

Mr. Martin J. Steindler, Chairman
 Advisory Committee on Nuclear Waste
 U.S. Nuclear Regulatory Commission
 Washington, DC 20555

June 19, 1995

0402

Dear Mr. Steindler:

SUBJECT: RESPONSE TO YOUR ADDITIONAL COMMENTS ON THE U.S. DEPARTMENT OF ENERGY PROGRAM APPROACH

In your letter to the Chairman, dated April 28, 1995, you discuss four concerns that the Advisory Committee on Nuclear Waste (ACNW) has with the U.S. Department of Energy's (DOE's) program approach. Your concerns reflect the information presented by DOE at the March 15-16, 1995, ACNW meeting. The staff shares your concerns with the program approach and continues to urge DOE to document its program in a clear and timely manner. As you note in your letter, the absence of a repository reference design remains a major problem. In this regard, the staff strongly concurs in the Chairman's remarks to the Sixth Annual International High-Level Radioactive Waste Management Conference, where he specified the need for submittal of a complete application for construction authorization before Nuclear Regulatory Commission's review will begin. The Chairman noted that a complete application would necessarily include a reference design and the appropriate detail on thermal loading strategy. The staff will emphasize and continue to pursue the ultimate need for a complete application during its preapplication activities with DOE. Specific responses to your four concerns are enclosed.

If you have questions on the staff's responses, please contact Mr. Joseph Holonich, Chief, High-Level Waste and Uranium Recovery Projects Branch, at (301) 415-7283.

Sincerely, *Original signed by*
 James M. Taylor
 Executive Director
 for Operations

Enclosure: Response to ACNW letter
 of 4/28/95

cc: The Chairman
 Commissioner Rogers
 Commissioner de Planque
 Commissioner Jackson
 SECY OGC OPA OCA

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OFC	HLUR*	E	HLUR*	E	HLUR*	E	TECH ED*	OGC*	E
NAME	MDelligatti		JThoma		JHolonich		EKraus	CWReamer	
DATE	6 /06/95		5/25/95		6/07/95		5/25/95	5/25/95	
OFC	DWM*		NMSS*		NMSS*		EDO	EDO	
NAME	JGreeves		MKnapp		CPaperiello		HThompson	JTaylor	
DATE	06/08/95		06/09/95		06/09/95		6/19/95	6/19/95	

Advisory Committee on Nuclear Waste

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Executive Director for Operation

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Commissioner de Plaque
Commissioner Jackson
SECY

CONTACT: Mark Delligatti, NMSS/DWM
415 6620

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NAME	MBelligatti		JThoma 507		JHolonich		EKraus	CWRGAMCR
DATE	05/12/95		5/12/95		5/12/95		05/12/95	05/18/95
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* SEE PREVIOUS CONCURRENCE

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NAME	MDeIligatti		JThoma <i>JOT</i>		JHolonich <i>J.M. Holonich</i>		EKraus		CWReamer	
DATE	6/2/95		5/25/95		5/25/95		5/25/95		5/25/95	
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MEMORANDUM TO: Martin J. Steindler, Chairman
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NAME	MDelligatti		JThoma 307		JHolonich 307 for 34		EKraus	CWREGAMCR
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NAME	JGreeves		MKnapp		CPaperiello		HThompson	JTaylor
DATE	/ / 95		/ / 95		/ / 95		/ / 95	/ / 95

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RESPONSE TO CONCERNS EXPRESSED BY ADVISORY COMMITTEE ON NUCLEAR WASTE

Concern 1:

Continued emphasis by DOE on the two-stage licensing approach will pose serious difficulties for the Commission. A lack of sufficient data, the use of bounding assumptions, the likely absence of a detailed repository design or critical decisions about the design (e.g., thermal management), and the absence of other information needed for determining the quality of conclusions reached by DOE will unduly complicate the Commission's decisionmaking and at best, could lead to conditional decisions. The two-stage licensing process, while not necessarily faulty in principle, is in this instance relatively uncertain. In order to clarify the consequences of decisions to proceed with two-stage licensing as currently described, the Commission should ask NRC staff to analyze the uncertainties that will be reflected in the response to the license application and to define, at an early stage, what limitations DOE can expect in NRC decisions on the license application.

Response:

The staff shares the general concern with ACNW that implementation of DOE's program approach could result in the development by DOE of an application for construction authorization which does not contain sufficient site and design information to demonstrate compliance with technical criteria and performance objectives of 10 CFR Part 60. The paucity of information available from DOE on implementation of the program approach for licensing has caused the staff to make certain inferences with regard to this concern. It appears that DOE might be considering deferral of some data collection until the performance confirmation phase. This would result in the staff's review of this data during the review for application for emplacement of waste or permanent closure of a repository.

DOE has stated that the details of the program approach will be forthcoming as implementation continues. Be assured, however, that regardless of DOE's approach, the staff's objective during prelicensing will continue to be one of identifying concerns early and providing DOE with guidance so that the license application will have sufficient site and design information to demonstrate with reasonable assurance compliance with NRC requirements. This site and design information is also needed in sufficient detail for the Commission to make its statutory comments to the President and Congress on the extent to which the at-depth site characterization analysis and waste form proposal are sufficient for inclusion in a license application. The staff is taking a proactive approach to avoid or mitigate potential concerns with DOE's program approach. There appear to be sound reasons for streamlining the DOE program. The staff believes that streamlining can (and must) be met without sacrificing the quality of the data collected and analyzed. This data must be sufficient to support with reasonable assurance, a DOE compliance demonstration.

Enclosure

As you are aware from its recent presentations to the ACNW, DOE plans to make the licensing strategy described in the Site Characterization Plan consistent with the program approach. DOE's goal is to more efficiently develop an acceptable license application. This revised licensing strategy includes: a waste isolation and containment strategy; recognition of associated key uncertainties; and approaches to address these uncertainties. As indicated in DOE's "Civilian Radioactive Waste Management Program Plan," this revised licensing strategy will be documented in Revision 1 to the License Application Annotated Outline (AO) in 1996. It will identify the information needed for demonstrating compliance with reasonable assurance. Therefore, the revised licensing strategy should clarify the information to be available in the license application and that which will become available subsequently during construction and operation as a result of performance confirmation testing. It is vital to effective program implementation for DOE to systematically develop and document this strategy which the staff intends to review.

The staff will also review compliance demonstrations resulting from the licensing strategy as they are documented in the AO. This will include the technical uncertainties in the technical basis for the compliance demonstrations. DOE compliance demonstrations in the license application must take into account uncertainties and gaps in knowledge using such techniques as bounding assumptions and sensitivity and uncertainty analyses. However, to make a reasonable assurance finding at this stage, bounding assumptions must have enough data for an acceptable technical basis. This might include: 1) showing that the bounds selected represent a reasonable range of values or alternatives and 2) analyzing the sensitivity of repository performance to variations in the bounds to show that the selected bounds do not underestimate repository performance.

The staff will communicate the results of these reviews through Preliminary Evaluation Reports (PERs). The process used to develop the PERs will be consistent with the strategy discussed in NUREG-1495, "Overall Review Strategy for the NRC High-Level Waste Repository Program." The PERs will document the staff technical views regarding a specific part of the AO including areas where the staff is reasonably satisfied with the DOE approach, and other areas where the staff is able to identify concerns with the DOE program that must be resolved before submittal of the license application. Through the PERs, DOE will be provided an early indication of staff concerns that might ultimately lead to limitations in the NRC decisions on the license application.

Finally, as the Chairman has indicated, the NRC will revise its current licensing process, if necessary. To date, the staff's interactions with DOE have not indicated any need to significantly change the process, beyond the procedural changes that both NRC and DOE have agreed will enhance the prelicensing consultation phase and the licensing process. These include a reduction in the number and kinds of documents submitted by DOE to NRC for review and the vertical slice initiative, which is discussed below.

Concern 2.

NRC staff has stated that a much closer and more timely surveillance and tracking of DOE activities is necessary. We recommend that NRC staff and the DOE discuss the need, in light of the program approach and schedules, for more rapid access by NRC staff to the DOE data and results. There will need to be adequate evaluation and analysis of the results by DOE and its contractors prior to their use by NRC. NRC staff needs to be proactive in obtaining early access to the data and results that will be contained in the license applications. However, the staff must also recognize the need for DOE to ensure the quality and validity of the data transmitted, and for the orderly management of their program.

Response:

DOE's implementation of its program approach has caused the staff to refocus its pre-licensing strategy, including its license application review strategy and its performance assessment program, in view of accelerated schedules and compressed DOE data gathering programs.

The need for timely access to technical data was emphasized by NRC staff in negotiations with DOE to revise the procedural agreement. The agreement recognizes that DOE has a legitimate need to ensure the quality and validity of data transmitted and to ensure an orderly management of its program. To achieve an appropriate balance, the agreement provides for access for all parties to data within 45 days (which allows for completion of appropriate quality assurance reviews of data before its release).

In terms of on-line data availability, two very promising initiatives are underway. The staff and its contractor, the Center for Nuclear Waste Regulatory Analyses, are currently involved in a pilot project with DOE to provide NRC access to DOE's Automated Technical Data Tracking System, which provides a reference catalogue of titles of available reports. DOE is also in the process of providing available data to program participants via CD-ROM technology. These initiatives should enhance DOE's ability to meet its commitments under existing Procedural Agreements.

Concern 3.

The emphasis by DOE on the use of bounding assumptions in modeling with limited field and laboratory data makes evaluation and prioritizing by NRC staff of parameters and phenomena more dependent on the staff's judgment than on the results of analytical processes. This dependence would be diminished if performance assessment is expedited. The staff will need to ensure that it is able to evaluate and prioritize the technical issues and bases for scenarios that are to be evaluated and for which data or reliable models will be required. We believe this assignment, although difficult, is vital to ensure that the staff resources are employed to meet the schedule requirements contemplated by the DOE program approach. We reemphasize the need of the HMSS and RES staffs to develop protocols for addressing, in the very near future, the potential deficiencies in the planned performance assessment. We are confident that the NRC staff can identify the high-priority issues and scenarios that relate directly to the regulations. NRC should reorganize its license application review strategy and the PA programs in light of the expected deficiencies in the information supplied by DOE.

Response:

Through the staff's use of Systematic Regulatory Analysis, Iterative Performance Assessment, its reviews of DOE documents, and other scientific literature, 10 key technical issues (KTIs) were identified. When the staff had assembled the list of KTIs, it then aggregated all 54 of the previously identified key technical uncertainties (KTUs) into this group of 10 KTIs. The current list of KTIs from NRC's perspective includes: (1) volcanism probability and consequences; (2) location and characterization of structural features which affect water and vapor movement; (3) thermal-mechanical-hydrological-chemical coupled processes; (4) thermal effects and redistribution of moisture; (5) waste package degradation; (6) geochemical effects on radionuclide transport within and beyond the thermally altered zone; (7) evolution of groundwater in the near-field environment; (8) methods of assigning probability to and estimating consequences of disruptive scenarios; (9) structural deformation and seismicity; and (10) exploratory studies facility. The staff's iterative performance assessment program will emphasize the sensitivity of repository performance to key issues as well as provide a total systems perspective. These issues and their significance to performance will be discussed by the staff and DOE. The staff believes that its lists of KTUs and KTIs are complete. Should the ACNW disagree, please inform the staff, also providing a recommendation regarding prioritization of any suggested additions to the list.

To achieve better integration of NRC's prelicensing activities and to husband scarce resources, the staff will undertake vertical slice audits to evaluate the effectiveness of DOE's program approach in evaluating key technical issues which NRC staff believes are significant to repository system performance. This initiative will allow the staff to do a focused investigation of DOE's program for building a demonstration

of compliance with the associated regulatory requirements in the license application. This approach ensures that by the time that DOE submits its license application all KTUs will have been addressed. This effort is being coordinated with the Office of Nuclear Regulatory Research.

Concern 4.

NRC staff should formulate, as early as possible, the issues in the current DOE program approach that may be unresolved or difficult to resolve. One path would be to identify the anticipated results that would be available by the deadline for decisions on the site suitability. Owing to the complexity of the system and the descriptions of a suitable site, early awareness of the status of data and modeling related to the site characterization should be developed. The status of the data base and the quality of the models should be analyzed by NRC staff, and this information should be made available for the Commission decision and comment process at the time that the technical site suitability is transformed into a recommendation to be made to the President.

Response:

As discussed above with regard to the ACNW's third concern, the staff is pursuing focused audits of DOE activities related to the key technical issues that the staff believes may be unresolved or difficult to resolve at the time of license application. These proactive reviews, including site visits, will facilitate early awareness of the status of data and modeling related to site characterization. During key DOE activities related to these issues (e.g., the ongoing elicitation of volcanic probabilities) NRC staff will summarize its observations and concerns in a letter report to DOE, in order to provide timely feedback on the sufficiency of DOE's evaluation of these issues. To the extent that completion of a focused audit intersects with completion of an AO review, the letter to DOE will be the vehicle for forwarding the PER, discussed above. It is the staff's intent to continually review the list of key technical issues and to revise it as appropriate when issues are resolved or when the relative status of issues changes. Additionally, the staff's review of the AO, particularly as it is able to address a key technical issue, provides an avenue for its regular review of the DOE data base and for analysis of DOE models. Regarding DOE codes and models, the staff continues its iterative performance assessment program and will review DOE's future total system performance assessments, as part of the AO review. As discussed above, the staff plans to document its reviews in the PERs. The audit process involving focused review of key issues, interactions with DOE, and timely feedback will provide a sound technical basis for the Commission's recommendation to the President on technical site suitability.