the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement* (DIRS 103220-DOE 1997), DOE retained the option to use surplus plutonium as mixed-oxide fuel in Canadian uranium deuterium reactors, which would occur only in the event of a multilateral agreement between Russia, Canada, and the United States. Since the publication of the *Surplus Plutonium Disposition Draft Environmental Impact Statement* (DIRS 103222-DOE 1998), DOE determined that there is adequate commercial nuclear reactor capacity in the United States for disposition of the portion of U.S. surplus plutonium suitable to become mixed-oxide fuel. Therefore, DOE is no longer pursuing the Canadian uranium deuterium option. However, this option is still under consideration for the disposition of Russian surplus plutonium. To assist the United States, Russia, and Canada in considering this option, the three countries are conducting a joint experiment that will involve irradiating a small amount of mixed-oxide fuel fabricated from United States and Russian surplus weapons plutonium in a Canadian research reactor. This effort involved a one-time shipment of a small quantity of plutonium from the United States to Canada (65 *FR* 1620; January 11, 2000).

Mixed-oxide fuel has been used in light-water reactors since 1963 and is currently in more than 30 European reactors. Three European plants (two in France and one in Belgium) produce about 170 metric tons (190 tons) per year of mixed-oxide fuel for use in light-water reactors. In addition, mixed-oxide fuel plants under construction in Japan, Russia, and the United Kingdom will bring worldwide production of this fuel to more than 360 metric tons (400 tons) per year soon after 2000. DOE drew on this extensive experience to estimate potential impacts related to disposition of weapons-grade plutonium in U.S. light-water reactors. DOE evaluated these impacts in other documents (DIRS 103215-DOE 1996; DIRS 103222-DOE 1998; DIRS 103227-DOE 1999), and has not included them in this EIS (see Section 1.5.3).

6 (8481)
Comment - EIS001568 / 0003
The facility will not hold any decommissioning waste, whatsoever. That's a whole other problem, that's a shock to me. And I don't know how you're going to be planning on dealing with the huge volumes of materials that will be generated by that.

Response
This comment is correct that, in general, DOE does not plan to dispose of waste from decommissioning activities in a geologic repository. Candidate materials for a repository at Yucca Mountain are limited to spent nuclear fuel, high-level radioactive waste (as defined by the Nuclear Regulatory Commission at 10 CFR 60.2), and other wastes such as commercial Greater-than-Class-C and Special-Performance-Assessment-Required wastes if the Nuclear Regulatory Commission determines that they require permanent isolation.

In general, waste from decommissioning is not classified as radioactive waste, or is classified as low-level radioactive waste and disposed of in near-surface facilities. Some wastes associated with the decommissioning of commercial nuclear reactors could be Greater-Than-Class-C, and DOE has included them in the evaluation of Inventory Module 2 in Chapter 8 of the EIS. In addition, DOE has performed programmatic and site-specific evaluations of various options related to the disposition of its low-level waste, including the waste streams expected from facility decommissioning. Other DOE documents (such as DIRS 101802-DOE 1995 and DIRS 103209-DOE 1995) discuss impacts related to these activities.

6 (8996)
Comment - EIS001040 / 0027
What possible scientific reason would DOE allow mixtures of waste from civilian, research and defense sources?

Response
Spent nuclear fuels, whether generated from commercial applications or research or defense programs, have similar nuclear and physical characteristics and require long-term isolation from humans and the environment. As suggested by this comment, some of the spent nuclear fuel to be disposed of at the proposed repository has been generated as a result of civilian research. However, these materials are still the property of the U.S. Government.

6 (9442)
Comment - EIS001888 / 0130
DEIS Statement (pg. 2-38) - The DEIS assumes that, at the time of shipment, the spent nuclear fuel and high-level radioactive waste would be in a form that met approved acceptance and disposal criteria for the repository.

Clark County comment - The DEIS did not delineate how or who will be responsible for ensuring that the material to be disposed of is in approved form. NEPA [National Environmental Policy Act] Regulation: Sec. 1502.1 Purpose; Sec. 1502.16 Environmental consequences.

Response
Waste generators would be responsible to certify that their wastes meet the repository's waste acceptance criteria before acceptance by DOE and shipment to the proposed repository. DOE would be responsible for ensuring that the waste is in a form that meets approved acceptance and design criteria as specified in the repository's operating license. Section A.1.1.3 of the EIS describes the steps to meet the disposal criteria. As part of the process the Department would conduct inspections, audits, and quality assurance checks pursuant to a range of DOE Orders (see Section 11.3).

6 (10028)
Comment - EIS001930 / 0003
The EIS summary also specified that radioactive waste from medical and research labs would be deposited at the Yucca Mountain site, but it does not specifically identify the primary locations of these source points. It is likely that, due to the number of biomedical businesses located in San Diego that there are source points located in San Diego that would utilize regional state and local highways in San Diego County. Will truck routes from these sites be altered?

Response
The specific radioactive wastes from medical and research labs mentioned in this comment could be classified as Greater-Than-Class-C low-level wastes. Section A.2.5 of the EIS provides information about Greater-Than-Class-C wastes that could eventually require geologic disposal. These wastes are included in the EIS as part of Inventory Module 2. As stated in the introduction to Chapter 8 of the EIS, the disposal at Yucca Mountain of any wastes in excess of the 70,000 metric tons of heavy metal included in the Proposed Action would require legislative action by Congress unless a second repository was in operation. Section 8.4.1.1 addresses transportation impacts of the additional inventory modules. The majority of Greater-Than-Class-C wastes would be shipped from commercial nuclear utilities (65 percent by volume). Specific information regarding the various locations of other Greater-Than-Class-C wastes throughout the country is not readily available. The analysis assumed these wastes would be shipped from the 72 commercial sites using existing roadways or rail routes.

6 (10392)
Comment - EIS002192 / 0003
As you know, I will protest to my dying day and sue everybody until I die regarding the 10 percent DOD high-level waste and classified waste going into Yucca Mountain.

There is no mention of this DOD stuff in this report, and it is very remiss on that.

Response
The EIS, in accordance with the NWPA, evaluated the Proposed Action to construct, operate and monitor, and eventually close a repository at Yucca Mountain that would contain 70,000 metric tons of heavy metal (MTHM). The 70,000 MTHM would consist of 63,000 of commercial spent nuclear fuel and 7,000 MTHM of defense-related materials (10 percent of the total). The 7,000 MTHM of defense-related materials consist of 2,333 MTHM of spent nuclear fuel, primarily from DOE production reactors, and 8,315 canisters of solidified high-level radioactive waste, primarily from the production of nuclear weapons materials. Appendix A of the EIS contains detailed descriptions of these materials (Table A-20 specifically includes 65 MTHM of spent nuclear fuel from Navy applications), and Chapters 4 and 5 of the EIS describe the short- and long-term impacts of repository disposal, respectively. Chapter 6 describes impacts related to the transportation of these materials to the proposed repository.

In addition, Chapter 8 of the EIS evaluates the disposal in the repository of all commercial and DOE spent nuclear fuel and all high-level radioactive waste projected through 2046 (Module 1) as well as Greater-Than-Class-C low-level waste and defense-related Special-Performance-Assessment-Required low-level waste (Module 2) as a reasonably foreseeable future action. For this reason, Chapter 8 evaluates potential impacts for these actions as potential cumulative impacts.

In relation to classified materials in Yucca Mountain, Appendix A provides an inventory of all candidate materials for disposal in the repository. All waste accepted for disposal would meet the repository waste acceptance criteria as well as the packaging requirements regardless of the classification of the materials. These waste form and packaging requirements would ensure that long-term performance objectives can be met.

6 (10403)
Comment - EIS002192 / 0009
With DOE, I will absolutely not allow the secret stuff classified in my mountain, and how NRC [Nuclear Regulatory Commission] can even entertain anything to do the licensing, I do not know, but this will come up and this will go to court.

Response
All waste accepted for disposal would meet the repository waste acceptance criteria as well as the packaging requirements regardless of the classification of the materials. These waste form and packaging requirements would ensure that long-term performance objectives could be met.

6 (11316)
Comment- EIS002244 / 0002
We should quit calling it nuclear waste and start causing [calling] it nuclear poisons, or raw materials for weapons of mass destruction. When we examine the time frame of 50,000 years for nuclear waste disposal, we need to relate it to the life span of our own civilization of 5,000 years. Or a -- or let's see, a life of our civilization of 5,000 years, or 70 times our own life span.

When we examine the transportation issues of nuclear waste, we are now referring to them as the transportation of unstable raw materials or weapons of mass destruction. When we examine the issue of disposal of nuclear waste and structural integrity of containment for 50,000 years, the perceived risk under the new parameters become an unacceptable risk as well. This is the new assessment.

Response
Thank you for your input and participation in the EIS process. DOE has used terminology in the EIS consistent with the NWPA and standard industry usage.

With regard to perceived risk and the stigma of transporting and disposing of spent nuclear fuel and high-level radioactive waste, in the absence of a large accident or a series of smaller accidents, there is little reason to expect that perceptions about an operating repository would be likely to engender adverse effects. While stigmatization can be envisioned in some scenarios, it is not inevitable or quantifiable. DOE addressed the topic of perceived risk and stigma in this Final EIS (see Section 2.5.4 and Appendix N).

6 (11499)
Comment- EIS001337 / 0124
Page 1-3 Last sentence (continuing to Page 1-4) states, "...low-level radioactive wastes could require disposal in a monitored geologic repository." The DEIS does not appear to consider under what circumstances and in what quantities low-level waste would be disposed of at Yucca Mountain. The DEIS contains no assessment of the transportation requirements associated with transportation of low-level waste to the site.

Response
The low-level wastes the EIS considers for potential disposal at Yucca Mountain are those that would require eventual disposal in a geologic repository. Sections A.2.5 and A.2.6 of the EIS specifically identify these as Greater-Than-Class C low-level and Special-Performance-Assessment-Required wastes. The disposal of these

wastes is a reasonably foreseeable action identified in a public scoping comment for this EIS. Chapter 8 addresses these wastes as part of Inventory Module 2. Section 8.4 describes their transportation.

6 (11506)
Comment - EIS002137 / 0007
I believe this is a national issue. We talk about spent fuel rods. We talk about the fact that there's X number of commercial facilities. It's more than that. We have 115 submarines. We've got aircraft carriers. We've got reactors inside of universities. Hey, a lot of that's a national issue.

Response
This comment is correct in assessing that the disposal of spent nuclear fuel from commercial nuclear reactors, DOE and Navy spent nuclear fuel, and high-level radioactive waste is a national issue. Pursuant to the Nuclear Waste Policy Act of 1982, the EIS is part of the process required to resolve the issue. Appendix A provides a comprehensive description of the spent nuclear fuel and high-level radioactive waste that DOE would place in a geologic repository at Yucca Mountain.

6 (11938)
Comment - EIS001040 / 0014
Who holds title to the commercial and/or defense wastes?

Response
The owners of the nuclear powerplants that generate commercial spent nuclear fuel hold title to it. Defense spent nuclear fuel and high-level radioactive waste is owned by the United States. The New York State Energy Research and Development Authority owns commercial high-level radioactive waste at the West Valley Demonstration Project.

The NWPA specifically states that, "Delivery, and acceptance by the Secretary, of any high-level radioactive waste or spent fuel for a repository constructed under this subtitle shall constitute a transfer to the Secretary of title to such waste or spent fuel." Therefore, all wastes to be disposed of in Yucca Mountain would be the property of DOE on receipt. Prior to acceptance by the Secretary, the materials would have to be shown to meet the repository's waste acceptance criteria as specified by the Nuclear Regulatory Commission licensing conditions.

6.1 Inventories

6.1 (13)
Comment - 4 comments summarized
Several commenters criticized the method DOE used to calculate the metric tons of heavy metal equivalent for high-level radioactive waste. The commenters stated that the formula used (0.5 metric tons of heavy metal per canister of high-level waste) is a generalization and does not adequately reflect the actual content of heavy metal in the waste or the risks associated with the radioactive constituents. Another commenter acknowledged the Nuclear Waste Policy Act of 1982 limit of 70,000 metric tons of heavy metal but notes that by using the current calculation method, half of the high-level waste now in inventory would be precluded from being shipped to Yucca Mountain.

Response
Appendix A of the EIS describes the basis for several candidate methods for determining metric tons of heavy metal (MTHM) equivalence for high-level radioactive waste and explains that legislative action by Congress would be required to emplace more than the allotted 70,000 metric tons of heavy metal into the repository until a second repository was in operation. This comment is correct in that, depending on the equivalence methodology used, the total quantity of high-level radioactive waste that could be included in the 70,000 MTHM varies to a great degree. Since 1985, DOE has consistently used the "historical method" (0.5 MTHM per canister) as a planning basis, and this method is used in the EIS to determine the number of canisters of high-level radioactive waste included in the Proposed Action. There is a relatively small quantity of "commercial" high-level radioactive waste (West Valley Demonstration Project) that has been determined to have an MTHM equivalency per canister of 2.3, but the overall assumption of the 0.5 MTHM/canister remains valid since the vast majority of high-level radioactive waste canisters are "defense" waste, and constitute the basis for the 0.5 MTHM/canister assumption. Using this historical method,

less than half of the high-level radioactive waste inventory is included in the 70,000 MTHM. However, DOE has also evaluated the impacts of repository disposal of the entire inventory of high-level radioactive waste. Specifically, Chapter 8 provides cumulative impacts for the Proposed Action inventory (which includes less than half the high-level radioactive waste canisters utilizing the 0.5-MTHM-per-canister method) and for the Inventory Module 1 (which includes the balance of the high-level radioactive waste canisters). Using different equivalence methods would shift the proportion of the high-level radioactive waste canisters that could be disposed of between the Proposed Action and the Module 1 Inventory, but would not significantly change the cumulative impacts because spent nuclear fuel would dominate long-term repository performance results. Regardless of the equivalence method used, the EIS analyzes the range of potential impacts from disposal of the entire inventory of high-level radioactive waste such that the more conservative consequences are apparent.

The other equivalence methods, including the total radioactivity and the radiotoxicity methods, result in lower estimates of MTHM per canister. As such, these other methods result in the total inventory of high-level radioactive waste being accepted in the 70,000-MTHM Proposed Action repository. DOE is aware of these alternative methods and included them, for information, in Appendix A of the EIS.

6.1 (18)

Comment - 10 comments summarized

Several commenters believe that the Draft EIS spent nuclear fuel inventory and characteristics do not accurately represent the spent nuclear fuel DOE would receive. According to commenters, DOE has neglected a change in industry practice that has significant impacts on the fuel that will be discharged in the future. The change is that higher megawatt day per metric ton of heavy metal is becoming more common in industry operations. Therefore, the repository could receive younger fuel with a higher burnup ratio. Several commenters stated the need for DOE to update the inventory and characterization information. Commenters suggested the Department consider a range of different fuel ages in its analyses rather than examining only 25-year-old spent nuclear fuel because it is likely that younger, more radioactive fuel could be shipped to Yucca Mountain.

Response

DOE does not believe it has misrepresented the spent nuclear fuel characteristics in the Draft EIS. Section A.2.1.5 of the Final EIS provides the bases for selecting average pressurized-water reactor and boiling-water reactor fuel assemblies. These fuel assemblies replace the "typical" fuel assemblies in the Draft EIS and are based on more recent projections of commercial spent nuclear fuel shipments to the repository. Specifically, DOE selected the average assemblies to be representative of the average of the fuels the repository would receive and to provide a realistic estimate for analysis. The average commercial assemblies specified are used in the Final EIS for calculating the repository inventory and post-irradiation elemental distribution.

Rather than the average fuel, however, the Final EIS includes a new "representative" commercial fuel for purposes of calculating impacts of repository and transportation accidents. The representative fuel is based on a hazard index approach that considers the relative hazard for all commercial fuel to be received at the repository. This fuel, as the commenters note, is younger and has higher burnup than the typical commercial fuels used in the Draft EIS. Use of bounding fuel (maximum burnup and minimum cooling) is not appropriate for transportation accidents because transportation casks, to ensure compliance with thermal and direct radiation exposure limits, would only contain limited quantities of such fuel. Such loading requires use of casks that carry fewer spent nuclear fuel assemblies than the large-capacity casks assumed for the analyses in the EIS. In addition, the bounding fuel represents a very small fraction of the waste inventory. Thus, a reasonably foreseeable transportation accident that could involve shipment of this fuel would be much less severe than the maximum reasonably foreseeable accident in the EIS because of the lower quantity of the material available for release from an affected cask.

Similarly, for the maximum reasonably foreseeable repository accident, exclusive involvement of younger fuel would not be realistic because of the nature of the activities in the Waste Handling Building. Routine blending operations in the Waste Handling Building would include both younger and older spent nuclear fuel at any given time. Therefore, the Waste Handling Building would contain a mixture of younger, high-burnup and older, low-burnup fuel assemblies that would all be equally affected in the event of an accident. The Final EIS defines the parameters of the "representative" commercial fuel and the rationale for developing this new type for use in accident analysis.

6.1 (46)
Comment - 24 comments summarized
Commenters stated that the Proposed Action would be insufficient to dispose of the entire inventory of spent nuclear fuel and high-level radioactive waste projected to be generated in the foreseeable future. The EIS should provide an analysis of the impacts of continued storage or other management options for spent nuclear fuel and high-level radioactive waste that are not included in the Proposed Action. Commenters noted that by the time the repository would open in 2010, there would already be enough materials ready for transport to fill it completely. As a consequence, a number of commenters questioned how much waste is really going to be sent to Yucca Mountain, 70,000 or 105,000 metric tons of heavy metal. One commenter requested that the alternatives include the management of all spent nuclear fuel and high-level waste by evaluating larger repository capacities, describing the need for a second repository, and describing how the foreseeable inventory would be managed. Another commenter stated the EIS does not provide an evaluation of waste generated under renewed reactor licenses.

Response
Consistent with the Nuclear Waste Policy Act of 1982, the EIS evaluates impacts associated with the disposal of 70,000 metric tons of heavy metal (MTHM) of spent nuclear fuel and high-level radioactive waste as part of the Proposed Action. Appendix A identifies the total amount of spent nuclear fuel and high-level radioactive waste that DOE projects could be generated in the foreseeable future. The 105,000 MTHM mentioned in the EIS is the amount of spent nuclear fuel that existing commercial nuclear powerplants are assumed to generate through 2046. Chapter 8 evaluates potential consequences of using a repository at Yucca Mountain to dispose of the entire amount produced through 2046, for which DOE has ultimate responsibility. Appendix A describes the inventory and characteristics of the materials.

As noted above, Appendix A and Chapter 8 of the EIS address the potential for as much as 105,000 MTHM. This volume includes the assumption that all of the existing commercial nuclear reactors receive a 10-year extension to their operating licenses from the Nuclear Regulatory Commission, as well as the entire inventory of projected spent nuclear fuel and high-level radioactive waste from DOE and the Navy (see Section A.2). The EIS does not address any waste that could be generated by new commercial nuclear facilities because DOE cannot speculate about the long-term power generation mix commercial utilities may use in the future or about when or where new commercial nuclear reactors might go into operation. The NWPA states that the Nuclear Regulatory Commission decision to approve a DOE License Application shall prohibit the emplacement in the Yucca Mountain Repository of more than 70,000 MTHM of spent nuclear fuel and high-level radioactive waste until a second repository was in operation. In the case of a second repository, DOE would conduct appropriate environmental reviews at the time additional requirements or actions were identified.

6.1 (49)
Comment - 11 comments summarized
Commenters were concerned about the commitment that DOE has made to receive foreign research reactor fuels and other fuels from foreign commercial reactors. One commenter wanted to know specifically about materials from Japan.

Response
The Nuclear Non-Proliferation Act addresses the need to increase the effectiveness of international safeguards and controls on peaceful nuclear activities to prevent proliferation. To meet the goals of the Act, one of its provisions allows the United States, after complying with several statutory requirements, to accept foreign spent nuclear fuel regardless of its origin.

The Nuclear Non-Proliferation Act requires that the Secretary of Energy, Secretary of Defense, Arms Control and Disarmament Agency, and Nuclear Regulatory Commission agree that accepting such foreign fuel would meet the goal of the Act (that is, preventing proliferation). Under the Act, the Arms Control and Disarmament Agency would prepare a Nuclear Proliferation Assessment Statement to explain how U.S. acceptance would prevent proliferation. (Note: The Arms Control and Disarmament Agency is now part of the Department of State). The Act also establishes a process for Congress to approve the acceptance. In addition, the United States can accept limited quantities of foreign fuel without Congressional approval if the President determines that an emergency situation requires acceptance and is in the national interest, and notifies Congress with a detailed explanation and justification as soon as possible.

Consistent with the Nuclear Non-Proliferation Act and as described in the *Final EIS on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuels* (DIRS 101812-DOE 1996), the United States recently started accepting highly enriched uranium that it leased to other countries in the 1950s for use in research reactors. This action involves the acceptance of approximately 19.2 metric tons of heavy metal (21.2 tons) in spent nuclear fuel and 0.6 metric tons of heavy metal (0.7 ton) in target material from 4 countries over a 13-year period. The purpose of the action is to support the broad U.S. nuclear weapons nonproliferation policy calling for reduction and eventual elimination of highly enriched (weapons-grade) uranium. The analysis for this EIS included this material.

There is no effort by the Japanese government or Japanese utilities to ship spent nuclear fuel to the United States. The amount of foreign fuel, if any, that this country would accept under the Nuclear Non-Proliferation Act is limited to situations in which acceptance would be necessary to prevent proliferation of nuclear materials. While the United States can decide to accept foreign fuels under certain circumstances, other countries do not have an unfettered option to send their spent nuclear fuel to the United States.

Other than the foreign fuel noted above, this EIS does not anticipate or analyze the disposal of such fuel in the proposed repository. If in the future this country should consider acceptance and disposal of additional foreign fuel pursuant to the Nuclear Non-Proliferation Act, DOE would analyze it in accordance with its National Environmental Policy Act implementing regulations (10 CFR Part 1021).

6.1 (89)
Comment - 3 comments summarized
Commenters stated that vitrification of liquid high-level waste poses a serious technological challenge. Thus, DOE may opt to ship liquid high-level waste to the proposed repository.

Response
Vitrification is a process that solidifies and immobilizes high-level radioactive waste into a borosilicate glass or ceramic form inside stainless-steel canisters. Although vitrification does pose technical challenges, DOE has used this process for several years at the Savannah River Site in South Carolina and the West Valley Demonstration Project in New York. The waste acceptance criteria for the proposed repository, when finalized, would preclude the emplacement of liquid high-level radioactive waste. Therefore, DOE would not ship liquid wastes to the repository.

6.1 (116)
Comment - 9 comments summarized
Commenters stated that DOE must consider the volume and radioactivity of what is currently being proposed for disposal, and disposal packaging technology, including the "can-in-canister" and mixed oxide fuels for surplus plutonium pursuant to Nuclear Waste Policy Act. Commenters were also concerned that transportation impacts for these wastes had not been evaluated.

Response
Section A.2.4 of the EIS provides the inventory and characteristics of the surplus weapons-usable plutonium that is proposed for disposal at the repository. The Proposed Action includes the disposal of 50 metric tons (55 tons) of surplus plutonium. No more than 33 metric tons (36 tons) of this material would be converted to mixed-oxide fuel for use in commercial nuclear reactors. The other approximately 17 metric tons (19 tons) would be disposed of as an immobilized plutonium form in a can surrounded by glass in high-level radioactive waste canisters. The spent mixed-oxide fuels would be part of the 63,000 metric tons (69,000 tons) of commercial spent nuclear fuel in the Proposed Action and the immobilized plutonium would be part of the 7,000 metric tons (7,700 tons) of the DOE waste allocation.

DOE has included the 17 metric tons (19 tons) of surplus plutonium, which it would ship to Yucca Mountain in an immobilized waste form, in the shipment of 6,055 high-level radioactive waste canisters from the Savannah River Site (Section J.1.2.1.2 of the EIS). As listed in Table A-50 of the EIS, 670 of these canisters would contain immobilized plutonium. Chapter 6 and Appendix J evaluate the impacts associated with the transportation of these canisters for the Proposed Action. Chapters 4 and 5 address the short- and long-term impacts associated with disposal of these canisters, respectively.

In addition, the Proposed Action includes the impacts associated with transportation of the mixed-oxide fuel. DOE assumes that it would ship this fuel in one of the mixed-oxide shipping casks listed in Section J.1.2.1.1 of the EIS. The Department estimates that mixed-oxide fuel would make up less than 1 percent of the spent nuclear fuel in the Proposed Action.

6.1 (120)
Comment - 4 comments summarized
Commenters stated that the term "spent nuclear fuel" is misleading because it implies that the radioactivity is reduced or no longer present.

Response
The Nuclear Waste Policy Act of 1982 and the Glossary to the EIS (Chapter 14) define "spent nuclear fuel" as "fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing." DOE uses the term in the EIS to be consistent with the Act, not to be misleading. Appendix A describes the relevant characteristics of this material used to evaluate the environmental and safety impacts.

6.1 (474)
Comment - EIS000069 / 0006
We suggest that the total radioactivity of 14 billion curies in Nye County -- that is the burden that has been imposed upon Nye County as best we can tell from best available DOE information -- will continue to be a threat to the contamination of the environment and the water resources of this county and to the well-being and health and safety and the quality of life of this county well into the future, in perpetuity, forever.

Response
DOE recognizes that the risk of adverse health effects caused by exposure to ionizing radiation is of concern to many people. The Environmental Protection Agency's *Environmental Radiation Protection Standards for Yucca Mountain, Nevada* (40 CFR Part 197) require DOE to demonstrate a "reasonable expectation" that the "reasonably maximally exposed individual" not receive a radiation dose greater than 15 millirem per year for 10,000 years following disposal. DOE is committed to keeping radiation doses from Yucca Mountain-related activities below regulatory radiation exposure limits.

The updated analysis in the Final EIS projects that the Proposed Action would likely result in extremely small releases of radioactive contamination to the environment in the first 10,000 years after repository closure (more than 10,000 times less than the individual protection standard set by 40 CFR Part 197).

In addition to the 10,000-year compliance period, DOE has evaluated potential impacts for the period of geologic stability at the repository (that is, 1 million years). This evaluation was performed, in accordance with 40 CFR Part 197, to gain insight into the very long-term performance of the repository and thus provide information for the decisionmakers in making both design and licensing decisions. These results show a mean peak dose rate that is much lower than background levels (see Chapter 5 of the EIS for details).

6.1 (510)
Comment - EIS000061 / 0005
The disposal of these wastes, with a total radioactivity on the order of 14 billion curies, will most certainly render the environment of Nye County vulnerable to contamination well into the future and will pose a threat to the citizens in the shadow of the repository that will last, for all practical purposes, in perpetuity.

Response
DOE recognizes that the many people are concerned about the risk of adverse health effects caused by exposure to ionizing radiation. The Environmental Protection Agency regulations establishing *Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada* (40 CFR Part 197) require DOE to demonstrate that the "reasonably maximally exposed individual" would not receive a radiation dose greater than 15 millirem per year for 10,000 years following disposal. DOE is committed to keeping radiation doses from Yucca Mountain-related activities well below regulatory radiation exposure limits.

The updated analysis in the Final EIS projects that the Proposed Action would likely result in extremely small releases of radioactive contamination to the environment in the first 10,000 years after repository closure (more than 10,000 times less than the individual protection standard set by 40 CFR Part 197).

In addition to the 10,000-year compliance period, DOE has evaluated potential impacts for the period of geologic stability at the repository (that is, 1 million years). This evaluation was performed, in accordance with 40 CFR Part 197, to gain insight into the very long-term performance of the repository and thus provide information for the decisionmakers in making both design and licensing decisions. These results show a mean peak dose rate that is much lower than background levels (see Section 5.4.2 of the EIS for details).

6.1 (553)
Comment - EIS000075 / 0005
The issue of curies came up. How much is going into that repository? It's very difficult to tell given the EIS that came up, but it's very important.

Response
Section A.2.1.5.2 of the EIS lists the estimated number of curies in 50 separate isotopes in commercial spent nuclear fuel, each of which DOE used in the evaluation of impacts. DOE did not sum the individual radionuclides because a grand total could be misleading due to the wide variation of potential health effects among nuclides. For example, a curie of plutonium could cause a much greater effect to human health than a curie of cesium, which could cause a much greater effect than a curie of tritium. For that reason, the EIS estimates radiological dose to humans in rem or millirem.

6.1 (1040)
Comment - EIS000243 / 0002
I disagree with one of the statements made by a previous speaker, and that is that waste will be reduced in other places should the Yucca Mountain repository go ahead. From what I understand, waste may very well increase here in Idaho, because a decision to put a repository at Yucca Mountain, or perhaps any repository, but certainly for the purposes of this EIS one at Yucca Mountain, would then trigger the importation of more waste here to Idaho, and it may, in fact, increase nuclear activities which result in more waste in many of the places, whether it's commercial sites or military sites. So I think that's another impact that should be looked at. I would say that's about it for this comment.

Response
The potential selection of Yucca Mountain as the Nation's geologic repository would not cause the shipment of additional nuclear waste to Idaho. DOE currently maintains its inventory of spent nuclear fuel at a number of sites across the country. The EIS addresses shipment of DOE spent nuclear fuel to the repository from DOE sites in Idaho, South Carolina, Washington, and Colorado. The consolidation of fuel at these sites is part of separate DOE action evaluated in the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DIRS 101802-DOE 1995). With regard to increasing nuclear activities at commercial or military sites, the projected spent nuclear fuel inventories described in Section A.2.1.5.1 of the EIS include a conservative estimate of the potential inventory assuming commercial plant license extensions from the Energy Information Administration.

6.1 (1111)
Comment - EIS000250 / 0006
Another myth, and it pertains specifically to Idaho, is that this facility will solve our nuclear waste problems. However, the facility would take a portion of our waste and not our entire inventory. There is specific warning in the Governor's agreement that Governor Batt signed in 1995 with the nuclear Navy and Department of Energy that removes the limit on shipments of spent fuel to Idaho once this repository is in place.

I think you have to look at what is going on right now with the electro-metallurgical technology. The Department of Energy wants to use that to treat special batches of fuel. But I know the Department of Energy is also considering that treatment for other batches of fuel particularly Navy fuel, foreign reactor fuel, and perhaps other types of fuel. It's been talked about.

Response
DOE is aware of the terms and conditions of the Settlement Order and, if Yucca Mountain was recommended and approved as the site for the proposed repository, would make every effort to ensure that disposal operations began as scheduled and that waste currently in storage, to the amount limited by law, went to the repository. As noted by this comment, current restrictions prevent DOE from disposing of all spent nuclear fuel and high-level radioactive waste in the repository.

The Nuclear Waste Policy Act of 1982 limits a first repository to a volume of 70,000 metric tons of heavy metal (MTHM) until a second repository is in operation. The statutory limitations on the capacity of the first repository mean that not all DOE spent nuclear fuel and high-level radioactive waste could be placed in the first repository without Congressional action to amend or remove the capacity limit.

The EIS makes assumptions about a potential shipping queue for DOE spent nuclear fuel and high-level radioactive waste. These assumptions would maximize the potential impacts. The actual shipping queue for acceptance of the 7,000 MTHM of DOE materials would be finalized at a much later date, after a resolution of repository siting.

In September 2000, DOE selected electrometallurgical technology to treat sodium-bonded spent nuclear fuel from the Experimental Breeder Reactor-II at the Argonne National Laboratory - West near Idaho Falls, Idaho. In addition, the Department will develop alternative technologies that could provide cost savings or other benefits for similar fuel from the Fermi-1 Reactor. This decision followed the successful completion of a 3-year research and development demonstration project of this technology in August 1999. An independent review by the National Research Council found no technical barriers to the use of this technology to treat Experimental Breeder Reactor-II fuel. However, DOE will continue to investigate alternative treatment techniques while monitoring the results and costs of the electrometallurgical treatment of this fuel. Data evaluated through the National Environmental Policy Act process indicate DOE might be able to take advantage of the differences in the Fermi-1 and Experimental Breeder Reactor-II fuel to save money by treating the two fuel types with different techniques. If no alternative is more cost-effective for the Fermi-1 spent nuclear fuel, however, electrometallurgical treatment remains a viable option. DOE evaluated the inventory of high-level radioactive wastes resulting from the electrometallurgical treatment of sodium-bonded spent nuclear fuel in the Yucca Mountain EIS. Section A.2.3.2.2 of the EIS specifically discusses these waste types. DOE has no plans for the use of this technology, although potentially applicable to a wide variety of spent nuclear fuel types in addition to sodium-bonded fuels, for treatment of other DOE spent nuclear fuel, including naval or foreign reactor fuels.

6.1 (1176)
Comment - EIS000244 / 0001
At present there are about 150 separate sites in 41 states where used nuclear fuel and high-level radioactive waste is stored.

Response
As noted in Sections A.1.1 of the EIS, more than 99 percent of the commercial spent nuclear fuel would be from 72 sites in 33 states. Spent nuclear fuel from other facilities (for example, civilian research reactors) could be shipped directly to the repository. However, that inventory reflects less than 0.001 percent of the total spent nuclear fuel in the Proposed Action.

DOE maintains its inventory of spent nuclear fuel at five sites across the country. The Department's high-level radioactive waste is at the Savannah River Site in South Carolina, the Hanford Site in Washington, the West Valley Demonstration Project in New York, and the Idaho National Engineering and Environmental Laboratory. Prior to shipments of this material to a repository, all DOE spent nuclear fuel could be consolidated at four locations: the Savannah River Site in South Carolina, the Hanford Reservation in Washington, the Idaho National Engineering and Environmental Laboratory, and the Fort St. Vrain Dry Storage Facility in Colorado. Section A.2.2 of the EIS provides information on DOE spent nuclear fuel. The shipment of fuel to these sites is evaluated in *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DIRS 101802-DOE 1995). Based on the consolidation of DOE spent nuclear fuel already planned and the relatively small quantities of spent nuclear fuel at other locations, the EIS assumes all of the material would be at 72 commercial sites and 5 DOE sites across the country before shipping began.

6.1 (1206)
Comment - EIS000272 / 0003
We have sites in this state [Georgia] along with others that hold nuclear waste at the site of the utility companies' nuclear reactors. We have waste at the Savannah River site, right adjacent to us, over there on the river. The truth is that that waste right now is in its most volatile, unstable state, that is, its highest level of radioactivity. I'm not at all concerned by the fact that if and when the day comes that we transport this nuclear waste across the 40-plus states, depending on where the site is -- Having that happen 50 years from now, to me, is a far better alternative, when the radioactivity of that, the danger posed by these wastes in the event of an accident or emergency, is far lessened as the years go by. They are at a very unstable point now, sited at the nuclear reactors.

Response
This comment is correct in saying that, as spent nuclear fuel and high-level radioactive waste age, their radioactivity decreases. However, Congress, in passing the NWPA, established a schedule for the siting, construction, and operation of a repository that would provide adequate protection for the public and the environment. If the Yucca Mountain Site was recommended and approved, DOE would construct, operate and monitor, and eventually close a repository in accord with the provisions of this Act.

The comment is also correct in that delaying the shipment of these materials for 50 years could reduce radiation exposures to transportation workers (truck drivers and handlers) and the public living along the transportation routes. However, because of the generally higher population densities at the generator sites, delaying shipment to the proposed repository and allowing the material to accumulate could increase potential overall impacts to current and future generations of individuals living and working around the potential storage facilities at those sites. Section 7.2.1.7.3 of the EIS (Table 7-6) contains information on the effects of delayed shipment indicating that most short-term impacts from the continued storage of spent nuclear fuel and high-level radioactive waste (15 latent cancer fatalities) would result from exposure to noninvolved workers working near the storage facilities during the first 100 years of storage. Implementation of the Proposed Action would avoid much of this exposure. Under a delayed shipping scenario, such exposures would be additive to the somewhat reduced exposures to workers and the public resulting from the later transportation of spent nuclear fuel and high-level radioactive waste to the repository. Thus, a significant reduction in collective impacts under a delayed shipping scenario would be unlikely.

6.1 (1221)
Comment - EIS000296 / 0007
Absolutely no utility that increases the danger of high-level nuclear waste that they produce should be a part of the program, anyway. In that I'm talking specifically about Duke Energy and about Virginia Power because they have a very ill-conceived and dangerous plan to use -- at the taxpayer's expense, of course -- the weapons-grade plutonium at the power plants McGuire I and II in North Carolina, Catawba I and II in South Carolina and Virginia in Louisa County, North Anna I and II. And so no utility that takes on additional dangers in either the actual hazard or the amount of the waste should be a part of this program at all.

Response
DOE evaluated the environmental impacts associated with using mixed-oxide fuels in commercial nuclear reactors in the *Surplus Plutonium Disposition Final Environmental Impact Statement* (DIRS 118979-DOE 1999). This is a separate action from the Proposed Action evaluated in the Repository EIS, which focuses on the environmental impacts associated with construction, operation and monitoring, and eventual closure of a repository for disposal of spent nuclear fuel and high-level radioactive waste. In accordance with the Nuclear Waste Policy Act of 1982 and the *Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste* (10 CFR Part 961), DOE must accept (for disposal in a repository) all spent nuclear fuel from commercial utilities that have contributed to the Nuclear Waste Fund. Section 1.5.3 of the EIS discusses and lists other environmental documents that evaluate proposals and form a basis for decisions related to a geologic disposal program, including the Surplus Plutonium Disposition EIS. Appendix A of the EIS provides additional information about the inventory, characteristics, and sources of all materials that are candidates for disposal at Yucca Mountain, including surplus weapons-usable plutonium (see Section A.2.4).

6.1 (1317)
Comment - EIS000338 / 0001
The Department's concern is the storage and loading of high level wastes, particularly surplus weapons-usable plutonium, from Los Alamos for disposal at the proposed Yucca Mountain site (Volume I, p. 1-7; Volume II p. A-47). There is no information within the DEIS to indicate how Los Alamos will transfer such high-level radioactive material into the proper packaging (shipping casks). Specifically, the DEIS does not address what the potential contribution this activity at Los Alamos will be to radionuclide emissions subject to 40 CFR Part 61, Subpart H. Subpart H sets a facility-wide cap of ten millirems per year on the dose of radiation to which any member of the public might be exposed from air emissions. The DEIS should address to what extent a connected action of construction of facilities for waste packaging and loading at Los Alamos is necessary, and what the air quality impacts from packaging such wastes might be.

Response
The EIS evaluates impacts associated with the shipment of immobilized plutonium and spent mixed-oxide fuel. The analysis assumed that DOE would ship immobilized plutonium from the Defense Waste Processing Facility at the Savannah River Site, and the mixed-oxide fuel from the commercial utility that used the fuel in its reactor. The *Surplus Plutonium Disposition Final Environmental Impact Statement* (DIRS 118979-DOE 1999) addresses the transportation of plutonium from its current location to the Savannah River Site and the impacts from its subsequent processing.

Section J.1.3.1.2 of the EIS describes the potential radiological impacts of DOE spent nuclear fuel and high-level radioactive waste loading operations.

6.1 (1549)
Comment - EIS000357 / 0008
Page 1-6. 1.2.2.2. "Additional small quantities remain at other locations." What is going to be done with these quantities? Will they be dealt with under this planned action?

Response
Appendix A of the EIS addresses the complete inventory of DOE spent nuclear fuel. DOE maintains its inventory at a number of sites across the country. Before shipping this material to the proposed repository, the Department would consolidate all its spent nuclear fuel at four locations–the Savannah River Site in South Carolina, the Hanford Site in Washington, the Idaho National Engineering and Environmental Laboratory, and the Fort St. Vrain dry storage facility in Colorado. The *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DIRS 101802-DOE 1995) evaluates the shipment of this fuel.

6.1 (1550)
Comment - EIS000357 / 0009
Page 1-7. 1.2.4. Will the plutonium at the Pantex Plant, Rocky Flats Environmental Technology Site, Los Alamos and Lawrence Livermore National Laboratories be treated by this proposed action? If so, why are these not included in the maps, transportation routes, and analysis?

Response
The surplus plutonium DOE would dispose of under the Proposed Action [50 metric tons (55 tons)] would come to the repository in two forms. Plutonium that had been converted to mixed-oxide fuel would be shipped in the form of spent nuclear fuel from its associated commercial utility. Immobilized plutonium would be shipped in high-level radioactive waste canisters from the Savannah River Site.

The EIS evaluates impacts associated with the shipment of immobilized plutonium and spent mixed-oxide fuel. The analysis assumed that DOE would ship immobilized plutonium from the Defense Waste Processing Facility at the Savannah River Site, and the mixed-oxide fuel from the commercial utility that used the fuel in its reactor. The *Surplus Plutonium Disposition Final Environmental Impact Statement* (DIRS 118979-DOE 1999) addresses the transportation of plutonium from its current location to the Savannah River Site and the impacts from its subsequent processing.

The transportation analyses in Chapter 6 of the EIS include the shipment of these two forms to the Yucca Mountain Repository. DOE has clarified the introduction to Chapter 6.

6.1 (1551)
Comment - EIS000357 / 0010
Page 1-11. 1.3.2.2. The weight of inventory of radioactive heavy metal is specified as 70,000 MTHM. But how does this convert to volume?

Response
Appendix A of the Draft EIS provides information that attempts to correlate the 70,000 MTHM (metric tons of heavy metal) of materials into volume. For the 63,000 MTHM of commercial spent nuclear fuel, A.2.1.5.1 reports the volume to be approximately 29,000 cubic meters (38,000 cubic yards). For the entire inventory of DOE spent nuclear fuel (2,500 MTHM, of which 2,333 MTHM is included in the Proposed Action), the table in Section A.2.2.3 reports the total volume to be approximately 1,900 cubic meters (2,500 cubic yards). For high-level radioactive waste, there would be two types of canisters [3 meters (9.8 feet) long and 4.5 meters (15 feet) long]. The estimated volume of high-level radioactive waste in the Proposed Action would be 6,600 cubic meters (8,600 cubic yards). Therefore, the total volume of materials to be emplaced during the Proposed Action would be approximately 37,500 cubic meters (49,000 cubic yards).

The value of MTHM for DOE and commercial spent nuclear fuel is based on the actual amount of heavy metals (uranium, plutonium, and thorium) in the spent nuclear fuel when it was received at the repository. For high-level radioactive waste, however, very little of these heavy metals would actually be in each canister. The 0.5 MTHM per canister is a convention applied to the high-level radioactive waste canisters only for accounting purposes. It does not apply to the accumulation of MTHM for spent nuclear fuel.

6.1 (1552)
Comment - EIS000357 / 0011
Page 1-12. Section 1.3.2.2. Do we assume that the 105,000 metric tons of heavy metal of waste from operating nuclear power plants through the year 2046 would equal 210,000 canisters of waste? Why is this not specified when the 2,500 metric tons of heavy metal of DOE spent nuclear fuel translates to 22,280 canisters, far more than the 0.5 metric tons of heavy metal proposed per canister?

Response
There is a distinct difference in the way that the EIS accounts for and describes spent nuclear fuel and high-level radioactive waste. The EIS analysis based the value of metric tons of heavy metal (MTHM) for DOE and commercial spent nuclear fuel on the actual amount of heavy metals (uranium, plutonium, and thorium) in the spent nuclear fuel the repository would receive. The total projected amount is 105,000 MTHM of commercial spent nuclear fuel (which would be in the form of approximately 360,000 assemblies either uncanistered or canistered, depending on the packaging scenario) and 2,500 MTHM of DOE spent nuclear fuel in standard DOE fuel canisters. The total projected amount of high-level radioactive waste from Section A.2.3.5.1 of the EIS is 22,280 canisters. This waste would generally be in the form of borosilicate glass in stainless-steel canisters, and would actually contain very little heavy metal. The 0.5 MTHM per canister is a convention applied to the high-level radioactive waste canisters for accounting purposes. It does not apply to the accumulation of metric tons of heavy metal for spent nuclear fuel. Appendix A provides more information on this topic.

6.1 (1727)
Comment - EIS000291 / 0002
Just as an example, several times in the opening remarks there was the comment that there are 77 storage sites now, and not a mention was made that immediately upon leaving one of those storage sites there would be one more, on the truck. And there wasn't any mention that once it arrives wherever it's going, that there will be one more and that for many, many years, for decades, there will be not 77 storage sites in the country but many more. There will be temporary storage sites on the roads and, of course, the repository will be an additional one.

Response
DOE identified the number and locations of 77 generator sites as a basis for determining the potential impacts associated with transportation of the waste material to the proposed repository and for evaluation of the No-Action

Alternative. As a consequence, DOE believes that waste in transit is thoroughly analyzed in the EIS. In addition, the EIS discusses intermodal transfer stations, and alternative transportation modes. Adding material in transit to the list of 77 sites would be misleading.

6.1 (1955)
Comment - EIS000483 / 0001
The Yucca Mountain Environmental Impact Statement (YM-EIS) should include the option of emplacement of depleted uranium (DU) in the repository as a useful material and/or as a waste.

The United States has an inventory of ~500,000 tons of radioactive DU, which is a secondary product from the production of (1) commercial spent nuclear fuel, (2) navy and research reactor fuel, and (3) nuclear weapons. Much of this material may ultimately become a waste. Geological disposal is the preferred option for disposing of large quantities of DU. DU is not included in the draft YM-EIS (pg 8-60). The basis for this recommendation to include DU in the YM-EIS is as follows:

1. U.S. Nuclear Regulatory Commission (NRC) actions clearly indicate that geological disposal of DU is the preferred option for disposal of DU.

2. The "Final Programmatic Environmental Impact Statement (PEIS) For Alternative Strategies for the Long-Term Management and Use of Depleted Uranium Hexafluoride" raises serious questions about the viability of non-repository DU disposal options.

3. Disposal of DU in a repository assures a consistent waste management philosophy.

Response
DOE currently stores about 700,000 metric tons (770,000 tons) of stable depleted uranium in the form of uranium hexafluoride at three locations in Tennessee and Kentucky. The EIS (in Sections 4.1.15.3, 4.1.15.5.4, and 4.1.15.5.5) recognizes the potential benefits of using depleted uranium as a shipping cask material. While depleted uranium could be used in the manufacture of waste packages, the amount of this material far exceeds the quantities that could be used in such packages. However, disposal of depleted uranium as a waste in the Yucca Mountain Repository is not authorized by the Nuclear Waste Policy Act of 1982, which limits disposal to spent nuclear fuel and high-level radioactive waste. Thus, depleted uranium does not meet the criteria for materials that DOE could dispose of in a repository, and is not included in the Proposed Action as an acceptable waste form.

Nuclear Regulatory Commission regulations (10 CFR Part 61) indicate that low-level radioactive waste, such as depleted uranium, can be disposed of in near-surface trenches, which is a sufficient and far less costly method than a geologic repository. This disposal option is considered in the *Final Programmatic Environmental Impact Statement for Alternative Strategies for the Long-term Management and Use of Depleted Uranium Hexafluoride* (DIRS 152493-DOE 1999). DOE did not choose this option, however, as the preferred option because of the preference to undertake some future productive use of depleted uranium. DOE did consider the use of depleted uranium for repository components. Such use was not deemed practical.

The DOE plan for the conversion of depleted uranium hexafluoride advocates the development of a strategy for future management of depleted uranium. The strategy entails conversion of uranium hexafluoride to an environmentally safer form (either an oxide or metal or both), to enable its constructive use. DOE will continue to keep its options open regarding potential beneficial uses of this material.

6.1 (2866)
Comment - EIS001099 / 0001
The Tennessee Department of Environment and Conservation, DOE Oversight Division (TDEC/DOE-O).

At present, there are no categorized high level wastes on the Oak Ridge Reservation (ORR). There is, however, a potential for categorizing part of ORR's Special Case wastes (SCW) as High-level waste. Both the preferred alternative and the no-action alternative are therefore, of importance to the State of Tennessee.

The State recommends contingencies for disposal of any newly categorized 'high level' waste be included in the EIS. In the no action alternative, DOE should evaluate and discuss funds for management and control of in situ releases from these wastes.

Two terms have been used in Environmental Impact Statements prepared by DOE since the Waste Management document was issued. They are "Special Case" wastes (SCW) and Special-Performance-Assessment-Required (SPAR) wastes. SPAR wastes are mentioned in the documents on WIPP [Waste Isolation Pilot Plant] and Yucca Mountain. SPAR waste is one of the categories of SCW. Nine categories of special wastes are listed in a status report of SCW dated April 29,1997:

1. Non-certifiable defense transuranic waste
2. Non-defense transuranic waste
3. Greater than class C waste (GTCC) which was originally Special-Performance-Assessment-Required waste
4. Performance Assessment Limited (PAL) waste originally also SPAR waste
5. Fuel and fuel-debris
6. Uncharacterized waste
7. Excess nuclear material
8. Radiation sources
9. DOE-titled waste or material held by Nuclear Regulatory Commission (NRC) licensees.

Since characterization of the entire class of Special Case wastes has not been completed, the inventory of each category is uncertain, especially in view of inaccuracies in DOE's past inventory estimates. The amount of Special Case waste that will fall into the Special-Performance-Assessment-Required waste category is not known. DOE should reevaluate Categories 1 and 2 for disposal at WIPP and/or explain why the waste would not meet the WIPP WAC [waste acceptance criteria] or could not be cost effectively disposed at WIPP. DOE-Oak Ridge Operations is currently preparing and EIS to construct a TRU [transuranic waste] Processing Facility at ORNL [Oak Ridge National Laboratory]. Categories 1 and 2 of the SCW could be handled by the Oak Ridge treatment facilities and the waste disposed at WIPP. Categories 1, 2, 3 & 4 at present do not have disposal options. The State of Tennessee's position is that DOE should carefully inventory, characterize, verify current safe storage, and identify disposition options for those category 1, 2, 3 & 4 wastes unsuitable for shallow land burial. Categories 5 through 9 should be assessed in detail for potential classification as High-level waste (Radioactive Management DOE Order 435.1) or other categories suitable for disposal options.

Planned disposition of several categories of waste has been documented by DOE. These documents have assumed the absence of certain waste categories at some sites. The preferred (and selected) alternatives contained in these documents do not include contingencies for later discoveries of additional inventory from these sites.

The Records of Decision on [the WIPP project] are already in place. They direct the disposition of some of the ORR wastes. Disposition of Special Case wastes and non-defense wastes by choice, were not considered in those Records of Decision. As a host State to those unidentified, uncharacterized and unknown amounts of wastes, Tennessee requests that the EIS address the above comments and include options that respond to ORR problems in a timely manner.

Response

The Nuclear Waste Policy Act of 1982 defines high-level radioactive waste as, "(A) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (B) other highly radioactive material that the Commission, consistent with existing law, determines by rule requires permanent isolation."

As stated in this comment, there is currently no high-level radioactive waste on the Oak Ridge Reservation. Therefore, DOE has identified no high-level radioactive waste for shipment from Oak Ridge to the proposed repository. The EIS did, however, identify Special-Performance-Assessment-Required low-level wastes in Inventory Module 2 that DOE could ship from Oak Ridge. Section 8.4.1.1 of the EIS addresses the impacts of such shipments. Section 8.2 addresses the impacts of the disposal of those wastes at the repository. As discussed in

Section 7.3, DOE did not conduct a specific No-Action analysis for Inventory Module 2, because DOE believes that the Module 1 No-Action analysis provides a reasonable estimate of the impacts from Module 2.

Because this is not a programmatic waste management EIS and is specific to the disposal of spent nuclear fuel and high-level radioactive wastes, DOE has not evaluated unidentified, uncharacterized, and unknown amounts of waste, as requested by this comment, and believes attempts to estimate quantities and resultant impacts from disposal or continued storage of such materials at this time would be too speculative to provide meaningful information to the decisionmaking process.

6.1 (4249)
Comment - EIS001160 / 0063
Page 1-4, Section 1.2.1, Generation of Spent Nuclear Fuel and High-Level Radioactive Waste, Paragraph 5, Line #2 states "All of these reactors have been shut down for several years." This statement is not entirely correct. Most of these reactors have been shut down for several years, however the production of plutonium for weapons research and other research purposes have continued. In any case, it would be useful to reference how many years the reactors have been shut down, and what storage problems and considerations were observed, perhaps in the appendices.

Response
The cited paragraph in the EIS refers to reactors used to produce weapons-grade materials, such as plutonium. DOE has shut down all reactor fuel cycles used for this purpose. The repository waste of concern from the fuel-cycle operations is defense high-level radioactive waste. Appendix A of the EIS discusses the specific inventory of such wastes, including the high-level radioactive waste to which the cited paragraph refers. In addition, Appendix A discusses the anticipated spent nuclear fuel inventory from currently operating reactors, commercial and DOE.

Regarding the suggestion to include reactor shutdown times and other information, DOE has not added this material because it would add no discriminating information for decisionmakers.

6.1 (4253)
Comment - EIS001160 / 0067
Page 1-7, Section 1.2.3, High-Level Radioactive Waste, Paragraph 2, line(s) 3-4. The text here states, "Treatment ordinarily includes separation of the waste into high activity and low activity fractions, followed by vitrification of the high activity fraction." High and low fractions are not clearly defined. It would be advantageous to list the criteria for high and low fractions in the appendices not only for storage limitations but also for transportation criteria. Furthermore, the type of canister the vitrified high fraction material is stored in should also be listed both for storage and transportation purposes as this material may present different packaging demands than fuel assemblies.

Response
Section 1.2.3 of the EIS accurately describes an ordinary vitrification process. The separation of high- and low-activity fractions is a result of a typical vitrification pretreatment for high-level radioactive waste. Pretreatment ordinarily concentrates the radioactivity from the waste, resulting in a reduction of the amount of high-level radioactive waste. The low-activity fraction from the pretreatment process does not meet the definition of high-level radioactive waste (10 CFR 60.2). The Waste Incidental to Reprocessing determination process is used to determine that the low-activity fraction does not need to be managed as high-level radioactive waste. Three criteria must be satisfied for this waste to be managed as low-level radioactive waste and, therefore, suitable for near-surface disposal without vitrification. The EIS Glossary (Chapter 14) contains definitions of high- and low-level radioactive waste. The inventory for shipment to and disposal at the proposed repository includes only the vitrified high-level radioactive waste.

6.1 (4707)
Comment - EIS001230 / 0002
Metric Tons of Heavy Metal

The Nuclear Waste Policy Act was enacted in 1982 for the purpose of developing a geologic repository to protect the population and the environment from the hazards of radioactive waste. The Nuclear Waste Policy Act limited

the amount of SNF [spent nuclear fuel] and HLW [high level waste] to 70,000 metric tons of heavy metal (MTHM) that could be placed in the Nation's first geologic repository until a second repository could become operational.(1) The limitation was meant to provide "regional equity" among potential repository sites.

We understand that the material that could eventually go to the geologic repository includes civilian SNF (from commercial nuclear power plants), DOE SNF (from DOE production reactors, naval reactors, and experimental reactors), and DOE HLW(2) (primarily waste that resulted from the chemical extraction of weapons-usable materials from defense SNF). In order to project the impacts that would result from the geologic repository, DOE must determine the quantities and characteristics of each of the three materials that would be disposed.

DOE determined that 90 percent (63,000 MTHM) of the 70,000 MTHM (allowed into the geologic repository) would be allocated for commercial SNF and the remaining 10 percent (7,000 MTHM) for DOE SNF and HLW. It has further been determined that 33 percent of the DOE's allotment (2,334 MTHM) would be allocated for DOE-owned SNF and 67 percent (4,666 MTHM) for HLW.

Calculation of the MTHM of SNF is relatively straightforward, based on the actual heavy metal content of the SNF. Calculation of the equivalent MTHM for HLW (which was not specified by Congress) is somewhat more complicated, however, and will affect the quantity of waste that can be accepted into the geologic repository. Both commercial SNF and DOE HLW contain the radioactive elements that are formed in a nuclear reactor. However, DOE SNF was generally retained in the reactor for a much shorter time than is the case for a comparable amount of commercial SNF. Because the amount of waste that is produced in SNF is dependent upon the length of time it stays in the reactor, much less radioactive waste material was produced per metric ton of DOE SNF compared to waste produced per metric ton of commercial SNF. In addition, DOE's HLW consists only of the radioactive waste elements, which were separated from DOE SNF using a technology known as reprocessing, and no longer includes the heavy metals. Because of these differences, we recommend that the most consistent and comparable measure for comparing HLW with SNF is in terms of an "equivalent MTHM" or the quantity of HLW that would produce the same radioactivity or radiotoxicity as a metric ton of SNF.

In the Draft EIS, impacts are evaluated using a method for calculating MTHM equivalence based on historical projections of radioactivity in HLW. Those historical projections are no longer valid, however, because the radioactivity levels in HLW now being produced are significantly lower. If the historical projections method is applied, the level of radioactivity that would result from each MTHM of HLW disposed in the geologic repository would be significantly lower than the level of radioactivity that would result from each MTHM of commercial SNF disposed. We believe there is no scientific basis for this inequitable and overly restrictive approach. In addition, the geologic repository capacity restriction of 4,666 MTHM for HLW will be inadequate to accommodate all of the HLW under DOE's purview if DOE uses the historical projections method.

This dilemma is recognized in Appendix A of the Draft EIS through the discussion of the methods for calculating MTHM. One method, the Total Radioactivity Method, would establish equivalence based on a comparison of the radioactivity inventory (curies) of HLW to the average curies found in a metric ton of commercial SNF. The second, the Radiotoxicity Method, would involve calculation of the "relative radiotoxicity" (based on the inventory of specific radionuclides present and their respective regulatory release limits). Using either of these two methods for calculating the MTHM equivalency for HLW would allow a more equitable allocation of storage space in the geologic repository between the commercial and DOE materials. Both of these alternative methods would allow DOE to dispose of all of its HLW at the geologic repository, without exceeding maximum limits established by Congress.

Accordingly, the INEEL CAB [Idaho National Engineering and Environmental Laboratory Citizens Advisory Board] recommends that DOE adopt either the total radioactivity method or the radiotoxicity method in this EIS as a more equitable and scientifically justifiable estimate of equivalent MTHM for the inventory of HLW. This approach would pose no additional risk to human health and the environment (above the risks evaluated in the Draft EIS). It would also reduce risks and costs associated with managing those risks at the sites where the undisposed HLW would remain, pending development of another repository at some undetermined point in the future.

Under its current design, the geologic repository will accept no waste with hazardous constituents as defined by the Resource Conservation and Recovery Act (RCRA). However, the DOE-owned HLW that is currently at INEEL

contains listed hazardous constituents and is classified as "RCRA hazardous.(3) In order for the HLW presently at INEEL to be disposed at the proposed geologic repository, various additional activities would have to occur. The INEEL CAB is concerned that the Draft EIS does not address what actions would be required to dispose of HLW that contains listed hazardous constituents, the impacts of those actions, nor the impacts of disposing those wastes at the proposed geologic repository. We note that these wastes constitute a significant portion of the HLW under DOE's control, and that DOE is responsible for permanent disposal of the entire inventory of HLW under the Nuclear Waste Policy Act.

Under the current regulatory framework, two options exist that could allow eventual disposal of these hazardous wastes at the proposed geologic repository at some point in the future. DOE could decide to seek a permit for the geologic repository as a disposal facility under RCRA. Such a permit would require approval by the State of Nevada (as the State has regulatory authority under RCRA within that state). Alternatively, DOE could seek to have the HLW with hazardous constituents "delisted" (following treatment) to allow their disposal in the geologic repository. That strategy would require documentation of the treatment methodology and extensive coordination among the states of Nevada and Idaho and two regions of the U.S. Environmental Protection Agency. Both strategies could prove difficult to implement. Nevertheless, the INEEL CAB recommends that DOE evaluate the Proposed Action in the Final EIS based on an assumption that all of the HLW with hazardous constituents will eventually go to the geologic repository for permanent disposal. This approach would allow development of environmental documentation that could support follow-on decision-making should DOE eventually overcome the challenges to acceptance of hazardous constituents at the geologic repository.

1. The Draft EIS explains that: 1) quantities of SNF are traditionally expressed in terms of metric tons of heavy metal, not including other materials such as cladding and structural materials, 2) a metric ton is 1,000 kilograms

2. or 2,200 pounds, and 3) uranium and plutonium are called heavy metals because they are extremely dense.

3. Including HLW from West Valley.

4. HLW currently at Savannah River Site does not contain hazardous constituents and is believed to be acceptable at the geologic repository.

Response

In relation to the calculation of metric tons of heavy metal (MTHM), Appendix A of the EIS describes the basis for several candidate methods for determining metric tons of heavy metal repository equivalence for high-level radioactive waste and explains that Congress would need to take legislative action before DOE could emplace more than the allotted 70,000 metric tons of heavy metal in the proposed repository. This comment is correct in that, depending on the equivalence methodology, the total quantity of high-level radioactive waste in the 70,000-MTHM repository could vary to a great degree. Since 1985, DOE has used the "historical method" (0.5 MTHM per canister) as a planning basis, and used this method in the EIS to determine the number of canisters of high-level radioactive waste in the repository. Using this method, the Proposed Action (70,000-MTHM repository) would contain less than half of the high-level radioactive waste inventory. However, DOE has evaluated the consequences of repository disposal of the entire inventory of high-level radioactive waste. Specifically, Chapter 8 of the EIS discusses cumulative impacts for the Proposed Action inventory (which includes less than half the high-level radioactive waste canisters under the 0.5- MTHM-per-canister method) and for a Module 1 inventory (which includes the balance of the high-level radioactive waste canisters). Using different equivalence methods would shift the proportion of high-level radioactive waste canisters for disposal between the Proposed Action and the Module 1 Inventory, but would not significantly change the cumulative impacts because spent nuclear fuel would dominate long-term repository performance results. Regardless of the equivalence method, the EIS analyzes impacts from the disposal of the entire inventory of high-level radioactive waste such that conservative consequences are apparent.

While the EIS evaluates the environmental consequences of the disposal of more than 70,000 MTHM repository of spent nuclear fuel and high-level radioactive waste (Module 1 inventory), the ultimate limits on disposal quantities belong to Congress.

The other equivalence methods, including the total radioactivity and radiotoxicity methods, result in lower estimates of metric tons of heavy metal per canister. As such, these methods would result in the acceptance of the total

inventory of high-level radioactive waste in the 70,000-MTHM repository. Appendix A of the EIS includes these methods for information purposes.

In response to the comment's concern about hazardous waste, current planning calls for a Yucca Mountain Repository not to accept wastes either listed or characteristic hazardous at the time of disposal, as defined in 40 CFR Part 261.

DOE is aware that the high-level radioactive waste at both the Idaho National Engineering and Environmental Laboratory and the Hanford Site contain listed hazardous wastes. The Environmental Protection Agency and the States of Nevada, Washington, and Idaho would have to "delist" such wastes before DOE could dispose of them at a Yucca Mountain Repository because there are no plans to permit the repository as a Resource Conservation and Recovery Act disposal facility. DOE would have to petition the Environmental Protection Agency to delist the waste. Petitions to the states under state law or regulations might also be required.

DOE high-level radioactive waste could exhibit characteristics of hazardous waste (ignitability, reactivity, corrosivity, and toxicity) prior to treatment. The treated (vitrified) waste would not exhibit such characteristics. Characteristic hazardous wastes do not require a petition and rulemaking by the Environmental Protection Agency or states to exit the hazardous waste system.

Both listed and characteristic hazardous wastes would have to meet applicable *Land Disposal Restrictions Treatment Standards* (40 CFR Part 268) prior to disposal at a Yucca Mountain Repository. Waste treatment processes designed to treat wastes to meet these standards can be designed to produce wastes that can be delisted. The petition process for delisting is straightforward, and delisting standards are clear. Therefore, neither the cost of treatment nor the petition process is considered a barrier to delisting the waste. DOE would work with the states and the Environmental Protection Agency to ensure they had the information they needed to evaluate the delisting petitions.

6.1 (4810)
Comment - EIS000938 / 0005
This DEIS lists the materials (Table A-8, Volume 2, Page A-17) to be stored. They are careful in this table to not list the half life of the elements. This is an example of how DOE presents a report which on the surface the general public receives a feeling that it must be good. Look how thick it is. DOE is very careful not to blatantly lie but they come very close.

Response
In response to comments, DOE has added half-lives for all radionuclides identified for disposal at the proposed repository to Appendix A of the EIS (Section A.2.1.5.2 and elsewhere).

6.1 (4811)
Comment - EIS000938 / 0006
Vol. 1, Page 1-6, Paragraph 1.2.2.1, Commercial Spent Nuclear Fuel, DOE carefully describes the type of fuel stating that the material also contains actinides. The actinides are so dangerous that in 1973 a NASA [National Aeronautics and Space Administration] report with funding from the AEC [Atomic Energy Commission] stated that the study was conducted because although the actinides are a small fraction of the total waste the half life of some of the materials is over a million years. What I am concerned about is that this small fraction is equivalent to about 9 tons of which a percentage will be dangerous far beyond the 20,000 years that DOE states is the safe period for ALL the waste stored in the repository. The report is bogus if the actinides are included. Some of these will be carried by the underground water table and will end up concentrated in the food chain of future generations. This is in direct conflict with the enabling directive that the Federal Government shall protect future generations and the environment, (Page 1-1, Bullet 2). There is NO proof anywhere in this document that the actinides are not dangerous. Why is this small fraction not dangerous to the public safety, health and the environment of future generations and is in conflict with a published NASA report which describes the problem with actinides that are in the spent fuel rods. Are any of the nuclides specified in Table I-9 chemically toxic materials?

Response
The inventory described in Appendix A of the EIS includes radionuclides of the actinide series. The modeling of long-term performance including actinide-series radionuclides is discussed in Section I.3.1. The 18 actinides included in the analysis are listed in Table 1-5. Chapter 5 and Appendix I provide the environmental consequences of long-term repository performance. The EIS does not indicate that actinides are not dangerous; however, the repository design and the natural features of Yucca Mountain would act to isolate all types of radionuclides, including the actinides. The EIS analyzes the long-term performance of the repository to isolate them.

Extensive studies at Yucca Mountain show evidence of low rainwater infiltration and percolation rates, long groundwater residence times, and a repository horizon that has been hydrologically stable for long periods. The repository emplacement areas would be in areas away from faults that could adversely affect the stability of the underground openings or act as pathways for water flow that could lead to radionuclide release. DOE recognizes that some radionuclides would eventually enter the environment outside the repository. However, analysis of long-term performance shows that the combination of natural barriers of the site and engineered barriers would keep such a release small enough to cause no serious impact on the health and safety of people or the environment. The EIS based its analysis of impacts on a state-of-the-art modeling technique that is internationally recognized as an adequate and proper approach. The analysis of long-term performance used the radionuclides in the inventory with high potential for impact on human health, long half-life, high solubility, and low chemical sorption to estimate impacts to people (Section I.3 of the EIS). The results of the analysis indicate that the impacts for the 10,000-year evaluation period would be low and that health effects would be thousands of times less than natural incidences of health problems in the population.

Section I.3.2 of the EIS lists an inventory of chemical materials DOE would place in the repository, and Section I.3.2 discusses potential chemical toxicity. Section I.3.1.3 lists the radionuclide inventory for Greater-Than-Class-C and Special-Performance-Assessment-Required waste, which includes plutonium, a heavy metal that could have toxic effects. The radiological toxicity of plutonium far exceeds its chemical toxicity. In addition, while there are established radiological limits for exposure to plutonium, there are no such limits for chemical toxicity. Therefore, because DOE thoroughly evaluated the radiological consequences of plutonium and found them to be low, it did not analyze plutonium for chemical toxicity.

6.1 (5306)
Comment - EIS001805 / 0002
We urge the U.S. Department of Energy (DOE) to take all steps necessary to ensure that the first National repository is designed to accommodate all SNF [spent nuclear fuel] and HLW [high-level radioactive waste] without exceeding the limitations imposed by Congress.

We note two changes that will limit DOE's ability to dispose of the entire inventory of SNF and HLW under its purview at the proposed geologic repository.

First, DOE is using an outdated method for calculating the "metric tons of heavy metal" that can be disposed in the repository. Use of this overly restrictive and scientifically unjustified method will mean that the total volume of HLW waste cannot be disposed at the proposed geologic repository within congressionally imposed restrictions on the total volume to be accepted at the first repository. In order to resolve this first challenge, the INEEL CAB [Idaho National Engineering Environmental Laboratory Citizens Advisory Board] recommends that DOE adopt either the total radioactivity method or the radiotoxicity method as more equitable and scientifically justifiable method of calculating the metric tons of heavy metal in DOE's HLW inventory.

Second, DOE has stated that the proposed geologic repository will accept no waste with hazardous constituents as defined by the Resource Conservation and Recovery Act (RCRA). Much of the DOE-owned inventory of HLW is classified as RCRA hazardous and would therefore not be accepted for disposal at the proposed geologic repository. Under the current regulatory framework, two options exist that could allow eventual disposal of these hazardous wastes at the proposed geologic repository at some point in the future. DOE could decide to seek a permit for the geologic repository as a disposal facility under RCRA. Alternatively, DOE could seek to have HLW with hazardous constituents "delisted" following treatment to allow disposal in the geologic repository. Both strategies would likely prove quite difficult to implement. A third option is not in DOE's purview: It would involve congressional action to waive the requirement for a RCRA permit for the repository.

Metric Tons of Heavy Metal

The Nuclear Waste Policy Act was enacted in 1982 for the purpose of developing a geologic repository to protect the population and the environment from the hazards of radioactive waste. The Nuclear Waste Policy Act limited the amount of SNF and HLW to 70,000 metric tons of heavy metal (MTHM) that could be placed in the Nation's first geologic repository until a second repository could become operational.[1] The limitation was meant to provide "regional equity" among potential repository sites.

We understand that the material that could eventually go to the geologic repository includes civilian SNF (from commercial nuclear powerplants). DOE SNF (from DOE production reactors, naval reactors, and experimental reactors), and DOE HLW[2] (primarily waste that resulted from the chemical extraction of weapons-usable materials from defense SNF). In order to project the impacts that would result from the geologic repository, DOE must determine the quantities and characteristics of each of the three materials that would be disposed.

DOE determined that 90% (63,000 MTHM) of the 70,000 MTHM (allowed into the geologic repository) would be allocated for commercial SNF and the remaining 10% (7,000 MTHM) for DOE SNF and HLW. It has further been determined that 33% of the DOE's allotment (2,334 MTHM) would be allocated for DOE-owned SNF and 67% (4,666 MTHM) for HLW.

Calculation of the MTHM of SNF is relatively straight forward, based on the actual heavy metal content of the SNF. Calculation of the equivalent MTHM for HLW (which was not specified by Congress) is somewhat more complicated, however, and will affect the quantity of waste that can be accepted into the geologic repository. Both commercial SNF and DOE HLW contain the radioactive elements that are formed in a nuclear reactor. However, DOE SNF was generally retained in the reactor for a much shorter time than is the case for a comparable amount of commercial SNF. Because the amount of waste that is produced in SNF is dependent upon the length of time it stays in the reactor, much less radioactive waste material was produced per metric ton of DOE SNF compared to waste produced per metric ton of commercial SNF. In addition DOE's HLW consists only of the radioactive waste elements, which were separated from DOE SNF using a technology known as reprocessing, and no longer includes the heavy metals. Because of these differences, we recommend that the most consistent and comparable measure for comparing HLW with SNF is in terms of an "equivalent MTHM"--or the quantity of HLW that would produce the same radioactivity or radiotoxicity as a metric ton of SNF.

In the Draft EIS, impacts are evaluated using a method for calculating MTHM equivalence based on historical projections of radioactivity in HLW. Those historical projections are no longer valid, however, because the radioactivity levels in HLW now being produced are significantly lower. If the historical projections method is applied, the level of radioactivity that would result from each MTHM of HLW disposed in the geologic repository would be significantly lower than the level of radioactivity that would result from each MTHM of commercial SNF disposed. We believe there is no scientific basis for this inequitable and overly restrictive approach. In addition, the geologic repository capacity restriction of 4,666 MTHM for HLW will be inadequate to accommodate all of the HLW under DOE's purview if DOE uses the historical projections method.

The dilemma is recognized in Appendix A of the Draft EIS through the discussion of the methods for calculating MTHM. One method, the Total Radioactivity Method, would establish equivalence based on a comparison of the radioactivity inventory (curies) of HLW to the average curries found in a metric ton of commercial SNF. The second, the Radiotoxicity Method, would involve calculation of the "relative radiotoxicity" (based on the inventory of specific radionuclides present and their respective regulatory release limits). Using either of these two methods for calculating the MTHM equivalency for HLW would allow a more equitable allocation of storage space in the geologic repository between the commercial and DOE materials. Both of these alternative methods would allow DOE to dispose of all of its HLW at the geologic repository without exceeding maximum limits established by Congress.

Accordingly, the INEEL CAB recommends that DOE adopt either the total radioactivity method or the radiotoxicity method in this EIS as a more equitable and scientifically justifiable estimates of equivalent MTHM for the inventory of HLW. This approach would pose no additional risk to human health and the environment (above the risks evaluated in the Draft EIS). It would also reduce risks and costs associated with managing those risks at the sites

where the undisposed HLW would remain, pending development of another repository at some undetermined point in the future.

Hazardous Constituents

Under its current design, the geologic repository will accept no waste with hazardous constituents as defined by the Resource Conservation and Recovery Act (RCRA). However, the DOE-owned HLW that is currently at INEEL contains listed hazardous constitutes and is classified as "RCRA hazardous[3]." In order for the HLW presently at INEEL to be disposed at the proposed geologic repository, various additional activities would have to occur. The INEEL CAB is concerned that the Draft EIS does not address what actions would be required to dispose of HLW that contains listed hazardous constituents, the impacts of those actions, nor the impacts of disposing those wastes at the proposed geologic repository. We note that these wastes constitute a significant portion of the HLW under DOE's control, and that DOE is responsible for permanent disposal of the entire inventory of HLW under the Nuclear Waste Policy Act.

Under the current regulatory framework, two options exist that could allow eventual disposal of these hazardous wastes at the proposed geologic repository at some point in the future. DOE could decide to seek a permit for the geologic repository as a disposal facility under RCRA within the state). Alternatively, DOE could seek to have the HLW with hazardous constituents "delisted" (following treatment) to allow their disposal in the geologic repository. That strategy would require documentation of the treatment methodology and extensive coordination among the states of Nevada and Idaho and two regions of the U.S. Environmental Protection Agency. Both strategies could prove difficult to implement. Nevertheless, the INEEL CAB recommends that DOE evaluate the Proposed Action in the Final EIS based on an assumption that all of the HLW with hazardous constituents will eventually go to the geologic repository for permanent disposal. This approach would allow development of environmental documentation that could support follow-on decision-making should DOE eventually overcome the challenges to acceptance of hazardous constituents at the geologic repository.

Closure of the Geologic Repository

The Draft EIS describes the Proposed Action ending with closure of the proposed geologic repository by 2033. The Idaho Settlement Agreement requires that DOE complete treatment of all HLW at INEEL, making it "road-ready" by the year 2035. The Draft EIS for Idaho's HLW and Facilities Disposition (HLW EIS), written in compliance with the Idaho Settlement Agreement, will allow meeting the 2035 deadline. As the geologic repository closure date is not specified by the Nuclear Waste Policy Act, the INEEL CAB recommends that it be extended to allow for acceptance of the INEEL's HLW.

Waste Acceptance Requirements

The DOE has begun specifying repository waste acceptance requirements for HLW from Savannah River and Hanford as well as other DOE SNF (in the Waste Acceptance Systems Requirements Document). Those requirements have been modified as more is known about the characteristics of the wastes after treatment. The INEEL CAB recommends that DOE further modify the Waste Acceptance Systems Requirements Document to accommodate the INEEL HLW forms described in the Draft HLW EIS.

Full Analysis

According to the "Purpose and Need for Action," in the Draft EIS, this EIS is being prepared to support DOE decision-making related to the Federal Government's responsibility for permanent disposal of all SNF and HLW. Therefore, the INEEL CAB recommends that each alternative include a full description of what would be done to manage the entire inventory of SNF and HLW, including any portions that would not be disposed at the geologic repository for any reason. In addition, the description of impacts under each alternative should include those impacts that would result from ongoing management of those wastes (any not disposed at the geologic repository) at their present locations.

Conclusions Regarding Our Recommendations for Changes to the EIS

If DOE incorporates all of the above recommendations, the Final EIS will:

Support informed decision making regarding future management of all SNF and HLW, in accordance with the federal government's responsibilities under the Nuclear Waste Policy Act.

Allow the design of the geologic repository to accommodate all of the SNF and HLW in DOE's inventory (within the capacity limitations specified in the Nuclear Waste Policy Act), and

Preclude the need for further environmental documentation under the National Environmental Policy Act, as the Final EIS would provide bounding estimates of the impacts of the geologic repository and other reasonable management alternatives for the entire inventory of SNF and HLW under DOE management.

1. The Draft EIS explains that: 1) quantities of SNF are traditionally expressed in terms of metric tons of heavy metal, not including other materials such as cladding and structural materials, 2) a metric ton is 1,000 kilograms or 2,200 pounds, and 3) uranium and plutonium are called heavy metals because they are extremely dense.

2. Including HLW from West Valley

3. HLW currently at Savannah River Site does not contain hazardous constituents and is believed to be acceptable at the geologic repository.

Response

In relation to the calculation of metric tons of heavy metal (MTHM), Appendix A of the EIS describes the basis for several methods for determining MTHM equivalence for high-level radioactive waste and explains that Congress would have to take legislative action to emplace more than 70,000 MTHM in the repository. This comment is correct in that, depending on the equivalence methodology, the total quantity of high-level radioactive waste that the 70,000-MTHM repository could include varies to a great degree. Since 1985, DOE has used the "historical method" (0.5 MTHM per canister) as a planning basis, as it did in this EIS to determine the number of canisters of high-level radioactive waste in the proposed repository. Using this method, the repository would include less than half of the high-level radioactive waste inventory. However, DOE has evaluated the consequences of repository disposal of the entire inventory of high-level radioactive waste. Specifically, Chapter 8 discusses cumulative impacts for the Proposed Action Inventory (which would include less than half the high-level radioactive waste canisters with the 0.5-MTHM-per-canister method) and for a Module 1 inventory (which would include the rest of the canisters). Using different equivalence methods would shift the proportion of the canisters that DOE could dispose of between the Proposed Action and the Module 1 Inventory, but would not have a major effect on cumulative impacts because spent nuclear fuel would dominate long-term repository performance results. Regardless of the equivalence method used, the EIS analyzes impacts from the disposal of the entire inventory of high-level radioactive waste such that bounding consequences are apparent.

The other equivalence methods, including the total radioactivity and radiotoxicity methods, would result in lower estimates of MTHM per canister. As such, these other methods would result in the acceptance of the total inventory of high-level radioactive waste in the repository. DOE is aware of these methods and discusses them in Appendix A of the EIS.

The purpose of the EIS is to evaluate the environmental consequences of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository to dispose of 70,000 MTHM of spent nuclear fuel and high-level radioactive waste. It also evaluates reasonably foreseeable actions such as the disposal of a greater inventory of spent nuclear fuel and high-level radioactive waste representing maximum projected inventories of those materials. The EIS analyses are based on reference designs, conservative inventories, and conservative methodologies. DOE can consider and ultimately pursue disposal of the greater inventory of materials as long as the EIS appropriately assesses such disposal by evaluating the environmental consequences of such reasonably foreseeable actions. While the EIS evaluates the environmental consequences of disposal of more than 70,000

MTHM of spent nuclear fuel and high-level radioactive waste (Module 1 inventory), only Congress can set policy on the ultimate limits.

In response to the comment's concern about hazardous waste, current planning calls for a Yucca Mountain Repository to not accept wastes that are at the time of disposal either listed or characteristic hazardous wastes, as defined in 40 CFR Part 261.

DOE is aware that high-level radioactive waste at the Idaho National Engineering and Environmental Laboratory and the Hanford Site contains listed hazardous wastes. Such wastes would have to be "delisted" by the Environmental Protection Agency and the States of Nevada, Washington (for Hanford), and Idaho before DOE could dispose of them at a Yucca Mountain Repository because there are no plans for a Resource Conservation and Recovery Act permit for the repository. DOE would have to petition the Environmental Protection Agency to delist the waste. In addition, petitions to the States could be required.

DOE high-level radioactive waste could exhibit characteristics of hazardous waste (ignitability, reactivity, corrosivity, and toxicity) prior to treatment. The treated waste would not exhibit any of those characteristics. Characteristic hazardous wastes do not require a petition and rulemaking by the Environmental Protection Agency to exit the hazardous waste system.

Both listed and characteristic hazardous wastes would have to meet applicable *Land Disposal Restrictions Treatment Standards* (40 CFR Part 268) at a Yucca Mountain Repository. Waste treatment processes to meet these standards can produce wastes that are delistable. The petition process for delisting is straightforward, and delisting standards are clear. Therefore, neither the cost of treatment nor the petition process is considered a barrier to delisting these wastes. DOE would work with the states and the Environmental Protection Agency to ensure they have the information they need to evaluate the delisting petitions.

The EIS cumulative impact analysis includes all Idaho National Engineering and Environmental Laboratory high-level radioactive waste, as discussed above. The analysis assumed that receipt and emplacement of the entire Module 1 inventory of spent nuclear fuel and high-level radioactive waste would begin in 2010 and continue for 36 years, as discussed in Section 8.1.2.1 of the EIS. The dates a repository would become available, complete emplacement operations, and ultimately close are subject to many variables. It could close as early as 50 years or as late as 324 years after emplacement began.

The development of waste acceptance criteria documents is beyond the scope of this EIS. However, DOE does not believe that setting waste acceptance criteria without full consideration of input from the affected generators would be in their best interests. Therefore, the Department has instituted a program under which criteria development occurs through a formal technical review and comment process with all affected parties to ensure material transportation and disposal in a manner that would protect the public and provide long-term repository performance in compliance with the Environmental Protection Agency's public health and environmental radiation protection standards at 40 CFR Part 197.

6.1 (5318)
Comment - EIS001887 / 0051
Page 1-8; Section 1.2.5 - Other Waste Types with High Radionuclide Content

The Draft EIS fails to articulate an adequate legal rationale supporting the inclusion of wastes other than spent nuclear fuel and high-level radioactive waste as defined in the Nuclear Waste Policy [Act] of 1982, as amended. Particularly, there does not appear to be any legal justification for the inclusion of "Special-Performance-Assessment-Required" waste referred to in Section 1.2.5.

Response
As discussed in Section 1.5.1.1 of the EIS, comments received during the public scoping period requested that the EIS evaluate the potential acceptance of other waste types that could require disposal in a deep geologic repository in addition to the projected inventory of spent nuclear fuel and high-level radioactive waste. As a result, in Section 8.2 DOE analyzed the impacts of the disposal of Greater-Than-Class-C low-level waste and Special-Performance-Assessment-Required waste as reasonably foreseeable future actions. The introduction to Chapter 8 explains that

emplacement of these wastes at Yucca Mountain could require a determination by the Nuclear Regulatory Commission that these wastes require permanent isolation.

6.1 (5332)
Comment - EIS001887 / 0060
Page 1-23; Section 1.5.1.1 - Additional Inventory Studies

The Nuclear Waste Policy Act limits the amount of spent nuclear fuel that can be disposed in a Yucca Mountain repository. In addition, the Act does not authorize disposal of Greater-Than-Class-C or Special-Performance-Assessment-Required waste in a Yucca Mountain repository.

Response
In accordance with the NWPA, the EIS evaluates the impacts of the Proposed Action, under which the Yucca Mountain Repository would accept 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste. As discussed in Section 1.5.1.1 of the EIS, comments received during the public scoping period requested that the EIS evaluate the potential acceptance of the projected inventory of spent nuclear fuel and high-level radioactive waste, as well as other waste types that could require disposal in a geologic repository. In response to comments, Chapter 8 evaluates Inventory Modules 1 and 2 as reasonably foreseeable actions. Module 1 evaluates the complete inventory of spent nuclear fuel and high-level radioactive waste. Module 2 evaluates Module 1 plus a projected inventory of Greater-Than-Class-C and Special-Performance-Assessment-Required wastes. In addition, the introduction to Chapter 8 states that the emplacement of these wastes at Yucca Mountain would require legislative action by Congress unless a second licensed repository was in operation and could require a determination by the Nuclear Regulatory Commission that these wastes require permanent isolation.

6.1 (5338)
Comment - EIS001887 / 0063
Final Waste Management PEIS [Programmatic EIS] for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste (Waste Management PEIS)

This document characterizes and identifies the volumes of HLW [high-level radioactive waste] at DOE facilities nationwide and uses or updates previous Spent Nuclear Fuel information. The PEIS evaluates only the storage of immobilized HLW canisters. Treatment and disposal of HLW were not analyzed. However, the final disposition of these immobilized canisters is on-site storage "until shipment to a geologic repository for disposal." If this waste is to be disposed at a Yucca Mountain repository, the Draft EIS should evaluate both the treatment and disposal of this waste at Yucca Mountain.

Response
DOE would not treat high-level radioactive waste at the repository; therefore, the EIS evaluation of repository operations assumed receipt of high-level radioactive waste in its final treated form. Appendix A of the EIS describes the anticipated final waste forms and radiological characteristics of high-level radioactive waste. Section A.2.3 contains background information on ongoing treatment at DOE facilities and on future and ongoing EISs relevant to treatment options at other DOE facilities. Section 1.5.3 lists relevant environmental documents.

6.1 (5680)
Comment - EIS001887 / 0301
Section 6 of the Draft EIS purports to address the environmental impacts of transportation without ever specifically describing the radiological characteristics of spent nuclear fuel (SNF) and high-level radioactive waste (HLW) that cause the most serious adverse impacts of repository transportation on public health and safety and the environment.

Nevada believes that the impacts of repository transportation activities cannot be accurately assessed without explicitly acknowledging the deadly nature of SNF and HLW. Nevada's 1995 scoping comments recommended: "The radiological consequences of exposure and contamination associated with each reference fuel type should be presented in terms understandable to the general public, and these consequences should be presented in the Executive Summary as well as in the body of the draft EIS." DOE has chosen to ignore Nevada's recommendation.

Section 6 contains no meaningful discussion of the radiological characteristics of the reference fuel types to be transported to the repository. Indeed, the Draft EIS overall barely discusses the radiological hazards of SNF. The Executive summary states that spent nuclear fuel "consists mostly of uranium, and is usually intensely radioactive because it also contains a high level of radioactive nuclear fission products." (p. S-4) The overview section of Volume 1 states that spent nuclear fuel "is intensely radioactive in comparison to non-irradiated fuel." (p. 1-6) Except for identifying Cesium-137 as a major source of SNF preclosure impacts and shielding requirements (p. A-9), Appendices A, F, and J provide little specific information on the hazards of SNF.

DOE has designated a 26 year-old PWR [pressurized-water reactor] spent fuel assembly with 39,560 MWd/MTHM [megawatt-days per metric ton of heavy metal] burn-up and 3.69 percent Uranium-235 initial enrichment as the "typical fuel type" for transportation impact analysis in Section 6 of the Draft EIS. (p. A-14) All other factors being equal, cooling time is the single most important determinant of transportation radiological risk. The 26 year-old SNF assumed in the Draft EIS is considerably less dangerous than the 10 year-old SNF assumed in past DOE program documents, and much less dangerous than the 5 year-old SNF that could be shipped to the repository in casks currently licensed by the NRC [Nuclear Regulatory Commission].

The typical PWR assembly described in the Draft EIS contains 31,000 curies of Cesium-137 and 21,000 curies of Strontium-90, and is a powerful source of penetrating gamma and neutron radiation. A person standing next to a single, unshielded 26 year-old SNF assembly for a few minutes would receive a radiation exposure sufficient to cause death in 50 percent of the population. Extend the time to ten minutes, and death from classic radiation sickness replaces concern about latent cancer fatalities.

Response

The EIS includes detailed discussions of the radiological impacts associated with the Proposed Action. The impacts include the consequences associated with normal incident-free conditions and accident scenarios, including transportation. Chapter 6 of the EIS discusses in detail potential impacts from transporting spent nuclear fuel and high-level radioactive waste from 72 commercial and 5 DOE sites to Yucca Mountain. Appendix J includes details of the analysis and methodology used to determine transportation impacts. Appendix A provides the inventory and characteristic information that DOE used throughout the EIS analyses, which reference that appendix in each applicable section. To clarify the inventory information used in the transportation analysis, DOE has added a new reference to Appendix A to the introduction to Chapter 6.

Chapter 1 of the EIS discusses in general terms each type of fuel that would be in the repository inventory. The discussion of fuel types in Chapter 1 and the Summary note in simple, understandable terms that the main hazard associated with spent nuclear fuel is "radioactivity" and that spent nuclear fuel is intensely radioactive. Appendix A contains more technical information, such as the amount and type of radioactivity, the final waste form, physical characteristics, mass and volume, chemical composition, thermal output, and canister data.

DOE does not believe it has misrepresented the spent nuclear fuel characteristics in the Draft EIS. Section A.2.1.5 of the Final EIS provides the bases for selecting average pressurized-water reactor and boiling-water reactor fuel assemblies. These fuel assemblies replace the "typical" fuel assemblies in the Draft EIS and are based on more recent projections of commercial spent nuclear fuel shipments to the repository. Specifically, DOE selected the average assemblies to be representative of the average of the fuels the repository would receive and to provide a realistic estimate for analysis. The average commercial assemblies specified are used in the Final EIS for calculating the repository inventory and post-irradiation elemental distribution.

The Final EIS includes a revised "representative" commercial fuel for calculating impacts of potential accidents. The representative fuel is based on a Hazard Index approach that considers the relative hazard of all commercial spent nuclear fuel that DOE could receive at the repository. This fuel would be younger (fewer years since removal from the nuclear reactor) and have higher burnup (more energy extracted from the fuel) than the typical commercial fuels analyzed in the Draft EIS. The use of the bounding fuel (maximum burnup and minimum cooling) is not appropriate for transportation accident analysis because DOE would not fill transportation casks with such fuel. The bounding fuel would exceed the thermal and direct radiation exposure limits for high-capacity transportation casks; therefore, shipments of such fuel would be in casks that carried fewer fuel assemblies than the large-capacity casks DOE assumed for the Draft EIS analyses. Furthermore, the bounding fuel represents a very small fraction of the spent nuclear fuel inventory. Thus, an accident involving shipment of bounding fuel would not be reasonably

foreseeable; that is, the likelihood of such an accident would be less than 1 in 10 million per year of transportation. In addition, potential accidents associated with the bounding fuel would be less severe than the maximum reasonably foreseeable accident evaluated in the EIS because there would be fewer fuel assemblies in each cask. The Final EIS defines the parameters of representative commercial spent nuclear fuel and the rationale for developing the representative fuel type for use in the accident analysis (Appendix A).

6.1 (5998)
Comment - EIS001879 / 0026
p. A-18 - Table A10 [Section A.2.1.5.2]

The summation of the grand totals for the individual radionuclides should be calculated and presented in this table.

Response
The table in Section A.2.1.5.2 of the EIS lists the estimated number of curies in 50 separate isotopes in commercial spent nuclear fuel, each of which DOE used in the evaluation of impacts. DOE did not sum the individual radionuclides because a grand total could be misleading due to the wide variation of potential health effects among nuclides. For example, a curie of plutonium could cause a much greater effect to human health than a curie of cesium, which could cause a much greater effect than a curie of tritium. For that reason, the EIS estimates radiological dose to humans in rem or millirem.

6.1 (6614)
Comment - EIS002101 / 0004
When these casks start rolling in -- I've been at your meetings where you haven't had the audacity to pull it out today, but fake spent fuel rods, parading around like look, this is a spent fuel rod, totally safe, totally nice, but it's been in water. Anybody here who has ever taken out a hot water heater knows that you get corrosion around your elements. There's a lot of -- of minerals and so on that's attached itself to those fuel rods that is also highly radioactive.

Response
This comment that a "clean" spent nuclear fuel rod does not have corrosion or "crud" as a spent nuclear fuel rod would have is correct. The EIS analysis modeled spent nuclear fuel rods in determining the environmental impacts of repository and transportation activities. Section H.2.1.4.1.1 describes the buildup of crud on the outside of the fuel rod cladding and how crud becomes radioactive from neutron activation. The EIS impact analyses included this radioactivity.

6.1 (6857)
Comment - EIS001466 / 0004
What is in these casks that will be rolling through Utah? And I'm from Michigan and I've only been in D.C. a few months. I've worked on this issue for over a decade. I lived about 35 miles from the Palisades nuclear plant.

And so this high-level waste, these are the fuel rods that come out of the core of the reactors. They're up to a million times more radioactive coming out than when they went in, and if you were to be within a yard of this stuff -- depends on how long it's been out of the core. If it's just come out of the core, then your lethal exposure could be in a matter of ten seconds; if it's been out for a number of years, your lethal exposure could be in a number of minutes.

So this material needs to be shielded, it needs to be isolated from the environment. Because of the long duration of the hazards of some of the radionuclides, it needs to be isolated from a living environment for hundreds of thousands of years.

Response
Spent nuclear fuel must be shielded and isolated to protect the environment and ensure the public's health and safety. DOE would ship spent nuclear fuel in casks certified by the Nuclear Regulatory Commission and designed to withstand severe accidents and provide sufficient shielding to meet U.S. Department of Transportation regulations on radiation exposure rates (49 CFR 173.441). As discussed in Section 6.2.3 of the EIS, radiation exposure to an individual near the route or near a rail yard could be as high as 300 millirem over the 24 years of the transport

campaign. The dose to an individual in a traffic jam immediately adjacent to a truck shipment could be as high as 20 millirem. In relation to environmental isolation, DOE believes that its proposed operational plan for a Yucca Mountain Repository provides a design and management approach that would isolate waste materials from the public and the environment for the foreseeable future, thereby ensuring the health and safety of the public.

6.1 (7198)
Comment - 010322 / 0006
Again on the fuel blending, and this is something new in the Supplement that I saw. Now, to do fuel blending you have to know the exact history of all the assemblies, as I understand it. Because the reactor sites, they do keep records and so on and so forth, but records often have mistakes.

And studies have been done that mistakes have been made in record keeping and the actual age of the fuel assembly. And I didn't see a really thorough evaluation of what would happen if those records were incorrect, fuel was blended that was thought to be older than it actually is, and what the consequences of that would be. And that's a big concern.

Response
A recent evaluation considered misloading of a waste container and found the event to be credible (DIRS 103237-CRWMS M&O 1998). However, DOE intends to develop waste container loading procedures based on thermal analyses of the various waste container configurations such that sufficient margin would be available to ensure that the waste package surface temperature design criteria would not be violated for any credible misload. Furthermore, extrapolation of the results of a recent waste package thermal analysis (DIRS 154278-CRWMS M&O 2001) indicates that the maximum thermal misload (all 5-year-old pressurized-water reactor spent nuclear fuel, the hottest fuel that could be shipped to the repository) would not result in waste package failure from excessive temperature. The accident analysis in Appendix H includes the failure of a waste package resulting from high-speed impact on the access tunnel wall following failure of the transporter (transporter runaway). The impacts from this accident, which include releases resulting from mechanical damage of the fuel, would bound the impacts from failure of a waste package as a result of thermal overload.

6.1 (7461)
Comment - EIS000817 / 0008
You have low-level waste BPRAs [burnable poison rod assemblies], etc. being put in HLW [high-level radioactive waste] containers. No low-level waste should take up room in a HLW repository. It's going to cause a problem if DOE has to take low-level waste out of the casks at Yucca Mountain packaging facility. Yet utilities are mixing low-level in with high-level assemblies in dry storage at their reactors. This should not be allowed... The NRC [Nuclear Regulatory Commission] withdrawal of the direct final rule to allow the VSC-24 [Ventilated Storage Cask, Model 24] cask certificate to be amended to allow putting BPRAs in the assemblies. I sent in comments, but I don't know what caused the withdrawal specifically. One of my concerns was putting low-level waste in high-level waste containers. Those assemblies are eventually bound for Yucca Mountain and a high-level waste repository with limited space and radiation and thermal loads is no place for low-level waste. NRC should not allow utilities to put them in casks now. What is [the] DOE position on this?

Response
The Standard Contract between DOE and the nuclear utilities (10 CFR Part 61) states that nonfuel components including, but not limited to control spiders, burnable poison rod assemblies, control rod elements, thimble plugs, fission chambers, and primary and secondary neutron sources, that are contained in the fuel assembly, or boiling-water reactor channels that are an integral part of the fuel assembly, which do not require special handling, could be included as part of the spent nuclear fuel delivered for disposal pursuant to the Standard Contract.

As long as the commercial nuclear utilities abide by the contract and meet the Yucca Mountain waste acceptance criteria, DOE is obligated to receive the spent nuclear fuel and its associated nonfuel assembly hardware for disposal in the proposed repository. The Nuclear Regulatory Commission will review the Yucca Mountain waste acceptance criteria, which would become part of the operating license issued by the before construction and operation of the repository.

6.1 (7497)
Comment - EIS001909 / 0001
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 OCRWM, DOE/EIS-0250D, July 1999 (hereinafter referred to as the DEIS) fails to address the single most important issue which affects risk reduction, namely, the apportionment of commercial spent nuclear fuel (SNF) and DOE high-level radioactive waste (HLW) and spent fuel within the disposal inventory limit set by Congress in the NWPA, i.e., 70,000 metric tons of heavy metal (MTHM). While this issue is clearly within the scope of the DEIS, and is in fact referenced in the DEIS with regard to an administrative decision made by DOE which establishes the MTHM ratio of SNF and HLW, no analysis is presented with regard to the risk reduction achieved by different disposal ratios of commercial SNF and DOE waste within the 70,000 MTHM Congressional limit....

The Yakama Nation (YN) entered into a Treaty with the United States government on June 9, 1855 (Treaty of 1855, 12 Stat 951). This Treaty was entered into pursuant to the laws of the Yakama and the U.S. Constitution, and was signed by the President of the United States on April 18, 1859 following ratification by Congress. It is in full effect today.

The YN retains perpetual rights on open and unclaimed land within the boundaries of the territory ceded to the United States government in the Treaty of 1855. The Hanford nuclear site is on YN ceded land. Due to the Hanford site's proximity to the Yakama Nation Reservation, the YN is affected by Hanford activities on its Reservation land as well as from impacts to the Hanford ceded land. In addition, the Hanford site creates off-site impacts which affect YN reserved rights on other areas of its ceded territory, including the Columbia River.

The greatest inventory of HLW and DOE SNF in the United States is located on YN ceded land at the DOE's Hanford site. Most Hanford HLW is stored in leaking underground tanks, but some HLW has now contaminated the vadose zone under the tanks, and some has reached the unconfined aquifer which flows into the Columbia River. This HLW poses acute as well as chronic risks to human health and the environment, resulting from its mobility into the environment, its extreme toxicity, and its long-lived activity. DOE SNF at Hanford is considered an acute risk as well, resulting from the degraded nature of containment, and the potential for a catastrophic release to the Columbia River. It is therefore of the greatest importance to the YN government that the United States fully consider any actions with regard to retrieval, processing, and disposal of this HLW which may affect the perpetual Treaty rights of the YN.

As mentioned above, the YN does not consider the analysis in the DEIS adequate at this time. The single greatest factor within the scope of the DEIS which affects risk reduction, including risk reduction to Yakama Tribal members and YN resources which are protected by Treaty, is the apportionment of commercial SNF and DOE waste in the proposed repository.

The human health and environmental risks posed by Hanford HLW are significantly greater than those posed by commercial SNF, and that risk may increase substantially as the Hanford HLW tanks continue to deteriorate and fail, and unless the Hanford SNF is stabilized and isolated from the environment. The most important and necessary analysis for the proposed Yucca Mountain repository is a comparative analysis of the risks of storage of DOE HLW and SNF relative to those of commercial SNF, prior to waste acceptance at a repository. This analysis is mandatory before DOE, Congress, and affected governments, including the YN, may have confidence in the SNF and HLW disposal program.

When the proposed analysis is conducted, it should fully account for the distinct pathways and risks posed to Native Americans, including YN Tribal members. (Please reference "Estimation of Health Risk Based on Revised Estimates of HEDR Doses for Maximum Representative Individuals Consuming Fish and Waterfowl from the Columbia River: An Evaluation of HEDR Reports on the Columbia River Pathway," Agency for Toxic Substances and Disease Registry, Atlanta, Georgia, March, 1998.)

Risks of DOE Hanford HLW and SNF vs. Commercial SNF

Hanford HLW exists in an extremely hazardous form. It consists of sludge, saltcake and liquids which are unstable and have numerous constituents which have reacted to form flammable gasses and potentially explosive compounds.

While extensive work has been undertaken over the past decade to assess and mitigate the risks posed by potential explosions in the Hanford HLW tanks, the reality is that characterization data does not exist at the level necessary to ensure that an explosion may be ruled out. DOE Hanford SNF is stored in a leaking basin which could fail during an earthquake, and the SNF elements have corroded and released HLW sludge to the basin floor. Commercial SNF, by comparison, is in the form of a solid with well defined characteristics, has more robust cladding, and is stored under stringent standards.

Hanford HLW has been released to the environment, and containment continues to fail. Once radioactive materials are present in the accessible environment, the risks posed to human health and the environment increase dramatically. Not only has Hanford HLW already impacted the accessible environment, but it is certain that those impacts will increase in the near term. Hanford HLW has been confirmed in the vadose zone, and HLW constituents have reached groundwater in some locations. Similar to the lack of characterization data, data on the extent of HLW contamination to the vadose zone and groundwater is incomplete. DOE Hanford SNF has released radionuclides into the soil from leaks in the basin. Commercial SNF remains contained and isolated from the accessible environment.

Hanford HLW is likely to produce unforeseen and unpredictable risks in its interactions with the environment. Unlike commercial SNF, which exists in a well-characterized and stable form, Hanford HLW constituents (sludge, saltcake, and liquids comprised of organic, inorganic and heavy metal radionuclides and chemical wastes) present significant risk assessment challenges. In short, Hanford HLW poses greater risk relative to commercial SNF once released to the environment by virtue of its composition. Similarly, DOE Hanford SNF exists in a form which is more difficult to retrieve from the environment than commercial SNF.

Section 1.4.2 -- "The Nuclear Waste Policy Act requires the Nuclear Regulatory Commission to include in the authorization a prohibition against the emplacement of more than 70,000 MTHM in the first repository until a second repository is in operation [Nuclear Waste Policy Act, Section 114(d)]. DOE has allocated 63,000 MTHM of commercial spent nuclear fuel and 7,000 MTHM equivalent of DOE spent nuclear fuel and high-level radioactive waste to the proposed repository at Yucca Mountain."

The DOE allocation of 7,000 MTHM equivalent of DOE SNF and HLW is one of the most significant factors in risk exposure considered in the DEIS -- yet no analysis is presented regarding the basis for this decision. In fact, this decision should have been fully subject to NEPA [National Environmental Policy Act] analysis, and alternatives presented for various repository allocations between commercial spent fuel and DOE spent fuel and HLW.

Response

DOE is implementing a plan to retrieve and stabilize the waste in the Hanford tanks to provide long-term protection of human health and the environment. As noted in the Tank Waste Remediation System EIS (DIRS 103214-DOE 1996) and its Record of Decision (62 *FR* 8693; February 26, 1997), the Department and the Washington State Department of Ecology have agreed to a plan that would isolate the tank waste from humans and the environment, and provide for the protection of public health and the environment until final disposition in a repository. The planned treatment will reduce the potential risk from such waste to a level similar to or less than the risk from spent nuclear fuel. As a consequence, the apportionment between DOE waste at Hanford and commercial spent nuclear fuel would not affect the EIS or Site Recommendation schedules.

DOE is carefully weighing and balancing a number of issues, such as priority based on risk, to determine the optimum shipping scenario that would include both commercial and DOE spent nuclear fuel and high-level radioactive waste, but has not set a specific order. DOE has been working on an optimized shipping schedule for the past 2 years based on acceptance rates for DOE spent nuclear fuel and high-level radioactive waste.

In relation to the 7,000 metric tons of heavy metal apportionment, DOE decided to allocate 10 percent of the capacity of the first repository for the disposal of DOE spent nuclear fuel and high-level radioactive waste (DIRS 104384-Dryfuss 1995; DIRS 104398-Lytle 1995). The 10-percent apportionment is simply an assumption for EIS analyses. Section A.2.3.1 of the EIS discusses the 10-percent allocation.

6.1 (7526)
Comment - EIS001723 / 0001
You're speaking of storing 77,000 metric tons of waste in the mountain.
Well, what is a metric ton? One metric ton is 2,200 lbs. So, then, 77,000 metric tons are 169,400,000 lbs.

How do we visualize what kind of volume we're speaking of, and how impractical this project really is?

Most of us drive cars, so let's use them as our example. Let's say for the sake of argument, they weigh 3,500 lbs. each. If I've done the math right, we are looking at trying to park 4,840,000 cars inside Yucca Mountain. Will they fit? Probably not!

Response
The Proposed Action for this EIS is to dispose of 70,000 metric tons of heavy metal (MTHM) of spent nuclear fuel and high-level radioactive waste in the proposed geologic repository. Appendix A of the EIS provides information that correlates the 70,000 MTHM of materials into volume. The total volume of materials that DOE projects it would emplace during the Proposed Action is approximately 40,000 cubic meters (52,000 cubic yards). Depending on the repository operating mode, which would affect the size of the repository, DOE would excavate between 4.4 and 8.8 million cubic meters (5.8 to 12 million cubic yards). Emplacement drifts would have a diameter of 5.5 meters (18 feet). Accounting for spacing between waste packages and the waste packages themselves, the repository would be more than adequate to accept the volume of material proposed.

6.1 (7590)
Comment - EIS001909 / 0007
Section A.2.3.1

"There has been no determination of which waste would be shipped to the repository, or the order of shipments."

This statement reveals the lack of analysis presented in the DEIS. Yucca Mountain, if it is licensed for acceptance of waste, will provide disposal capacity for actual commercial SNF and DOE HLW and SNF. The DEIS should provide a range of scenarios for which waste is proposed to be shipped to a generic repository, so the impacts of those scenarios may be evaluated.

Response
DOE is carefully weighing and balancing a number of issues to determine the optimum shipping scenarios that would include both commercial and DOE spent nuclear fuel and high-level radioactive waste, but the Department has not set a specific order. Because it would be at least 8 years before the repository could begin accepting spent nuclear fuel and high-level radioactive waste, the process used to determine the shipping order would likely continue to evolve for several more years. The process for determining shipment order would not impact the EIS or Site Recommendation schedules. DOE looks forward to working with its stakeholders during this time period as the process continues.

6.1 (7595)
Comment - EIS001909 / 0008
Section A.2.3.5.4

"In the extreme, the nonuniform blending of cesium concentrates and capsule materials into a relatively small volume of sludge waste could produce a few canisters with specific powers as high as 2,540 watts, which is the limit for the nominally 4.5-meter (15-foot) Hanford canisters in the Civilian Radioactive Waste Management System Baseline (Picha 1997, Attachment 1, page 2; Taylor 1997, all)."

The consideration of actual waste forms and waste package characteristics points to the need for a careful analysis of [the] waste inventory considered for disposal, and specifically the impacts of waste packages which may be stored for an indefinite period prior to acceptance for geologic disposal in a repository.

Response
DOE is considering actual waste forms and waste characteristics, which is why Appendix A includes information on the few Hanford high-level radioactive waste canisters that could have higher thermal outputs. The surface facilities design in the EIS includes staging and pool storage for canisters. Current plans call for putting the spent nuclear fuel and high-level radioactive waste received at the proposed repository in new waste packages at the surface facilities before emplacement. In the case of DOE materials, the canisters in which the material arrived at the repository would be placed directly in the waste packages to be emplaced.

6.1 (7600)
Comment - EIS001909 / 0009
Section A.2.3.5.7

"Hanford Site. DOE could need to ship such nonstandard high-level radioactive waste [HLW] packages as failed melters and failed contaminated high-level radioactive waste processing equipment to the repository. For this EIS, the estimated volume of nonstandard packages available for shipment to the repository from the Hanford Site would be equivalent to that described below for the Savannah River Site."

Table A-38 provides an estimate of 10 melters, 4.5 equivalent DWPF [Defense Waste Processing Facility] canisters for each melter, 1,000 metric tons for 10 melters, with one melter per disposal package.

The DEIS should fully consider Hanford HLW [high-level radioactive waste] in addition to tank waste, failed melters, and failed HLW processing equipment. In particular, the DEIS should provide an analysis of the fraction of Hanford HLW currently planned for separation and disposal at the Hanford site, by mass, volume and radionuclide content.

Response
The EIS considers all waste at the Hanford Site that DOE has declared to be high-level radioactive waste, including the vitrified high-level tank waste (with strontium and cesium capsules from the water basin blended into the tank waste) and the nonstandard packages (failed melters and processing equipment). Appendix A provides detailed information on these waste forms, including mass and volume, amount and nature of radioactivity, chemical composition, and thermal output. DOE has not declared other miscellaneous materials or wastes at the Hanford Site, either existing or forecast, to be candidate high-level radioactive waste streams and, therefore, has not evaluated other wastes in this EIS.

Because the Nuclear Waste Policy Act of 1982 limits the amount of spent nuclear fuel and high-level radioactive waste to 70,000 metric tons of heavy metal, the Proposed Action cannot include the total expected inventories of these materials. However, Chapter 8 of the EIS discusses the analysis of environmental impacts of inventories larger than that evaluated for the Proposed Action.

6.1 (7947)
Comment - EIS001903 / 0011
The Summary and main body of the EIS should explain the basis of the allocation and prioritization of DOE high-level waste shipments to the repository. The proposed action must consider the transfer of INEEL [Idaho National Engineering and Environmental Laboratory] high-level waste to the proposed Yucca Mountain repository. This information should not be hidden in an obscure table in an Appendix.

Response
Section 1.2 of the EIS discusses the types and quantities of radioactive material under consideration for repository disposal. Section 1.2.3 notes that the inventory of material being considered includes high-level radioactive waste at the Idaho National Engineering and Environmental Laboratory and refers to Appendix A for inventory details, including waste characteristics and volumes. Section A.2.3 provides the current status of Idaho National Engineering and Environmental Laboratory high-level radioactive wastes in the total inventory, treatment options, planned treatment dates, and proposed dates to ship such wastes to a repository. Section A.2.3.1 specifically notes that, using the historical method of estimating the metric tons of heavy metal equivalence, DOE could not dispose of all high-level radioactive waste in the current Proposed Action inventory allocation of 4,667 metric tons of heavy

metal. It also notes that DOE has not determined which waste it would ship to a repository or the order of shipments.

Because it would be at least 8 years before a repository could begin accepting spent nuclear fuel and high-level radioactive waste, the process DOE used to determine which waste it would ship and the shipping order would continue to evolve. DOE would work with its stakeholders during this period.

6.1 (8217)
Comment - EIS001873 / 0019
Chapter 8 should be expanded to include spent fuel that could be generated by new power plants or future DOE activities. The question to ask is: What is the maximum quantity of radioactive waste that could be sent to the Yucca Mountain area without the benefit of another complete EIS, and what would be the impacts of this expansion of the Project?

Response
Appendix A and Section 8.2 of the EIS address the potential for as much as 105,000 metric tons of heavy metal of commercial spent nuclear fuel that the operation of commercial nuclear reactors could generate. This value includes the assumption that the Nuclear Regulatory Commission would grant 10-year extensions of the operating licenses to all of the existing reactors. This projection from the Energy Information Administration is the most conservative projection of total spent nuclear fuel that could be generated. There are currently no plans to construct any new commercial reactors. Appendix A and Chapter 8 also address the total expected volume of spent nuclear fuel and high-level radioactive waste that DOE activities would generate.

6.1 (8409)
Comment - EIS001873 / 0074
P. 8-5. DOE should include spent nuclear fuel from new reactors that may be licensed in the future if Yucca Mountain is expanded.

Response
Appendix A and Section 8.2 of the EIS address the potential for as much as 105,000 metric tons of heavy metal of commercial spent nuclear fuel that the operation of commercial nuclear reactors could generate. This value includes the assumption that the Nuclear Regulatory Commission would grant 10-year extensions of the operating licenses to all of the existing reactors. This projection from the Energy Information Administration is a conservative projection of total spent nuclear fuel that could be generated. There are currently no plans to construct any new commercial reactors. Appendix A and Chapter 8 also address the total expected volume of spent nuclear fuel and high-level radioactive waste that DOE activities would generate.

6.1 (8571)
Comment - EIS000817 / 0179
P. A-28. Mixed Oxide -- you don't know if this will even work in Canadian reactors yet, so how can you say this? Wow! When I look at all the variables for material interactions here in all these waste forms -- I say leave it in the casks -- separate from each other.

Response
The mixed-oxide fuel discussed in Section A.2.2.4 of the EIS is existing DOE spent nuclear fuel that the Department would ship from the Hanford Site or the Idaho National Engineering and Environmental Laboratory. This is not the mixed-oxide fuel proposed to provide a means of disposing of surplus plutonium, which is described in Section A.2.4.5.1.

6.1 (8572)
Comment - EIS000817 / 0180
A-34. Can you solve the vitrification process problems or has this idea been discarded? How stable is borosilicate glass? Certainly all problems with this and electrometallurgical treatment needs to be solved before any repository decision is made.

Response
The vitrification process solidifies and immobilizes high-level radioactive waste into a borosilicate glass or ceramic form inside stainless-steel canisters. Although vitrification poses technical challenges, DOE has used it successfully for several years at the Savannah River Site in South Carolina and the West Valley Demonstration Project in New York (see Section A.2.3 of the EIS). It is a viable process for immobilizing high-level radioactive waste.

DOE has conducted considerable research on the various waste form materials. This information has been used to develop models of how these materials would perform over long periods in a repository environment. For example, models of commercial spent nuclear fuel dissolution are based on experimental tests in which actual reactor fuel was been used. The models for borosilicate glass and the plutonium ceramic are also based on extensive testing. Dissolution and degradation models for borosilicate glass have been under development for more than 25 years, and there has been extensive testing of plutonium ceramic degradation for several years to support the Yucca Mountain Project. While all these waste forms eventually degrade and dissolve, the process is extremely slow, being characteristic of reactions of water on glass and ceramic materials where time scales are in the hundreds of thousands of years (DIRS 153246-CRWMS M&O 2000).

Details about these dissolution models used in the Total System Performance Assessment are described in Appendix I of the EIS.

In September 2000, DOE selected electrometallurgical technology to treat spent nuclear fuel from the Experimental Breeder Reactor-II at Argonne National Laboratory-West near Idaho Falls, Idaho (65 *FR* 56565; September 19, 2000). In addition, the Department will further develop alternative technologies that might provide cost savings or other benefits for similar fuel from the Fermi-1 Reactor. This decision followed the successful completion in August 1999 of a 3-year research and development demonstration project of this technology. An independent National Research Council review found no technical barriers to the use of this technology to treat Experimental Breeder Reactor-II fuel. However, DOE will continue to investigate alternative treatment techniques while monitoring the results and costs of the electrometallurgical treatment of Experimental Breeder Reactor-II fuel. Data evaluated through the National Environmental Policy Act process indicate that DOE might be able to take advantage of the differences in the Fermi-1 and Experimental Breeder Reactor-II fuel to save money by treating the two fuel types with different techniques. If no alternative is more cost effective for the Fermi-1 spent nuclear fuel, however, electrometallurgical treatment remains a viable option.

6.1 (8589)
Comment - EIS001837 / 0003
Your Programmatic Waste Management DEIS fails to reflect the diversity of nuclear waste and the fact that we need a new classification system. The DEIS fails to address the issue that nuclear materials are more safely stored on site until decay, according to its classification as an element or isotope. An entire rewrite of the entire national management policy in Washington D.C. must exact the management for various isotopes depending upon specific radioactivity or decay life. Even in our own homes, we separate the brown bottles from the clear bottles. The nuclear industry must approach the various elements and isotopes the same way. No further expenditures should be made or rulemaking imposed regarding nuclear waste disposal plans until after the entire National Policy on nuclear waste management can be reviewed and revised by a Blue Ribbon Commission as per proposed SBA 540.

Currently, our nation's nuclear waste is misclassified and much of the so called low level nuclear waste should in reality be included in any management proposal for high level nuclear waste and/or mixed waste. The classification wording "high" and "low" level waste is deceitful and misleading. The same isotopes are included in both waste forms. High level waste can become low level simply by mixing and diluting the shipment. Your representative at the 2/22/00 hearing in San Bernardino claimed that there would be no liquid waste, but when she says this, she misleads the public. The DOE should be honest with the public and letting the public know that they mean something else. The drums or casks or shipment containers can have so much percentage liquid and still not be called liquid waste. The DOE can allow the liquid waste to be sopped up with toilet paper or whatever and not call it liquid. This is a classification problem.

Response
The purpose of this EIS is to evaluate the consequences of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository and of a No-Action Alternative. The classification of high- and low-level

radioactive waste and definition of acceptable amounts of residual liquids in waste packages is the responsibility of the Nuclear Regulatory Commission, the U.S. Department of Transportation, and Agreement State and disposal facility regulations and is, therefore, beyond the scope of this EIS. The inventory in the EIS evaluations included all projected spent nuclear fuel and high-level radioactive waste, as defined by the Nuclear Regulatory Commission. For reference, the EIS Glossary (Chapter 14) contains definitions for high- and low-level radioactive waste.

With regard to the comment that "high level waste can become low-level simply by mixing and diluting the shipment," high-level radioactive waste cannot be diluted with other less-concentrated isotopes of the same material to obtain low-level waste because, as currently defined, high-level radioactive waste is a source-based definition, and such dilution is not acceptable.

6.1 (9063)
Comment - EIS000489 / 0001
The draft EIS provides insufficient information on the radiological characteristics. We find this particularly galling because we spent a lot of time during the scoping process in 1995 specifying what we thought should be in the draft EIS.

Response
The level of information in Appendix A of the EIS on the radiological characteristics of the repository wastes is sufficient to assess the environmental impacts of both the Proposed Action (to construct, operate and monitor, and eventually close a geologic repository) and the No-Action Alternative. Appendix A provides considerable information on the types and amounts of radioactivity involved in each waste form. The information includes the final waste form, physical characteristics, mass and volume, amount and nature of radioactivity, chemical composition, thermal output, and canister data.

6.1 (9064)
Comment - EIS000489 / 0002
Now, I will give DOE credit. In some areas they did a very good job in a very difficult task. So many different types of highly radioactive materials are being shipped to the repository to come up with a few good reference ones you can meaningfully manage the analysis of is quite difficult.

For those of you who are concerned about the DOE defense cleanup, I particularly recommend looking at the part of the EIS in Appendix A around page 23. A very good job was done, in my opinion, picking a representative DOE spent nuclear fuel waste form.

Response
Thank you for your comment.

6.1 (9102)
Comment - EIS001822 / 0002
A recent article in the journal Science (see summary below from Chemical & Engineering News) shows that our government is ignoring work performed by their own nuclear chemists:

To begin with, the LANL [Los Alamos National Laboratory] research answers decades-old questions about fundamental plutonium properties like color and oxidation state. Haschke points out that PuO2 [plutonium dioxide] is dark yellow. The green color that has been observed previously is due to the higher oxide, he says--not impurities, as some have suggested.

And contrary to the commonly held view that the oxidation state of plutonium in the stable oxide is exclusively Pu(IV), the present work shows that PuO2 can be oxidized as high as $PuO_{2.27}$, suggesting that more than 25 percent of plutonium atoms are in the Pu(VI) state.

The study also provides another mechanistic explanation for the production that's been observed during plutonium hydrolysis and oxidation. Gas evolution in sealed storage containers leads to pressure buildup--a serious concern for long-term storage.

"The new results have great consequences for underground disposal of nuclear wastes," writes Charles Madic of the Centre CEA de Saclay (part of the French Atomic Energy Commission), Gif-sur-Yvette, France in a commentary in the same issue of Science.

A key factor in favor of burying plutonium waste is the highly insoluable nature of Pu(IV) compounds. But now the safety of those practices needs to be reconsidered, Madic comments in light of the fact that Pu(VI) species are far more soluble and hence more mobile in geological environments. Madic adds that these latest findings also call for "new evaluations of industrial operations involving PuO_2."

Haschke explains that water molecules split into hydrogen and oxygen atoms as water vapor absorbs on solid PuO_2. Oxygen (from water) converts the dioxide into higher oxide:

1. $PuO_2 + x\ H_2O\ \ PuO_2{+}x\ {+}2xH$

In an oxygen-free environment, he says, hydrogen atoms form H_2 that can desorb from the oxide surface.

"But if oxygen is present, hydrogen and oxygen react to form water because it's the thermodynamically favored process," Haschke asserts. That reaction serves to replenish the supply of surface water molecules. The newly formed H2O may then desorb from the surface or dissociate. If it dissociates, then the oxidation process continues and dioxide is converted to higher and higher oxides. Haschke says the group now plans to address environmental plutonium-migration issues.

Response
The comment references relatively recent findings (DIRS 150367-Haschke et al. 2000) dealing with the laboratory observation of a species of plutonium oxide that appears to have a higher solubility than the species most often considered to be the normal oxidized form of the metal (plutonium dioxide). Yucca Mountain project scientists involved in the analysis of long-term performance are aware of these findings and believe they are within the range of the conservatisms already built into the plutonium solubility model used in the modeling.

6.1 (9376)
Comment - EIS001888 / 0081
DEIS Table A-2 indicates that a total of 4.5 billion curies (Ci) were used for the proposed action. It is our understanding that the total number of Ci to be disposed of in the form of spent fuel range from approximately 11 billion Ci up to 19.3 billion Ci.* The documentation available in the DEIS is lacking in a clear and transparent rationale regarding the cause of this reduction from 11E9 Ci's to 4.5 billion Ci and what scientific rationale was employed to validate this reduction.

*Wymer, R.G. and A.C. Campbell. Chemistry in the Proposed Yucca Mountain Repository Near Field. January 2000.

Response
DOE prepared a table in Section A.1.1.4.2 of the EIS to list the relative amounts of radioactivity in various waste types. It is not the total radionuclide inventory used for any analysis. The radionuclides listed in the table were the primary contributors to impacts for various analyses (such as cesium for preclosure, technetium and neptunium for postclosure, and plutonium for the No-Action Alternative). The analyses in the EIS used the inventory specified in Appendix A for the various waste types. See Sections A.2.1 for commercial spent nuclear fuel, A.2.2 for DOE spent nuclear fuel, A.2.3 for high-level radioactive waste, and A.2.4 for surplus weapons-usable plutonium.

6.1 (9704)
Comment - EIS002154 / 0001
First of all, this is a very bad idea. They say 700 or 70 metric tons. That's only the beginning. They're not telling you about the foreign powers that made arrangements to ship their stuff here, also, so you can double that. But they don't tell you that. So all of a sudden we have a mountain full of nuclear waste -- excuse me. Nuclear material. There's nothing waste about it. The life span of that thing is 10,000 years plus. I've never known anything to be a waste that will have that kind of a life span. Can anyone tell me why they use that word "waste"?

Response
The Proposed Action evaluated 70,000 metric tons of heavy metal, and Section 8.2 of the EIS evaluates other material not currently proposed for disposal but that DOE could consider in the future. DOE has evaluated all foreseeable sources of spent nuclear fuel and included them in the inventory. The 10,000-year period is the evaluation period for which the EIS analyses determined environmental impacts, rather than a lifespan. It is based on the regulatory compliance periods specified in the Environmental Protection Agency's *Public Health and Environmental Radiation Protection Standards for Yucca Mountain* (40 CFR Part 197).

The updated analysis in the Final EIS projects that the Proposed Action would likely result in extremely small releases of radioactive contamination to the environment in the first 10,000 years after repository closure (more than 10,000 times less than the individual protection standard set by 40 CFR Part 197).

In addition to the 10,000-year compliance period, DOE has evaluated potential impacts for the period of geologic stability at the repository (that is, 1 million years). This evaluation was performed, in accordance with 40 CFR Part 197, to gain insight into the very long-term performance of the repository and thus provide information for the decisionmakers in making both design and licensing decisions. These results show a mean peak dose rate that is much lower than background levels (see Chapter 5 of the EIS for details).

The amount of foreign spent nuclear fuel that the United States would accept under the Nuclear Non-Proliferation Act is limited to situations in which acceptance is necessary to prevent proliferation of nuclear materials. While the United States can decide to accept foreign fuels under certain circumstances, other countries do not have the unfettered option to send their spent nuclear fuel to the United States. DOE notes that the foreign spent nuclear fuel evaluated in this EIS as candidate material for disposal at the proposed repository is exclusively of U.S. origin on loan to foreign governments for research and other commercial uses such as radiopharmaceutical production.

The terminology used in the EIS, including the term "waste," is consistent with the NWPA and standard industry and regulatory usage. Chapter 14 of the EIS contains definitions for these terms.

6.1 (9759)
Comment - EIS001888 / 0343
[Clark County summary of comments it has received from the public.]

Commenters requested that the EIS identify all waste (and waste characteristics) to be disposed of in the proposed repository. Examples of waste types that should be discussed (for disposal or in confirmation that they would not be disposed) included all waste types in other DOE EISs and DOE planning documents proposed for geologic disposal, Greater than Class C, special case, weapons-grade plutonium, highly enriched and Navy SNF [spent nuclear fuel], and West Valley SNF and HLW [high-level radioactive waste]. Characteristics that commenters stated were important for the EIS to discuss included fuel type, age, structural characteristics, cladding, and volume of each source of SNF and HLW. Two commenters requested that the EIS identify the order in which the producers/generators would ship SNF and HLW to the repository. One commenter stated that DOE SNF (including Navy SNF) should be received early.

Response
Appendix A of the EIS contains descriptions and characteristics of the materials that DOE plans to dispose of in the proposed repository in accordance with the 70,000-metric-tons-of-heavy-metal limit established by the Nuclear Waste Policy Act of 1982. It also contains descriptions and characteristics of the remaining spent nuclear fuel and high-level radioactive waste and other materials that could require disposal in a geologic repository. The materials described in Appendix A include commercial spent nuclear fuel (Section A.2.1), DOE spent nuclear fuel including naval fuel (Section A.2.2), DOE and commercial (West Valley) high-level radioactive waste (Section A.2.3), surplus weapons-grade plutonium (both as mixed-oxide fuel and immobilized with high-level radioactive waste) (Section A.2.4), Greater-Than-Class-C waste (Section A.2.5), and Special-Performance-Assessment-Required waste (Section A.2.6). DOE would ship the spent nuclear fuel currently stored at the West Valley Demonstration Project in New York to the Idaho National Engineering and Environmental Laboratory before shipping it to a repository, as evaluated in the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact*

Statement (DIRS 101802-DOE 1995). Section A.2.2.3 lists the inventory of DOE spent nuclear fuel at the Idaho National Engineering and Environmental Laboratory.

The specific characteristics discussed in Appendix A vary with the material type. For commercial spent nuclear fuel, Section A.2.1.5 of the EIS provides information on the various fuel types, typical ages or cooling times, structural characteristics, cladding, and volume. Sections A.2.2 and A.2.3 discuss similar characteristics of DOE spent nuclear fuel and high-level radioactive waste, respectively.

DOE has not determined an actual shipping queue for DOE materials and likely would not until there has been a final decision on a repository. To establish the basis for the transportation analysis, the EIS assumed that DOE would ship commercial spent nuclear fuel from the locations specified in the standard contracts it has established with the nuclear utilities (10 CFR Part 961), and high-level radioactive waste from the farthest sites first. This would result in the shipment of all high-level radioactive waste canisters from the Savannah River Site and the West Valley Demonstration Project with the balance of the 8,315 canisters transported from the Hanford Site, as listed in Section J.1.2.1.2 of the EIS. The EIS also assumed that the Proposed Action would include all naval spent nuclear fuel, with the remaining DOE spent nuclear fuel equally apportioned (approximately 93 percent) from each of the four sites, as listed in Section J.1.2.1.2.

6.1 (9932)
Comment - EIS001860 / 0011
The nation's classifications for radioactive waste need to be updated and improved

Spent canisters used for transportation should not be classified or stored as low-level radioactive waste. The proposal to do so contained in the Draft EIS lends credence to the argument that our definitions of low-level radioactive waste need to be rewritten to exclude many "below class C" items such as these.

Response
The purpose of the EIS is to evaluate the consequences of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository and of a No-Action Alternative. The classification of low-level waste is the responsibility of the Nuclear Regulatory Commission and is, therefore, beyond the scope of this EIS. In addition, the EIS presents the option of disposing of dual-purpose canisters as low-level radioactive waste or recycling them, if appropriate, with regard to protection of the environment and cost-effectiveness (Section 4.1.12.4).

6.1 (10059)
Comment - EIS001888 / 0540
[Clark County summary of comments it received from the public.]

Two commenters asked if the public would be aware of the import locations of military waste bound for the repository.

Response
Appendix A of the EIS provides details of the entire anticipated repository inventory, including defense-related high-level radioactive waste and final waste forms for surplus plutonium. This information includes the assumed location of the materials prior to shipment to the repository. For instance, all of the naval spent nuclear fuel, which is part of the DOE spent nuclear fuel inventory (Section A.2.2.3), would be received from the Idaho National Engineering and Environmental Laboratory.

6.1 (10874)
Comment - EIS000483 / 0002
There are several repository options for DU [depleted uranium]: the YM [Yucca Mountain] Repository, the Waste Isolation Pilot Plant (WIPP), or a new facility.

For several reasons YM is preferred.

1. The health and environmental impact will be low.

The draft YM-EIS indicates that the DU disposal in YM would not significantly impact the environment. Spent nuclear fuel [SNF] is primarily uranium. The analysis shows that SNF uranium (up to 105,000 metric tons) does not significantly contribute to the radiation hazards (Table 5-11) or chemical hazards (pg 5-41) associated with the repository. The health and environmental impact of DU would be less than SNF uranium because DU contains lower concentrations of the more radioactive uranium isotopes. Furthermore, the YM Project has conducted a separate preliminary assessment of the impact of DU on the repository. That assessment[3] also indicated that there would be no significant radiation exposures to the public from adding the DU to the repository.

2. YM is a civilian repository.

YM is designed for those civilian radioactive wastes for which shallow-land disposal is not acceptable or desirable. Much of the DU is from the commercial nuclear fuel-cycle industry and most future DU will be from this source. Acceptance of DU by the YM repository for disposal or use is within the fundamental mission of the YM repository.

3. There are potential beneficial uses of DU in YM that may (1) improve the performance of YM and (2) make YM the low-cost disposal option for DU.

DU may improve the performance of the proposed YM repository. The U.S. Nuclear Waste Technical Review Board[4,5], the Congressionally mandated technical review board for YM, has recommended consideration of the disposition of DU at YM to solve repository nuclear criticality issues and improve SNF disposal. Technical studies[6] have shown how the use of DU in the repository may reduce the long-term radionuclide release rate from the repository. Such use of DU in YM may reduce total costs to the taxpayer and electric-utility ratepayer by avoidance of disposal costs for DU.

References:

[3] Joshua Owen, Potential Disposal of Depleted Uranium in The YMP Subsurface Repository, Yucca Mountain Project Office, U.S. Department Of Energy, Las Vegas, Nevada, July 27, 1999.

[4] U.S. Nuclear Waste Technical Review Board, Report to the U.S. Congress and the Secretary of Energy: January to December 1996, Washington, D.C. 1997.

[5] U.S. Nuclear Waste Technical Review Board, Report to the U.S. Congress and the Secretary of Energy: 1995 Findings and Recommendations, Washington D.C., April 1996.

[6] C.W. Forsberg, "Advanced Spent-Fuel Waste Package Fill Material: Depleted Uranium Dioxide," p. 52 in *Trans. 1999 Winter Meeting American Nuclear Society, Long Beach, California, November 14-18, 1999*, La Grange Park, Illinois, November 1999.

Response

DOE currently stores about 700,000 metric tons of stable depleted uranium in the form of uranium hexafluoride at three locations in Ohio, Tennessee, and Kentucky. The EIS (in Section 4.1.15.3) recognizes the potential benefits of using depleted uranium as a shipping cask material. While depleted uranium could be used in the manufacture of waste packages, the amount of this material far exceeds the quantities that could be used in such packages. However, disposal of depleted uranium as a waste in the Yucca Mountain Repository is not authorized by the Nuclear Waste Policy Act of 1982, which limits disposal to spent nuclear fuel and high-level radioactive waste. Thus, depleted uranium does not meet the criteria for materials that DOE could dispose of in a repository and is not included in the Proposed Action as an acceptable waste form.

Nuclear Regulatory Commission regulations (10 CFR Part 61) indicate that low-level radioactive waste, such as depleted uranium, can be disposed of in near-surface trenches, which is a sufficient and far less costly method than a geologic repository. This disposal option is considered in the *Final Programmatic Environmental Impact Statement*

for Alternative Strategies for the Long-term Management and Use of Depleted Uranium Hexafluoride (DIRS 152493-DOE 1999). DOE did not choose this option, however, as the preferred option but rather decided to convert its inventory of uranium hexafluoride to a stable form and store the material for potential future use or disposal (64 *FR* 43358; August 10, 1999).

The DOE plan for the conversion of depleted uranium hexafluoride advocates the development of a strategy for future management of depleted uranium. The strategy entails conversion of uranium hexafluoride to an environmentally safer form (either an oxide or metal or both), to enable its constructive use. DOE will continue to keep its options open regarding potential beneficial uses of this material.

6.1 (11116)
Comment - EIS001207 / 0005
According to DOE ROD [Record of Decision] of 1/4/00, Disposition of Surplus Pu [Plutonium], NRC [Nuclear Regulatory Commission] has through some process approved (or tolerated) shipment of 17 metric tons of Weapons grade surplus Pu canned in canisters at the SRS [Savannah river site] for disposal at Yucca Mountain or another candidate pursuant to the Nuclear Waste Policy Act. What procedure was used by NRC, how and when was this done? DOE Yucca Mountain Site Characterization Office has obligation to address the full impacts of the total project during EIS process.

Response
In December 1998, DOE requested the Nuclear Regulatory Commission (NRC) to inform DOE of any potential legal or regulatory provisions that would prevent disposal of immobilized surplus plutonium waste forms and packages in a monitored geologic repository (see December 10, 1998, memo L. Barrett to C.J. Paperiello). On January 25, 1999, the NRC responded that

"The [NRC] staff is not aware of any existing legal or regulatory provisions that would prevent disposal of immobilized plutonium waste forms in a high-level waste repository. The detailed technical evaluation of these waste forms, their packaging, and the principal issues related to these waste (i.e., criticality, safeguards, and impact on repository performance) cannot be performed until DOE finalizes its waste package, engineered barrier, and repository designs and submits its pending license application for the planned high-level waste repository at Yucca Mountain, Nevada... Thus, the [NRC] staff believes that, with adequate canister and package design features and appropriate measures to address the aforementioned principal issues related to these wastes, the immobilized plutonium waste plutonium waste forms can be acceptable for disposal in a high-level waste repository."

Therefore, without giving final approval to ship these materials to Yucca Mountain, the NRC staff has acknowledged only that it is not aware of any legal or regulatory reasons the materials would not be acceptable for disposal at the proposed repository. Final approval to ship, receive, and emplace these materials would be subject to issuance of the NRC license, currently expected in 2010.

The environmental impacts associated with immobilization of the surplus plutonium into the "can-in-canister" waste form are evaluated in the *Surplus Plutonium Disposition Final Environmental Impact Statement* (DIRS 118979-DOE 1999). The impacts associated with the transportation of these canisters to the proposed repository have been evaluated in Chapter 6 and Appendix J of the EIS. The short- and long-term impacts associated with disposal of these canisters in the Proposed Action have been addressed in Chapters 4 and 5, respectively.

6.1 (11343)
Comment - EIS002268 / 0004
The Draft Environmental Impact Statement before us today does not acknowledge the uniquely lethal nature of the waste and fails to provide sufficient information on the unique radiological characteristics of highly irradiated nuclear fuel. Information on the total activities in curies, and the surface dose rates in rem per hour of the assemblies of irradiated fuel is essential for the assessment of risks posed by the transportation and burial of radioactive waste, yet DOE does not provide such data.

According to the State of Nevada, a typical assembly from a pressurized water reactor will contain, even after 26 years of cooling, 31,000 curies of cesium-137 and 21,000 curies of strontium-90, and is a powerful source of penetrating gamma and neutron radiation.

Response
Appendix A of the EIS reports the expected radionuclide inventory in curies for all contributing radionuclides. Section A.2.1.5.2 lists the values on a per assembly basis and the total projected number of curies by isotope for the Proposed Action and the additional inventory modules. The EIS analysis did not require surface dose rates for irradiated fuel, so Appendix A does not provide them. For transportation impacts, the EIS conservatively uses the U.S. Department of Transportation surface dose rate limit for all transportation casks when calculating incident-free risk impacts to the public. In addition, none of the severe accidents evaluated in a recent Nuclear Regulatory Commission report (DIRS 152476-Sprung et al. 2000) would result in a release of spent nuclear fuel assemblies from their shipping casks or a direct exposure to the public. For repository operations, DOE estimated personnel exposures for various activities from shielded elements based on the representative fuel assemblies during normal operations and postulated accidents. In summary, the EIS analysis included all appropriate information required to assess impacts from the spent nuclear fuel and high-level radioactive waste.

6.1 (12245)
Comment - EIS000817 / 0038
As I read p. iii of Volume I you state that the proposed action addressed is for disposal of SNF [spent nuclear fuel] and HLW [high-level radioactive waste] "currently in storage." We don't currently have 70,000 MTHM [metric tons of heavy metal] today, do we? And how rapidly is this going to change with the new fuels and new casks to be used -- MOX mixed-oxide fuel] for example -- and high burnup fuels -- and plant license renewals? You are planning for something you don't know the total of as I understand it -- and there is very little talk of siting a second repository any place. That's kept quiet. My bet is you'll never even attempt it. So "currently in storage" is not valid as I see it. What is really currently in storage, right now??

Response
This comment is correct. There are not 70,000 metric tons of heavy metal (MTHM) currently in storage. DOE has modified the Abstract to reflect this fact. As noted in the table in Section A.2.1.5.1 of the EIS, through 1995 there were 31,926 MTHM of commercial spent nuclear fuel in storage at commercial sites, and from 1996 to 2046, commercial facilities will produce an estimated additional 73,488 MTHM of spent nuclear fuel. As noted in Section A.1.1.2, through 1999 there were 40,000 MTHM of commercial spent nuclear fuel in storage at commercial sites.

6.1 (12278)
Comment - EIS001748 / 0002
Now, these scientific aspects or projections or estimates are exactly the part which are of a greater concern to me. I'm not really that concerned about the cost overruns, but about the safety. It's my understanding that the irradiated fuel rods that you want to ship out to Yucca Mountain will continue fissioning or that are fissioning right now will continue giving off radioactive gases, and I wonder will these gases not build up inside the casks during the transportation process. This fissioning will continue forever, and I'm wondering about gases caused by radiolysis if any residual water comes in contact with the casks and radiation zaps that water, the water molecules break down into hydrogen and oxygen and possibly could cause an explosion of hydrogen gas. This would cause damage to the cask or whatever is supposedly holding this radioactive material at bay and it could have a lot pressure put on it from within over time.

I would like to get back to my original concern about the load producing slowly but gradually increasing amounts of radioactive gases in transport. These gases, I think, are called noble gases because they do not react with other chemicals, but they cannot be filtered and they do break down into other long-lived radioactive materials eventually, and if these gases are inhaled, they can give off radioactive particles within our bodies which will still be emitting radiation, and that's the same stuff that doctors target very specifically to kill cancer cells and they make a patient very ill in the process. And I don't like the idea of this radiation floating around loose in our environment and/or entering parts of our body at random or being in the food and water we ingest. All of these are very real possibilities, and in my mind, probabilities.

I would like you to picture this from the inside out as we're taking about the proposal to transport it out to Yucca Mountain. The material you proposed to transport is "spent" uranium pellets, many of which are fractured to an almost dust-like consistency and this material is spent because it's no longer financially viable or profitable in the reactor, but it's still very radioactive and fissioning and will be for a long, long time. It's encased in damaged metal

holders, rods, or whatever they're called, coverings, and that's in bad shape, too, from being in use quite a while. These are enclosed in less than perfect casks and yet you proposed to transport thousands of such dangerous and unstable loads all across the country regularly over a period of 30 years and expect us to believe there won't be any accidents, and that doesn't even include the unfairness to the people who live closer to Yucca Mountain. We're worried about it passing through St. Louis and we're not, according to this proposal, going to have it in our back yards.

Response
This comment is correct that fissioning and gas production (through radioactive decay and radiolysis) will continue to occur in spent nuclear fuel to some degree for many years into the future. Because of these phenomena, waste packages and shipping containers are designed such that internal pressures can be monitored and gases purged as necessary to ensure the safety of workers and the general public. For example, before shipment, the spent nuclear fuel rods are thoroughly dried through a process of multiple purges with dry nitrogen gas and vacuum desiccation. The shipping cask is then filled to a slightly negative pressure with a noncombustible gas such as nitrogen or helium. In addition, internal pressurization is limited (to avoid overpressurization) by design specification determined by considering the very slow rate of gas generation from decay and fission gases. However, comprehensive monitoring and inspection programs required by Federal regulations are in place to detect and correct unexpected pressure conditions prior to shipment.

The comment is also correct in asserting that release of radioactive noble gases and other volatile radioisotopes would occur during handling operations (at generator sites and at the proposed repository). As discussed in Section J.1.3.1 of the EIS, DOE has conservatively estimated that the potential dose to members of the public from such releases would be very low (0.001 person-rem per metric ton of heavy metal of spent nuclear fuel loaded (DIRS 104731-DOE 1986), resulting in no or small impacts.

In relation to the comment's concern about the health hazards of radioactive noble gases "entering parts of our body," the Earth's atmosphere contains radioactive radon (a noble gas) that emanates naturally from soils and rocks in the Earth's crust. Radiation doses resulting from inhalation of this gas (and its decay products) are the principal source of background radiation exposure and result in annual doses to members of the public millions of time higher than those to individuals exposed during spent nuclear fuel handling activities (see Section F.1 of the EIS for details on sources of background radiation exposure).

In relation to potential transportation accidents, the EIS provides a detailed evaluation of impacts that could result from severe accidents (very unlikely) as well as those resulting from incident-free (routine) shipments of commercial and DOE spent nuclear fuel and high-level radioactive waste. Section 6.1.2 of the EIS describes the results of these evaluations for transportation within the State of Nevada, as does Section 6.2 for the rest of the Nation. Appendix J describes the evaluations in detail.

6.1 (12394)
Comment - EIS001887 / 0062
Page 1-26; Section 1.5.3 - Relationship to Other Environmental Documents

Table 1-1 - Draft EIS, Idaho High-Level Waste and Facilities Disposition

The 1995 Idaho/DOE Settlement Agreement (USDC) schedules conversion of all sodium-bearing HLW [high-level radioactive waste] liquid waste in the INTEC Tank Farm into calcine by 2012 and mandates removal of all calcined HLW by 2035. DOE now estimates that treatment will be completed and waste will be "ready for removal" from the Idaho National Environmental and Engineering Laboratory (INEEL) by 2035, but does not guarantee the waste will actually be removed by that date.

The State of Idaho maintains that sodium bearing tank waste is HLW and cites the DOE Order 435.1 definition of high-level waste as "liquid produced directly in reprocessing." Using this definition, the State identifies both sodium bearing and non-sodium bearing waste as HLW. The State of Idaho also includes in its HLW definition liquids from the second and third extraction cycles that were routed to an evaporator before being sent to the Tank Farm and states that "as such, these liquids contain radioactive fission products in sufficient concentrations to warrant permanent isolation in a geologic repository." (DOE says only the liquid from the first reprocessing cycle is

HLW.) Idaho contends that DOE should manage the sodium-bearing waste as HLW unless and until a "Waste Incidental to Reprocessing" determination is made in which the referenced HLW waste would be classified and managed as either TRU [transuranic waste] or low-level waste.

If Idaho's definition of HLW holds up, volume estimates for HLW from INEEL to Yucca Mountain could change substantially and would put pressure on DOE's 4,667 MTHM volume commitment for HLW in Yucca Mountain.

Idaho has also formally recommended that DOE allow disposal of HLW containing hazardous waste constituents at Yucca Mountain. If INEEL prevails, other sites would also be in line to ship such wastes to Yucca Mountain, and volume and waste type estimates, as well as the regulatory oversight scenario, would be significantly altered.

Idaho is also challenging DOE's method for calculating Metric Ton Heavy Metal [MTHM] for HLW because it does not accurately reflect actual concentrations of radionuclides and relative risk, i.e., DOE's standard says one canister of HLW = 0.5 MTHM. Idaho says this calculation does not recognize the fact that much of DOE's waste is less radioactive than "typical" waste used in the comparison. Idaho says DOE has overestimated the HLW MTHMs, exceeding the amount allowed in the repository. Idaho further contends that, if other methods of calculating MTHM were used, DOE could stay well within the capacity set for Yucca Mountain and allow INEEL to send larger quantities of its waste to Nevada.

Because waste volumes and types are so central to understanding the entire range of impacts associated with a Yucca Mountain repository, the Draft EIS should have fully evaluated these issues.

Response

The EIS includes an inventory of spent nuclear fuel and high-level radioactive waste based on current Nuclear Regulatory Commission definitions. Appendix A describes the basis for several candidate methods for determining metric tons of heavy metal equivalence for high-level radioactive waste and explains that Congress would have to take legislative action on the equivalence methodology.

The total quantity of high-level radioactive waste that the 70,000-metric-tons-of heavy-metal (MTHM) repository could accommodate varies to a great degree. Since 1985, DOE has consistently used the "historical method" (0.5 MTHM per canister) as a planning basis, and used this method in the EIS to determine the number of canisters of high-level radioactive waste in the proposed repository. Using this method, the repository would contain less than half of the high-level radioactive waste inventory. However, DOE has evaluated the consequences of repository disposal of the entire inventory of this material. Specifically, Chapter 8 of the EIS discusses cumulative impacts for the Proposed Action inventory (which includes less than half of the high-level radioactive waste) and for a Module 1 inventory (which includes the balance of that waste). Using different equivalence methods would shift the proportion of such canisters that the repository could handle between the Proposed Action and Inventory Module 1, but would not change the cumulative impacts because spent nuclear fuel would dominate long-term performance results. Regardless of the equivalence method used, the EIS analyzes the impacts from disposal of the entire inventory of high-level radioactive waste such that conservative consequences are apparent.

Other equivalence methods, including the total radioactivity and the radiotoxicity methods, result in lower estimates of MTHM per canister. These methods would result in acceptance of the total inventory of high-level radioactive waste in the repository. Appendix A of the EIS discusses these methods for information purposes.

The EIS evaluates the environmental consequences of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository to dispose of 70,000 metric tons of heavy metal of spent nuclear fuel and high-level radioactive waste. It also evaluates reasonably foreseeable actions such as the disposal of a greater volume of spent nuclear fuel and high-level radioactive waste that represents the maximum projected inventories of those materials. DOE based the EIS on reference designs, conservative inventories, and conservative methodologies. DOE could consider and ultimately pursue disposal of a greater inventory of materials as long as the EIS evaluated such disposal by analyzing the potential environmental consequences of reasonably foreseeable actions. While the EIS evaluates the environmental consequences of the disposal of more than 70,000 MTHM of spent nuclear fuel and high-level radioactive waste (Module 1 inventory), Congress would set the ultimate capacity of the repository.

DOE does not anticipate that Yucca Mountain waste acceptance criteria would preclude acceptance of high-level radioactive waste from the Idaho National Engineering and Environmental Laboratory following treatment with the exception of the current policy that the waste not be listed hazardous waste. The Department is aware of this requirement and further recognizes that it will have to petition the State of Idaho and the Environmental Protection Agency to delist the waste prior to disposal at Yucca Mountain.

6.1 (12430)
Comment - 010455 / 0004
The nation's classifications for radioactive waste need to be updated and improved.

Response
The purpose of the EIS is to evaluate the consequences of the Proposed Action to construct, operate and monitor, and eventually close a geologic repository and of a No-Action Alternative. The classification of low-level waste is the responsibility of the Nuclear Regulatory Commission and is, therefore, beyond the scope of this EIS. In addition, the EIS presents the option of disposing of dual-purpose canisters as low-level radioactive waste or recycling them, if appropriate, with regard to protection of the environment and cost-effectiveness (Section 4.1.12.4).

6.1 (12590)
Comment - EIS001632 / 0004
Section 1.2.3, page 1-7. The second full paragraph describes the treatment process for high-level waste from storage in waste tanks through solidification. Part of that process "ordinarily includes separation of the waste into high-activity and low-activity fractions." However, after describing what happens to the "high-activity fraction," there is no mention of what happens with the "low-activity fraction." The low-activity fraction is still high-level waste, and this discussion should include the disposition of the low-activity fraction.

Response
As explained in the EIS, the purpose of the pretreatment process is to separate the high-activity fraction, which requires the permanent isolation afforded by a repository, from the low-activity fraction. This large volume of low-activity waste is subject to a "waste incidental to reprocessing determination," as provided for in DOE's Radioactive Waste Management Manual (DOE M435.1-1). A waste stream can be managed as low-level waste if the waste incidental to reprocessing determination shows that it meets the following criteria:

- The key radionuclides are removed to the extent technically and economically practical (this is accomplished by pretreatment).
- It is managed to meet safety requirements comparable to the performance objectives set out in 10 CFR Part 61, Subpart C, Performance Objectives.
- It is managed in accordance with the DOE M 435.1-1 low-level waste requirements and is incorporated into a solid physical form at a concentration less than the Class C limits set out in 10 CFR 61.55.

The Waste Incidental to Reprocessing provision was included in the August 6, 1998, drafts of DOE Order 435.1 and DOE M 435.1-1 that were made available for public comment. DOE has since issued DOE Order 435.1 for implementation.

DOE has modified Section 1.2.3 of the EIS to reflect that low-level waste would be disposed of in accordance with applicable regulations.

6.1 (12605)
Comment - EIS001766 / 0003
When will the Department of Energy and involved energy corporations provide the following: Full disclosure as to whether this plan involves any militaristic uses such as the SSP which is the stockpile stewardship program as listed in Project Censored 1999, also in Nevada; surprise, surprise.

Response
The Proposed Action in this EIS is solely for the disposal of spent nuclear fuel and high-level radioactive waste as specified in the NWPA.

6.2 Waste Handling

6.2 (7660)
Comment - EIS001928 / 0015
Pg. S-59, last paragraph, please clarify the statement "The emplacement of Inventory Module 1 or 2 at Yucca Mountain would require legislative action by Congress unless a second repository were in operation". What that appears to say is that if a second repository is opened anywhere in the country Module 1 or 2 could then be placed in Yucca Mountain without Congressional approval. But what does one scenario have to do with the other?

Response
As noted in Section S.2.2.3 of the EIS, Section 114(d) of the Nuclear Waste Policy Act of 1982 directs that the maximum amount allowed for repository disposal is 70,000 metric tons of heavy metal (MTHM) of spent nuclear fuel and high-level radioactive waste "until such time as a second repository is in operation," even though the Nation will have more than 70,000 MTHM. The statement quoted in the comment from Section S.6.1 is a recognition of the limitations specified in the Act. DOE has modified the text to provide further clarification.

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CONVERSIONS

METRIC TO ENGLISH			ENGLISH TO METRIC		
Multiply	**by**	**To get**	**Multiply**	**by**	**To get**
Area					
Square meters	10.764	Square feet	Square feet	0.092903	Square meters
Square kilometers	247.1	Acres	Acres	0.0040469	Square kilometers
Square kilometers	0.3861	Square miles	Square miles	2.59	Square kilometers
Concentration					
Kilograms/sq. meter	0.16667	Tons/acre	Tons/acre	0.5999	Kilograms/sq. meter
Milligrams/liter	1[a]	Parts/million	Parts/million	1[a]	Milligrams/liter
Micrograms/liter	1[a]	Parts/billion	Parts/billion	1[a]	Micrograms/liter
Micrograms/cu. meter	1[a]	Parts/trillion	Parts/trillion	1[a]	Micrograms/cu. meter
Density					
Grams/cu. cm	62.428	Pounds/cu. ft.	Pounds/cu. ft.	0.016018	Grams/cu. cm
Grams/cu. meter	0.0000624	Pounds/cu. ft.	Pounds/cu. ft.	16,025.6	Grams/cu. meter
Length					
Centimeters	0.3937	Inches	Inches	2.54	Centimeters
Meters	3.2808	Feet	Feet	0.3048	Meters
Kilometers	0.62137	Miles	Miles	1.6093	Kilometers
Temperature					
Absolute					
Degrees C + 17.78	1.8	Degrees F	Degrees F – 32	0.55556	Degrees C
Relative					
Degrees C	1.8	Degrees F	Degrees F	0.55556	Degrees C
Velocity/Rate					
Cu. meters/second	2118.9	Cu. feet/minute	Cu. feet/minute	0.00047195	Cu. meters/second
Grams/second	7.9366	Pounds/hour	Pounds/hour	0.126	Grams/second
Meters/second	2.237	Miles/hour	Miles/hour	0.44704	Meters/second
Volume					
Liters	0.26418	Gallons	Gallons	3.78533	Liters
Liters	0.035316	Cubic feet	Cubic feet	28.316	Liters
Liters	0.001308	Cubic yards	Cubic yards	764.54	Liters
Cubic meters	264.17	Gallons	Gallons	0.0037854	Cubic meters
Cubic meters	35.314	Cubic feet	Cubic feet	0.028317	Cubic meters
Cubic meters	1.3079	Cubic yards	Cubic yards	0.76456	Cubic meters
Cubic meters	0.0008107	Acre-feet	Acre-feet	1233.49	Cubic meters
Weight/Mass					
Grams	0.035274	Ounces	Ounces	28.35	Grams
Kilograms	2.2046	Pounds	Pounds	0.45359	Kilograms
Kilograms	0.0011023	Tons (short)	Tons (short)	907.18	Kilograms
Metric tons	1.1023	Tons (short)	Tons (short)	0.90718	Metric tons
ENGLISH TO ENGLISH					
Acre-feet	325,850.7	Gallons	Gallons	0.000003046	Acre-feet
Acres	43,560	Square feet	Square feet	0.000022957	Acres
Square miles	640	Acres	Acres	0.0015625	Square miles

a. This conversion is only valid for concentrations of contaminants (or other materials) in water.

METRIC PREFIXES

Prefix	Symbol	Multiplication factor	
exa-	E	1,000,000,000,000,000,000	= 10^{18}
peta-	P	1,000,000,000,000,000	= 10^{15}
tera-	T	1,000,000,000,000	= 10^{12}
giga-	G	1,000,000,000	= 10^{9}
mega-	M	1,000,000	= 10^{6}
kilo-	k	1,000	= 10^{3}
deca-	D	10	= 10^{1}
deci-	d	0.1	= 10^{-1}
centi-	c	0.01	= 10^{-2}
milli-	m	0.001	= 10^{-3}
micro-	μ	0.000 001	= 10^{-6}
nano-	n	0.000 000 001	= 10^{-9}
pico-	p	0.000 000 000 001	= 10^{-12}