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EIS001106

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Dear Wendy,

My personal comments on the YMP DEIS are enclosed as hard copies accompanied by a disc of the files.

Regards,

Charlie

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Enclosures

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COMMENTS ON THE YMP DEIS

Charles R. Malone

EIS001106

January 27, 2000

VOLUME 1 Sections

- 1 **1.5 EIA Process:** This section gives an overly broad view of NEPA that focuses on procedure and avoids the intent, purpose, substance, and spirit of the act. There is no indication of the guidance followed in the course of conducting EIA or for preparing the DEIS. New guidelines and techniques for improving the NEPA process (e.g., Salk and others, 1998; Caldwell, 1998; Clark and Canter, 1997; Ortolano, 1997; Gilpin, 1997; Weisner, 1995; Bartlett and Malone, 1993) appear not to have been used in this case.
- 2 **1.53 Relationship to Other Environmental Documents:** This section includes the 1996 FEIS for NTS but does not mention the DOE's important Resources Management Plan that should have been a model for how YMP addressed its environment. This issue particularly involves the use of ecosystem management.
- 3 **2.2.1 Decommissioning and Reclamation:** This section provides no details about reclamation procedures, their application, and their chances for success.
- 36 **3. Affected Environment:** 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 what a true, undisturbed baseline, as intended by the NEPA regulations.
- 4 **Section 3.1.5, page 3-59,** only briefly addresses Biological Resources and Soils, referring to the *Environmental Baseline Files* (TRW 1999k and TRW 1991). The discussion in this section of the DEIS omits the physical environment, which together with the biological components comprise the ecosystem involved. Ecosystems are not discussed at all, and that level of ecological organization is ignored. The same is true for the discussions of Biological Resources

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related to transportation on pages 3-107 and 3-127. With respect to ecosystems, the DEIS states on page 3-59 that many of its studies for this aspect of the document “....**did not use an integrated ecosystem approach and, therefore, are of little value for evaluating impacts of the repository.**” This deficiency negates the sufficiency and credibility of the biological and ecological aspects of the entire DEIS. Further discussion of this matter is in Westman (1985), Wiesner (1995), Salk and others (1998), Caldwell (1998), Clark and Canter (1997), Ortolano (1997), Gilpin (1997), and Bartlett and Malone (1993).

- 5
4. **Environmental Consequences:** The fact that the DOE did not address the ecosystem level of organization for the DEIS renders an accurate interpretation of ecological impact assessment impossible. Westman (1985), Bartlett and Malone (1993), Salk and others (1998), Wiesner (1995), Caldwell (1998), Clark and Canter (1997), Ortolano (1997), and Gilpin (1997) discuss this issue. It is interesting, however, that the DOE did acknowledge the potentially adverse consequences to the ecosystem from different thermal loading schemes (Table 4-11, page 4-31). The thermal loading issue with respect to biological resources is avoided in Table 4-12, page 4-35, which summarizes overall impacts from the repository by stopping the summary after repository closure and ignoring the critical long-term ecosystem impacts. An equally important issue is that biological field studies conducted by the DOE and used for the EIA process were improperly designed and statistically analyzed thereby negating much of DEIS Section 4, Environmental Consequences.
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(cont'd.)
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5. **Long-Term Environmental Consequences:** Section 5.2.4.1, page 5-17, fails to include the potential for global climate change to effect repository performance and environmental consequences. The oversight also exists in Section 5.9, page 5-46, Consequences to Biological Resources and Soils. The section does address thermal loading effect (Table 5-18, page 5-47) to biological resources and soil. The potential temperature increases are overly conservative and their estimated ranges from low to high are ignored. Clearly there is a potential for vegetation to disappear above the repository and for the soil cover to be eroded away. The consequences of this to the site's geohydrology and the repository's performance should be addressed in Section 5.4.1, 5.4.2, and 5.4.3. These weaknesses exist because the DOE failed to adopt an ecosystem approach for the DEIS as recommended by Bartlett and Malone (1993), Clark and Canter (1977), and Salk and others (1998).

- 8 6. **Environmental Impacts of Transportation:** Impacts of transportation on biological resources and soils are curtly addressed in Sections 6.1.2.4 and 6.3.1.1. There is insufficient information and substance for the sections to be meaningful.
- 9 7. **No-Action Environmental Impacts:** This section lacks substance because of the large uncertainties and lack of information regarding the no-action alternative. Weaknesses of this kind are discussed by Salk and others (1998) and by Westman (1985).
- 10 8. **Cumulative Impacts:** Section 8.2.4, page 8-36, on Biological Resources is deficient in two major respects. First, an ecosystem approach was not adopted for the DEIS, and second thermal loading impacts are not factored into the cumulative effects. Section 8.4.2.4, page 8-89, on Biological Resources and Soils concerning transportation impacts in Nevada appears to address only the intermodal transfer stations and not the routes to be followed through the state. For these various reasons, the section is inadequate. Guidance such as that provided by Clark and Cantor (1997) should have been followed for this section to supplement CEQ's 1997, "Considering Cumulative Effects Under the NEPA."
- 11 9. **Mitigation Actions:** Biological Resources and Soils are addressed in Sections 9.2.3 (page 9-6) and 9.3.4 (page 9-19). In each case the focus is almost exclusively focused on the desert tortoise and not on other components of the ecosystem or on the ecosystem itself. Additionally, there is no consideration of risks associated with mitigation. For these and other reasons (Clark and Canter, 1997; Ortolano, 1997; Westman, 1985), the two section are inadequate.
- 12 10. **Unavoidable, Irreversible, or Irretrievable Impacts:** Section 10.1.1.4, page 10-3, addresses biological and soil resources for Yucca Mountain. No meaningful and substantive information is given and addressed, so the short section basically is meaningless.
- 13 12. **References:** There were 27 references that are important cited in the DEIS regarding biological, ecological, and soil resources. Of these, only three were professional publications reflecting work of the NWPO, when in fact there are many other NWPO and NWPO-related professional publications not included among the references cited in the DEIS. Among the DOE's 24 references are 10 reports issued by TRW regarding environmental information for the Yucca Mountain Project. Of these, four are Environmental Baseline Files that themselves draw upon additional sources of information. The key DOE citation in the DEIS that is of interest here

is: "TRW. 1999k. Environmental Baseline File for Biological Resources." In TRW 1999k, Section 4 on Opposing Views and Section 5 on Major Issues and Data Needs are attached to these comments. Section 4 identifies six opposing views to the DOE's field studies raised by NWPO and by NWTRB. These are key DEIS issues regarding the Yucca Mountain biological and ecological programs, and no dispute of them is made in the DEIS. This is consistent with the earlier statement on DEIS page 3-59 that the DOE failed to use an integrated ecosystem approach thereby negating many of its field studies for the biological and ecological resource aspects of the DEIS. As noted in the comments on DEIS Section 1.5 (above), there are many publications concerning EIA and NEPA processes that should have used as guidance by the DOE, cited, and referenced in the DEIS. Thus, the documentation used for the DEIS was cryptic and poor. □

REFERENCES

- Bartlett, R. and C. Malone. 1993. Science and the National Environmental Policy Act. *The Environmental Professional* 15(1): 1-160.
- Caldwell, K. 1998. *The National Environmental Policy Act*. Indiana University Press, Bloomington.
- Clark, R. And L. Canter. 1997. *Environmental Policy and NEPA*. St. Lucie Press, Boca Raton, FL.
- Gilpin, A. 1995. *Environmental Impact Assessment*. Cambridge University Press, New York, NY.
- Ortolano, L. 1997. *Environmental Regulation and Impact Assessment*. John Wiley & Sons, Inc., New York, NY.
- Salk, M. and others. 1998. Guidelines and techniques for improving the NEPA process. *Environmental Management* 23(4): 467-476.
- Westman, W. 1985. *Ecology, Impact Assessment, and Environmental Planning*. Wiley-Interscience Publications, New York, NY.
- Wiesner, D. 1995. *The EIA Process*. Prism Press, Bridport, Dorset, GB.

**COMMENTS ON THE YMP DEIS:
NEPA AND THE YUCCA MOUNTAIN PROJECT**

Charles R. Malone

January 27, 2000

Discussed and reviewed here are important aspects of the U.S. Department of Energy (DOE) 1999 Draft Environmental Impact Statement (DEIS) for the Yucca Mountain Project (YMP) [DOE. 1999. 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. USDOE, Washington, DC. July]. Recognized and accepted sources of information and insights regarding environmental documentation under the National Environmental Policy Act (NEPA) have been drawn upon as standards for judging the YMP DEIS. The sources are listed at the end of the review comments.

Following the Introduction are four segments of a Discussion section adapted from the professional sources to explain the standards adopted for the review. This information guides the Comments that follow the Discussion. Individual comments are lettered and correspond to highlighted letters in the Discussion for ease of comparing comments to information concerning NEPA. In both the Discussion and the Comments sections, some redundancy results because of issues arising from NEPA being related to differing contexts in the DEIS reviewed. In other words, a progression through the environmental document for the YMP in several cases repeatedly encounters similar aspects of NEPA and how it is interpreted by the DOE.

Discussion

This section summarizes aspects of NEPA and the environmental impact assessment (EIA) process relevant to the DOE's DEIS for the YMP. Information presented here was taken from the references listed following the review comments. These publications served as the standards used to evaluate the DEIS. Discussed first are aspects of NEPA identified as being particularly relevant to the YMP DEIS. Following that are issues relative to process and purpose in NEPA, issues regarding science and impact assessment for NEPA, and integrating environmental policy during the NEPA process. The importance of each issue or facet of NEPA presented in this section of this review will be apparent when the particular topic is addressed in the Comments section.

NEPA 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 is meant to coordinate responses to environmental issues by bringing together other environmental legislation and policy. [1] The difference between NEPA and other laws is in regards to focus, scope, and emphasis in that NEPA is distinguished by comprehensively addressing the overall environment rather than single media such as air, water, and protected natural resources. [2] The 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. [3]

NEPA provides a foundation for environmental policy to be integrated into federal missions consistent with the scope of environmental and ethical values. However, not all agencies have met this need by implementing the act's intent to meet the challenges imposed upon the environment by growth and development. In this regard, agencies have not risen to the aims of the Federal Ecosystem Management Initiative to foster sustainability through the ecosystem-based approach to managing the environment and its natural resources. Such should be among the goals of the NEPA process through well-executed EIA. Achieving this level of quality through NEPA means that government agencies must take the act as it was intended and not merely as a procedural and administrative hurdle. [4]

Actions proposed and taken by the U.S. government often are contrary to the aims and intent of NEPA. Among the reasons is the indifference of civil servants and agency bureaucrats to matters of ethics and principles. Another reason is ignorance of the environment, the concepts of sustainability and ecosystem management, and the pervasiveness of pollution. Most important is the lack in some federal agencies of unifying goals and strategies for perceiving, pursuing, and realizing NEPA's principles and long-range purposes. The bureaucrats within federal agencies need to be seriously and effectively committed to assuring that high qualities for the environment and for productive and healthful personal and civic life are achieved and sustained. This includes a responsibility to inform the public and interest groups of what is at stake and how adverse environmental consequences can be averted over time. Above all, it means that government agencies and bureaucrats need to be honest with the public about the true nature and ultimate balance of costs and benefits from proposed actions. [5]

The procedural requirements of NEPA are meant to force attention to the act's purpose of producing environmental documents for the NEPA process through application of the discipline of EIA. Thus, EIA is to be conducted by federal agencies before strategic decisions about a project have been made and not simply tailored to fit the project once a decision has been made to proceed with the action. In this context, NEPA is better served if environmental documentation is based on life-cycle EIA. This approach addresses a project's full life cycle from cradle to grave, including the fate of all pollutants and residuals and the full social, economic, and resource implications. NEPA also is better served when EIA is conducted in a strategic format that coordinates similar action over time in a regional context. [6]

In this manner, NEPA is meant to further environmental values and ethics present in our society that are supported by a majority of citizens. The values reflect concern about long-term physical environmental quality and the quality of the human environment in the face of material growth. Under NEPA, the process of EIA is meant to enhance the congruence of future actions with broad environmental goals that protect the environment for future generations. This means providing assurance of the widest range of beneficial uses of the environment without degradation, risk the health, and other undesirable consequences. [7]

To achieve good EIA as intended by NEPA, expertise must be assembled and allowed by agency bureaucrats to remain involved throughout the entire process and to participate as part of an interdisciplinary team. An agency's legal staff also should be part of the team and should be involved from start to finish with the NEPA process. Strategies and tactics taken by one component of the team must be understood and agreed to by the entire team. Participants must be educated in the substantive purposes of NEPA as well as in the procedural ones, and they must be trained properly to write satisfactory impact statements that all stakeholder groups can understand. Above all else, a good sense of professional ethics must be practiced by all participants in the EIA process. [8]

An important intent of NEPA is that post-project monitoring of the environmental effects of major projects be performed because of the inherent difficulty of accurately predicting the behavior of ecosystems. A corollary of this is that post-project mitigation of impacts be carried out when monitoring reveals the need, even though an impact statement did not anticipate the need. The reason for this is that EIA for complex projects is likely to incorrectly prejudge the impacts that are most serious and significant. [9]

Another important principle of NEPA is that the scope of EIA be sufficiently comprehensive to accurately reflect the complexities of environmental interconnectivity and interactions involved. Included are joint planning processes, research, public interactions, and integrating environmental documentation among various levels of government. Conflicts with land use plans, policies, and controls at different levels are to be avoided and the relationships between short-term uses of the environment and long-term productivity must be addressed. These goals also require applying the concept of interdisciplinary ecological and ecosystem planning over a region. This means that impact analysis should constitute a holistic approach to human-ecosystem interactions in the context of regional plans that have assessed the carrying capacity of the region's resources and the cumulative effects that could occur. [10]

To determine impact significance during EIA for NEPA, relevant considerations of the environment are to be evaluated for severity of impact caused by the intensity of the action undertaken. For example, the concept of a *threshold* for effects to occur is used in judging cumulative impacts. This is important in a regional context where similar or interrelated environmental threats may be posed by a federal agency or by several agencies over time. In these cases, single actions and impacts must be considered cumulatively and thresholds for effects that occur over long periods of time become important. Here the issue of "reasonably foreseeable" becomes important in terms of how much time must be involved before a future action can be undertaken safely. For ecosystem-level impacts, it is important to consider effects that can become cumulative over time. Also important is that mitigation measures for long-term impacts be addressed. Agencies are required to consider the degree to which environmental effects are uncertain or involve unique, unknown, and cumulative risks. [11]

Apprehension for future environmental quality has been aroused by concerns such as global warming and radioactivity. Adverse consequences of increased environmental perturbations, however, have not always been recognized by the general public, and government agencies should strive to educate the public rather than fostering further development at the risk of unexpected adverse impacts to the environment. [12] The goals of NEPA will not be fully realized in the absence of popular will sufficient to achieve them. Accomplishing this is a role of the federal government and its agencies. Means must be found to bring the political will and the missions of agencies closer to implementing the values expressed in NEPA's intent.

In large part, complying with NEPA is a symptom of obsession with procedure over substance. NEPA can involve different kinds of reports and in each case substance often suffers. Often overlooked is NEPA's intent that coordinating and integrating major programs impacting the environment and land use plans be addressed. These issues arise from the fact that impact assessment is meant to be a learning process. Thus, the environmental documentation provision of NEPA is meant to force the gathering, analysis, and reporting of substantive information for the purpose of improving the substance, economy, efficiency, and effectiveness of deciding and administering environmental policies and projects. [13]

Agencies and their bureaucrats often look at the informational substance of NEPA as an imposition that encumbers and delays the agency's mission and organic 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. [14]

A particularly onerous aspect of NEPA for government agencies is the act's mandate to use systematic interdisciplinary approaches to integrate science, socioeconomics, and environmental design arts in the EIA process. Many bureaucrats and agency personnel fail to understand the difference between interdisciplinary integration and the common multiple-disciplinary approach which fails to integrate the separate disciplines involved in the EIA process. Moreover, humans are to be considered as part of ecosystems and the environment but most often are not included except in socioeconomic and public health considerations. [15]

While the EIS process and its required documentation have improved federal planning and general environmental quality, EISs in general have not achieved the full intent declared by NEPA. If NEPA's intent is to be realized, consistent with its substantive goals, federal agencies must commit to and hold themselves to higher standards of ethics than are generally achieved. This is important to the future and depends upon the government and the people understanding

the nature of environmental quality and the problems posed to it by unlimited growth and development. Accomplishing NEPA's ultimate goals of sustainable development through the ecosystem-based approach means that the principles declared in NEPA must become a practiced reality. Sustainable yield of resources for maintaining development means that ecosystem processes and life-supporting environmental systems must be addressed in the EIA process. [16]

Science and Impact Assessment for NEPA

The framers of NEPA intended that interdisciplinary EIA be conducted that includes the human environment in the context of sustaining development, ecosystems, and natural resources. Sound scientific and technical information was meant to be drawn upon in the course of environmental documentation for learning and as a base for corrective measures. Information often is applied in an absolute sense of certainty rather than in the degrees of probabilities characteristic of the scientific process. Probabilistic science itself is inconsistent with legal questions that require a "yes" or a "no" answer. Thus, the uncertainty associated with any scientific issues can become lost in the decision making process stemming from the EIA process. This especially is the case in instances where insufficient information exists to describe environmental baseline conditions prior to performing EIA. [17]

Uncertainty also results when science is used but in a limited sense to support an agency's particular objective. Thus, narrowly and selectively focused scientific information often is skewed toward the biases of outside interests and of the agency. Decision-making often becomes encumbered with such hidden doubts. Injection of faulty information complicates already complex administrative procedures not designed to deal with scientific uncertainty. To this devil's mix of superficially scientific and technically derived base of information then comes powerful political influence and the opinion of influential interest groups. [18]

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 this, 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. 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. [19]

NEPA recognizes that environmental science may be inadequate for resolving numerous issues. Valid EIA 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 subsequence 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 that have been trained fully to comply with NEPA and not just to provide scientific information. [20]

In carrying out ecosystem assessment studies and designing mitigation responses, it is important that the basic attributes of ecosystems be identified and focused upon. The ultimate landscape and regional goals of a proposed action also must be stated, such as for optimizing resources yield or restoring natural ecosystem process, function, integrity, or biodiversity. Managing or manipulating ecosystems for different goals requires different strategies and techniques that need consideration in EIA for the NEPA process. Landscape planning according to natural boundaries rather than institutional boundaries that are artificial must be considered in the context of a proposed action that plausibly could effect the landscape or natural region. [21]

Understanding ecosystems is important for managing resources for human purposes. Ecosystems can be modified to yield some provisions and services, but their tendency is to return to the system's natural evolutionary form. Because of this, purposeful management requires sustained intervention. In cases where anticipated impacts may be unique because of the type of perturbation involved, ecosystems responses are almost impossible to predict. Whether the post-impact recover ecosystem will be satisfactory also cannot be predicted due to of the lack of examples to draw information from. In such cases, EIA must include simulation field studies and predictive modeling in the ecosystem type where real impacts will occur. [22]

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 are 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 process. In most cases involving a single, unreplicated natural ecosystem, traditional statistical approaches are unsuitable and yield results that highly questionable. [23]

Caution also is needed in making assumptions about the underlying future biological diversity and integrity of an impacted ecosystem. Assuming that the original natural ecosystem is the system most likely to return after an impact has subsided cannot be counted on to be reliable. Uncertainty exists if the impact exists far into the future because environmental factors such as climate may have changed significantly over long spans of time. If relevant information exists for the anticipated ecological and environmental conditions, ecosystem simulation modeling must be included in the EIA process for NEPA. [24]

Integrating Environmental Policy

Integration of policies within and among government agencies is necessary to prevent wasteful duplication. The NEPA process is meant to minimize conflicting goals by integrating related activities, legislation, and policies to avoid internal and interagency conflicts and working at cross-purposes. Often, threats to the environment can be traced to unintended effects of conflicting federal efforts. Avoidance of this by integrating government activities is a direct purpose of NEPA for encouraging productive harmony between humans and their environment. Thus, the EIA process should reveal the need for integrated federal public works planning to minimize conflicting programs. However, much federal activity and related legislation is in response to particular considerations with little effort given to inadvertent consequences, environmental effects, socioeconomic impacts, or other consequences. In a pluralistic democratic society each stakeholder group pushes its agenda with indifference to the values of other groups, and often federal agencies make no effort to avoid the shortcoming. [25]

Accomplishing integration among different stakeholders and within federal agencies often is resisted by agency personnel, and failure to do so diminishes environmental quality. In the NEPA and EIA processes, agencies should adopt a progressive attitude toward environmental management that includes all interested and effected stakeholder groups, not just sister federal agencies. Goals consistent with the Federal Ecosystem Management Initiative should be part of every agency's mission objectives and land use policies. In fact, many integrative and other aspects of NEPA are complimented by the Federal Ecosystem Management Initiative. Among these are the responsibility of government agencies to build human environmental values into their missions and to integrate them into EIA and their mission programs. Policy integration is

meant to foster more effective and sustainable programs by such means as stakeholder collaboration in planning and decision making. Accomplishing this requires greater agency-learning and reorientation than recognized before ecosystem management was included in federal environmental policies beginning in 1993 and culminating in 1995. Now, agencies need to strive more than ever to achieve coherent and broader-based public administration and service in the context of ecosystem management. [26]

All of this points to the increasing recognition in federal agencies for greater integration of environmental values into their programs, new and established alike. The integration required by NEPA plus that inherent in ecosystem management stems from increasing public expectations for more effective and efficient management practices. Opinion has swung in the last decade or so to the still growing opinion that damage to the environment is not unavoidable to achieve the objectives of public service from government agencies. To achieve responsible, ethical environmental management, agencies need to assure that their personnel understand ethics in terms of how the agency can conform with the intent of NEPA compliance based on integrated ecosystem management that includes values inherent with humans in the environment. [27]

Additionally, impact analysis and assessment will fall short of the reality meant to be achieved by NEPA unless agencies also learn to consider long-term sustainability of their public programs. [28] The goal of achieving sustainable natural resources and economies is the purpose of the Federal Ecosystem Management Initiative. All federal land management agencies have adopted ecosystem management among their internal orders, but few agencies have incorporated the concept of striving toward sustainability through applying the concept and practice of ecosystem management in the NEPA and the EIA processes. Ecosystem management requires an interdisciplinary approach that has as its foundation addressing human and economic development in a sustainable and environmentally sound manner.

Another important perspective is NEPA and the global environment. [29] Global environmental issues affect all or nearly countries, and the concept of "commons" applies to all areas of the environment outside the jurisdiction of any nation. These issues are meant to be addressed by the NEPA process in regards to our national intent not to jeopardize or irreparably damage the Earth's environment. Examples of such offensive actions are those that contribute to global climate change and others that increase the Earth's burden of radioactivity.

This section provides comments on the YMP DEIS that are keyed to the above discussion based on critical aspects of the NEPA process and the EIA process for the project in question. Thus, keys to matching a comment with the appropriate portion of the discussion are in the form of highlighted letters of the alphabet. Not all aspects and considerations relative to NEPA and EIA for the Yucca Mountain Project are addressed, only the most critical ones in the context of environmental and ecosystem science that are essential to the efficacy of the DEIS.

Relevant Characteristics of NEPA

14 **1. Procedural and coordination course:** NEPA establishes national environmental
policy and is not a regulatory act of substance like most other environmental statutes. [An
intention of NEPA is to bring all the environmental act together for an individual major action.
Typically most federal agencies succeed in this instance, as is the case for the Yucca Mountain
DEIS. Where the DEIS does fall short is in regard to joint regional land use planning with other
15 agencies, citizens, and private stakeholders.] Additionally, [there has been no effort on the DOE's
part to integrate environmental documentation for the YMP with other anticipated or ongoing
federal activities. In this context, the DOE should address relationships between short-term uses
of environmental resources and long-term productivity into the future.]

37 **2. The overall environment:** [The task of addressing the overall environment in an
integrated sense often is not achieved in NEPA documentation. Environmental components are
addressed in a piecemeal fashion, and this particularly is true for the ecological hierarchy. In the
case of the Yucca Mountain DEIS, only biota and soils were addressed, the former only at the
population and community levels. Ecosystems were avoided as was their role in the regional
landscape. The entire YMP DEIS is at fault in not using interdisciplinary EIA for the NEPA
process.]

16 **3. Not self-executing:** [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 the DOE such as the nuclear industry. Thus,
public stakeholders such as the citizens of Nevada may not substantially effect 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
decision making regarding execution and form of the proposed action for the YMP.]

17

4. **Federal sustainability policy:** The White House policy on sustainable environmental resources and economies supports NEPA's foundation of national policy. This fact is not recognized in YMP DEIS. The DOE has not met the intent of the NEPA process to meet the environmental challenges posed by growth and development. Sustainable development depends on reliable EIA which is lacking for the YMP. To fulfill the present need, the DOE must take NEPA as intended and not a mere set of procedural requirements.

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5. **Ethics and principles:** The YMP DEIS is indifferent to the principles of environmental and moral ethics expressed in NEPA. Also lacking is a unifying environmental goals and a strategy for the DOE to achieve it for the YMP. A commitment on the part of the DOE is needed to assure the protection of environmental quality and the achievement of moral and civil ethical principles. This includes openness and informing all of the stakeholders in the YMP and related regional activities about the full nature of costs and benefits of the Yucca Mountain program.

19

6. **Unbiased and comprehensive EIA:** The intent of the NEPA process is that unbiased environmental documents be prepared before a proposed action is tailored. The information and insights resulting from the EIA process is meant to be integrated into the final design and implementation of the action. Because of the legislative nature of the YMP and its exposure to powerful external and internal interests, this intent of NEPA has not been possible. In particular, the DOE has violated the ethical principle of avoiding biases in the conduct of EIA for the YMP. To avoid these faults the YMP DEIS should adopt both life cycle EIA and regional strategic EIA on a regional basis.

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(cont'd.)

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7. **Environmental values:** A particular loser in the NEPA process for the YMP has been long-term quality of the human environment regarding future generations in the Yucca Mountain region. The EIA process is meant to enhance the congruence of actions with broad environmental goals that protect environment far into the future. The DEIS in particular sacrifices condones sacrificing the Yucca Mountain region for the future. The inherent biases of those responsible for the DEIS weigh heavy on the project because independent outside review of the EIA process was limited. Those opposed to the YMP were viewed by the DOE with a lack of confidence when the opposite situation was the truth. This also was true of the contractors who executed EIA for the YMP who compromised their ethics and objectivity on behalf of the DOE.

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(cont'd.)

8. Ethics, indifference, and openness: [As a whole, the DOE has a poor record regarding environmental and human ethics, an indifference to environmental quality, and lacks openness to the public. The YMP is being conducted in this characteristic manner, where civil servants and bureaucrats ignore the higher precept of NEPA and ethics. The DEIS includes no sense of unifying goals and strategies for achieving national environmental policy and informing and educating people about the DOE's objectives which remain hidden and unopen.]

21

9. Post-project correction: Implicit in the NEPA process is that EIA for project approval does not end once environmental documentation is completed. Post-project analysis is important to ensure that the proposed development occurs as anticipated and that all impacts that occur were predicted. [In situations such as the YMP where environmental uncertainties are large and extent far into the future, continued monitoring and assessment are vital for managing risks. Such plans should be clearly outlined in the YMP DEIS.]

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10. Connectivity and carrying capacity: This issue concerns comprehensive and integrated EIA at the ecosystem and regional levels. [An interdisciplinary as opposed to a multiple disciplinary framework for protecting the environment is essential to EIA under NEPA. Only by understanding interconnectivity and the interactions of humans and the ecosystem can the concept of future carrying capacity of the human environment in the Yucca Mountain region be addressed. This is missing from the YMP DEIS and constitutes a significant oversight because of uncertainties about the long-term consequences for future generations of humans in the region.]

22

11. Significance effects: [The issue of significant effects is problematic for the YMP 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.]

23

12. Future environmental quality: [NEPA is meant to assure achievement of high environmental quality far into the future. The full range of uncertain adverse impacts of the YMP that are meaningful in the context of future generations is missing from the YMP DEIS and must be corrected to meet NEPA's purpose for sufficient EIA. This applies in particular to the

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cont.

interactions between global climate change and future releases of radionuclides into the regional and global environment from the YMP.

Process and Purpose in NEPA

24

13. Substantive integration: Impact assessment under NEPA is meant to be a substantive learning process such that agencies can see how to coordinate and integrate proposed actions. The Yucca Mountain DEIS fails to accomplish this in one notably significant instance, the so called Five-Party Interagency Agreement. The interagency agreement calls for integrated and coordinated land use planning in accordance with the tenants of ecosystem management in the Yucca Mountain region. This is missing from the DEIS, setting the Yucca Mountain site apart from all contiguous land use plans.

39

14. Avoiding NEPA: In the YMP DEIS, the 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.

40

15. Systematic interdisciplinary focus: The DOE is one of several federal agencies that typically fail to realize that NEPA mandates a comprehensive interdisciplinary to EIA. This is the case with the YMP DEIS, where multiple disciplines worked independently. There was no overall integration to bring them together into a sum that is greater than the parts. The failure to adopt an ecosystem management approach for the DEIS and to consider humans a part of the holistic environment are the prime indications of this shortcoming for the YMP.

25

16. Ecosystem-based management: NEPA infers that a goal of national environmental policy is to work toward sustainable resources and economies through ecosystem management. This policy also has been declared by the White House in a multiple-agency agreement that the DOE has agreed and established a departmental order for achieving. Such an approach has been taken by the DOE at the Nevada Test Site, but the YMP has steadfastly refused to adopt an ecosystem approach to managing the environment. Consequently, policy-relevant EIA and decision making in the context of holistic environmental and human dimensions cannot be conducted. This failure is at the root of the DEIS's fundamental insufficiency.

26

17. Science and uncertainty: Interdisciplinary EIA for NEPA means that the use of sound scientific information must be maximized in order to minimize the dependence on so-called 'best professional judgement.' A purpose of this approach is to reduce the degree of uncertainty in environmental documents such as the Yucca Mountain DEIS. In this respect, the DOE has failed throughout the YMP, particularly regarding a holistic environmental approach. The DEIS fails to indicate where scientific information is incomplete and repeatedly is substituted for by subjective judgement. In such instances, indications of the degree of uncertainty created or how the uncertainty ultimately can be compensated for or resolved should be addressed. A prime example of this weakness in the YMP DEIS is the lack of information regarding the nature of the pre-disturbed environmental baseline conditions. This and other uncertainties throughout the DEIS render it insufficient.

41

18. Biased interest groups: Biased intentions of the DOE and its interest groups play a large role in the uncertainty throughout the YMP DEIS. Under these influences, inadequate information is used for EIA. This renders the DEIS as the servant of development and economic growth at the expense of environmental quality.

27

19. Adaptive management: Often uncertainty can be reduced through environmental monitoring and adaptive management based on the resulting information. Such a tact should be followed during development and the useful lifetime of the YMP 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 DEIS but are not. This is unacceptable given the certainty of long-term environmental and health consequences associated with the program.

28

20. Weak information: In the numerous cases where sound information is missing from the YMP 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 assembled for the

YMP. Experts trained not just in their respective disciplines are need, but sound training and experience in EIA also is essential.

29

21. Boundaries and planning: The Yucca Mountain DEIS is deficient in terms of best professional practice for EIA because natural ecosystem and landscape boundaries were not adopted. Programs as important as the YMP is in terms of long-lived contaminants and future human generations require region planning and execution in the context of ecosystems and regional landscape boundaries. Otherwise, long-term and cumulative impacts cannot be addressed adequately. In terms of holistic environmental quality and EIA, the YMP DEIS is deficient as a NEPA document.

30

22. Ecosystem simulation modeling: The precedential nature of the YMP in terms of contamination far into the future will endanger the environment and render future natural resources unusable. A comprehensive and integrated holistic approach to EIA that considers humans within the natural environment should be applied to the Yucca Mountain natural region. Predictive simulation models of the natural ecosystem that consider global climate change and extend far into the future should be carried out. Such a task should be based on full ecosystem baseline information. The current DEIS fails in that respect and is deficient for the nature of the project. Details about such an EIA process are provided by the citations listed following these comments.

31

23. Study design and analysis: The ecological study design and the methodology adopted for EIA analysis for the YMP 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.

42

24. Ecosystem integrity: In cases such as the YMP where adverse health and environmental impact are likely to occur far into the future, reliable EIA must include considerations of long-term ecosystem function, integrity, and biodiversity. Such consideration especially are important regarding the likelihood for interactions between anticipated impacts from the YMP and long-term global climate change. Holistic EIA based on the concept and principles of ecosystem management are essential.

32 **25. Conflicting programs and projects:** Once again, in programs such as the YMP it is necessary that potential conflicts between future projects be addressed in a reasonably foreseeable manner. The Yucca Mountain region in particular is susceptible to such long-term impacts that have to be addressed in a context of ecosystem management. Such is among the intents of the existing Five-Party Cooperative Agreement for the region that the DOE has refused to adopt for the YMP.

33 **26. Ecosystem framework:** The Federal Ecosystem Management Initiative, which the DOE has agreed to, should have been applied to the YMP. Several reasons for this are commented on above, and additional reasons have to do with (a) the nature of the program needing a progressive attitude toward EIA and (b) the need for the program to be fully open to stakeholder involvement, in present and future terms. The DOE has refused to adopt these and other aspects of ecosystem management for the YMP, which renders the DEIS inadequate.

43 **27. Values and ethics:** Environmental values and ethics inherent in NEPA are not set reflected in the YMP DEIS. Sound integrity of EIA practice is fundamental for policy relevant decision making and must be evident in the DEIS for EIA to be credible. Ethical precepts are implicit when ecosystem management is used as a unifying theme for the NEPA process, and without that and outside review of EIA a crippling ethical dilemma hangs over the YMP.

34 **28. Long-term sustainability:** Implicit in NEPA is that environmental sustainability over the long term for future generations of humans is to be sought by the EIA process. The advantages and disadvantages of proposed actions regarding sustaining future generations in programs such as the YMP must be addressed by the NEPA process. This also is the purpose of the Federal Ecosystem Management Initiative and the Five-Party Interagency Agreement for the Yucca Mountain region. The DEIS for the YMP is deficient in these regards.

35 **29. Global pollution:** The intent of NEPA is that contributions to global environmental problems be avoided. Global environmental ‘commons’ such as the atmosphere applies to the YMP in the context of radioactivity and must be addressed by competent EIA in the DEIS. This in particular is an issue regarding future cumulative impacts and future generations.

Sources of Standards

EIS001106

- Bartlett, R.V. and C.R. Malone. 1993. Science and the National Environmental Policy Act. *The Environmental Professional* 15(1): 1-160.
- Bass, R.E. and A.I. Herson. 1993. *Mastering NEPA*. Solano Press Books, Point Arena, CA.
- Caldwell, L.K. 1998. *NEPA*. Indiana University Press, Bloomington.
- Clark, R. and L. Canter. 1997. *Environmental Policy and NEPA*. St. Lucie Press, Boca Raton.
- Committee on Environment and Natural Resources. 1995. A National Framework for Integrated Ecological Assessments. The White House, Washington, DC.
- Fogleman, V.M. 1990. *Guide to the National Environmental Policy Act: Interpretations, Applications, and Compliance*. Quorum Books, Westport, CN.
- Gilpin, A. 1995. *Environmental Impact Assessment: Cutting Edge for the Twenty-First Century*. Cambridge University Press, Cambridge, UK.
- Interagency Ecosystem Management Task Force. 1995. The Ecosystem Approach: Healthy Ecosystems *and* Sustainable Economies. Volume I - Overview. White House Council on Environmental Quality, Washington, DC.
- Jain, R. and L. Urban. 1993. *Environmental Assessment*. McGraw-Hill, Inc., New York.
- Ortolano, L. 1997. *Environmental Regulation and Impact Assessment*. John Wiley, New York.
- TKC (The Keystone Center). 1996. The Keystone National Policy Dialogue on Ecosystem Management. TKC, Keystone, CO.
- Salk, M.S., V.R. Tolbert, and J.A. Dickerman. 1998. Guidelines and Techniques for Improving the NEPA Process. *Environmental Management* 23(4): 467-476.
- Szaro, R.C., W.T. Sexton, and C.R. Malone. 1998. Ecosystem Management. *Landscape and Urban Planning* 40(1-3): 1-123.
- Westman, W.E. 1985. *Ecology, Impact Assessment, and Environmental Planning*. John Wiley & Sons, Inc., New York, NY.
- Wiesner, D. 1995. *The EIA Process*. Atrium Publishers, Santa Rosa, CA.