Dr. B. John Garrick, Chairman
Advisory Committee on Nuclear Waste
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

March 13, 2001

SUBJECT: HIGH-LEVEL WASTE KEY TECHNICAL ISSUE RESOLUTION PROCESS

Dear Dr. Garrick:

I am responding to your February 8, 2001, letter to the Chairman. In that letter, the Advisory Committee on Nuclear Waste (hereafter, the Committee) provided observations and concerns regarding the progress toward resolution of the key technical issues (KTIs). The Committee stated that the issue resolution process appears to be working as planned and both the U.S. Nuclear Regulatory Commission (NRC) and Center for Nuclear Waste Regulatory Analyses staffs have demonstrated a sound grasp of the technical issues. Furthermore, the Committee stated that it is pleased the staff has made significant progress in adopting a risk-informed and performance-based approach. However, the Committee provided two concerns, specifically: (1) whether all important subissues have been identified; and (2) whether issues and subissues are being appropriately integrated. In addition, the Committee noted its disappointment that the issue resolution meetings were not used to explore innovative ways to engage public participation in the evaluation process. Responses to each of the Committee's concerns and comments are presented below.

Comment 1. The Committee was concerned about whether all important subissues had been identified. For example, the Committee stated that examination of coupled processes in the waste package and near-field environments might lead to some "surprises" that are not subsumed in the current structure.

Response 1. It is the U.S. Department of Energy's (DOE's) responsibility to ensure that any future license application be complete in all respects. Therefore, DOE must fully cover all aspects of repository performance in an acceptable manner in its license application. The NRC staff, on the other hand, will review and audit any future license application, focusing on the most important factors to overall repository performance. This difference between the NRC staff and DOE, as a potential applicant, does not mean that DOE should focus its application on just those subissues identified as important by the staff. Rather, as stated earlier, DOE must present a high quality and complete application that demonstrates compliance with all NRC regulatory requirements. The limited, audited type nature of the staff's review does not relieve DOE of these obligations.

As part of its pre-licensing review, the NRC staff is relying on several techniques for ensuring that all important subissues have been identified and are addressed adequately (i.e., including appropriate coupling). First, the process of scenario analysis is directed at identifying a comprehensive set of features, events, and processes (FEPs) that have the potential to effect the performance of a Yucca Mountain repository. The screening of these FEPs from the performance assessment considers, as appropriate, coupled processes. The scenario analysis

process was developed to provide a framework to reduce the likelihood that important FEPs and, consequently, important subissues will remain unidentified. Second, the use of integrated subissues (ISIs) is directed at improving integration and efforts to consider the effects of coupled processes. These ISIs, each of which represents a different aspect of repository performance, are not limited to one discipline. Those FEPs included in the performance assessment will be reviewed as part of ISIs, which involve the pertinent disciplines. Using a multi-disciplinary approach to conduct the review will reduce the potential for surprises arising from coupled processes. Third, reviews relating to: (1) the capabilities and performance of specific barriers, and (2) the overall performance of the repository, will assist the staff in identifying and addressing processes and coupling that may be involved in more than one ISI. The NRC staff believes that these techniques represent a systematic and robust approach to identify and address all the important subissues.

Comment 2. The Committee was concerned about whether issues and subissues had been appropriately integrated. The Committee agreed with the use of the total system performance assessment (TSPA) code to determine "how the pieces fit together," and planned to monitor further progress in issue integration.

Response 2. As currently envisioned, the staff's approach used to evaluate the DOE's TSPA is hierarchical (Enclosure 1). The focal point is the overall repository system. To focus the review on the most important subsystems, the staff will examine the contribution to performance and capability of each of three repository subsystems: engineered system, geosphere, and biosphere. The staff has apportioned the analysis of post-closure repository performance among 14 integrated subissues (ISIs). The ISIs represent an interdisciplinary approach to reviewing DOE's performance assessment. The review of the ISIs will draw on the expertise of the KTI teams, but will more formally integrate the contribution of specific technical disciplines in the review of interdisciplinary questions posed in the ISIs.

As you note in your letter, NRC staff currently has activities underway to ensure that the KTIs are being appropriately integrated. First, NRC has conducted a number of technical exchanges with the DOE on the specific KTIs and is now preparing for a technical exchange to address the Total System Performance Assessment and Integration (TSPAI) KTI subissues in the May/June 2001 time frame. As part of this technical exchange, NRC and DOE will discuss model abstraction, which is comprised of the 14 ISIs, and scenario analysis, which addresses the screening of FEPs. As was done for the past KTI technical exchanges, NRC is using insights gained from it's total system performance assessment calculations, in addition to reviewing previous technical exchange information, as part of its preparation for the TSPAI KTI technical exchange. This information will help identify potential gaps of information pertaining to the ISIs and focus the staff on what information is needed for issue resolution. Second, NRC is preparing to publish an Integrated Issue Resolution Status Report that would have separate sections on each of the 14 ISIs. In preparing this document, NRC is again reviewing information provided during the past KTI technical exchanges and will integrate it under the 14 specific ISIs. Together, these activities should allow the staff to gain further information regarding the ISIs and will give the staff a better perspective on what factors are most important to overall repository performance.

General Comment. The Committee was disappointed that the issue resolution meetings were not used to explore innovative ways to engage the public in the evaluation process.

Response. The NRC staff agrees that innovative ways to illustrate and explain NRC's regulatory program are appropriate to enhance interactions with the public. During these multi-day KTI technical exchanges, we have attempted to encourage public comments and questions. Further, we attempted to assure that the comments and questions are addressed at the end of each day, as well as during breaks, before the meeting, and after the meeting. DOE and NRC have also addressed specific questions from the public regarding the presentations during the technical exchanges. However, it is important to point out that these technical exchanges are between DOE and NRC. We have attempted, consistent with NRC Management Directive 3.5, "Public Attendance at Certain Meetings Involving the NRC Staff," to assure that opening these meetings to public involvement does not impact the staff's ability to conduct business with DOE. Therefore, the staff has limited public involvement to that of observation.

In addition, in a letter to you dated December 11, 2000 (Enclosure 2), I outlined a number of very important initiatives - initiatives that we intend to develop and expand over the coming years. At a meeting of the Geological Society of America, held in Reno, Nevada, the week of November 12, 2000, handout and display materials were used to introduce performance assessment as a regulatory tool. Also included in these initiatives are holding meetings with the public to address specific questions or concerns, and discussing intermediate TSPA results (including those related to the performance of individual barriers). We are currently exploring ways to further engage the public in the understanding of the TSPA role in NRC's program, and in the evaluation process at the upcoming TSPAI KTI technical exchange. We will continue to seek innovative ways to illustrate and explain NRC's regulatory program for the broadest possible community of interested stakeholders.

In conclusion, I wish to thank the Committee for its observations and we continue to welcome the Committee's future observations and recommendations in these areas.

Sincerely,

/RA/

William D. Travers
Executive Director
for Operations

Enclosures:
1. Components of Performance Assessment Review
2. EDO Memo to ACNW dated December 11, 2000

cc: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield
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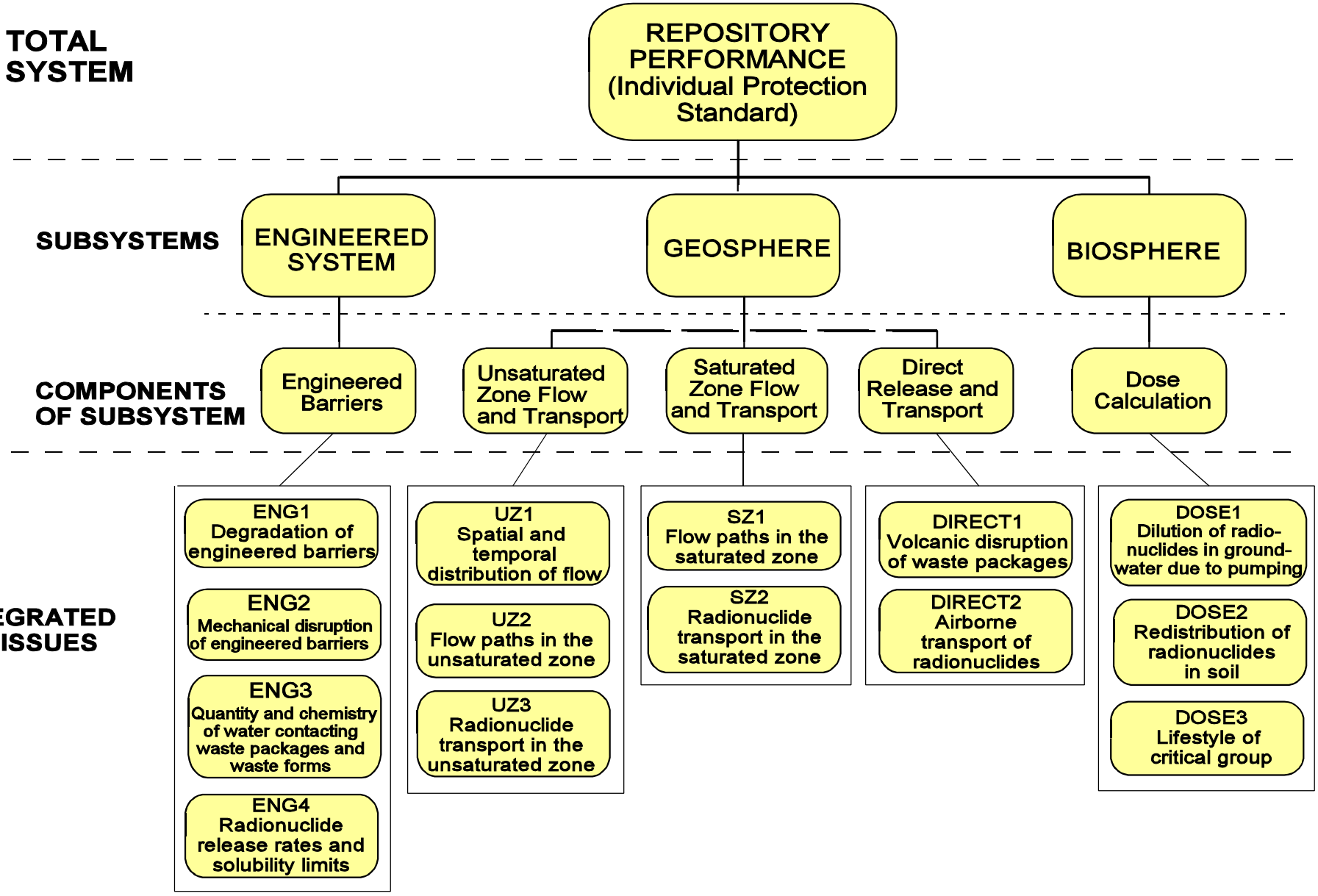
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Saturated Zone Flow and Transport
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ENG1 Degradation of engineered barriers
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UZ1 Spatial and temporal distribution of flow
UZ2 Flow paths in the unsaturated zone
UZ3 Radionuclide transport in the unsaturated zone
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SZ2 Radionuclide transport in the saturated zone
DIRECT1 Volcanic disruption of waste packages
DIRECT2 Airborne transport of radionuclides
DOSE1 Dilution of radio-nuclides in ground-water due to pumping
DOSE2 Redistribution of radionuclides in soil
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