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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
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June 2, 1999

Ms. Barbara A. Mazurowski, Director  
U.S. Department of Energy  
West Valley Area Office  
P.O. Box 191  
West Valley, NY 14171-0191

Dear Ms. Mazurowski:

U.S. Nuclear Regulatory Commission (NRC) contractor (Center for Nuclear Waste Regulatory Analysis or Center) personnel have completed their review of the "Outline for the Long-term Performance Assessment Methods Document" and "Outline for Chapter 8: The High-Level Waste Tanks Integrated Impacts Code" (PER370). The Center's comments are enclosed.

Since NRC is authorized to prescribe decommissioning criteria for the West Valley Demonstration Project, and due to the fact that the project facilities will ultimately return to NRC regulation, NRC staff recommends that these comments be considered in any revisions to NRC32.

NRC staff will comment on these outlines after the Staff Requirements Memorandum on decommissioning criteria for West Valley is issued by the Commission. If you have any questions, please contact Jack Parrott at 301-415-6700.

Sincerely,

John W. N. Hickey, Chief  
Decommissioning Branch  
Division of Waste Management  
Office of Nuclear Material Safety  
and Safeguards

Project No. M-32

Enclosure: As stated

cc: P. Piciulo, NYSERDA  
P. Merges, NYSDEC

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# COMMENTS ON THE U. S. DEPARTMENT OF ENERGY OUTLINE FOR THE LONG-TERM PERFORMANCE ASSESSMENT METHODS DOCUMENT

The U.S. Department of Energy (DOE) Outline for the Long-Term Performance Assessment Methods Document (Outline) presents a detailed and proactive approach to addressing Nuclear Regulatory Commission (NRC) and Center for Nuclear Waste Regulatory Analyses (CNWRA) comments on the conceptual approach to performance assessment (CAPA) for the West Valley site. General comments are provided on the Outline overall, and specific comments are provided for individual Outline chapters, where appropriate.

## GENERAL COMMENTS

### Comment 1:

Chapter groupings 3 through 7 and 8 through 13 should be prepared and then reviewed in parallel rather than sequentially.

### Basis:

Chapters 3 through 7 are referred to as the second review module. These chapters establish inputs for the dose modeling. Chapters 8 through 13 are termed the third review module. These chapters will present the methods used for the integrated site specific models.

The letter forwarding the Outline implies that the second and third review modules would be prepared and submitted for review sequentially. Reviewing the adequacy of data outside of the context of the models that will use the data is not a sound technical approach. The review of model inputs should be conducted in parallel with the review of the models, including the model algorithms and computer code module integration. The CNWRA understands that much of the modeling has been completed. If this is true, the parallel review of the model inputs and the models would be a normal procedure. A parallel review would also better support the proposed DOE schedule for completing the environmental impact statement (EIS).

### Comment 2:

The Performance Assessment Methods Document (PAMD) that will be developed from the Outline should provide additional information on and analysis of the EIS alternatives.

### Basis:

Closure alternatives are addressed in chapter 1 of the Outline and are not mentioned subsequently. The alternatives are sufficiently different that analyzing them for selection of a preferred alternative may require different conceptual approaches. The CNWRA assumes that the selection of a preferred alternative required analyses of each alternative. These analyses and their related assumptions, base cases and variations, and results should be fully documented in the PAMD or in the EIS. This documentation should include confidence estimates for the results, even if they are qualitative; and modeling uncertainties. This information is important because receptor doses, not just cost, are a key to selection of the preferred alternative.

Comment 3:

The Outline should address the performance of the total system and the development of the total system code.

Basis:

The Outline appears to emphasize the modeling and performance of individual waste management areas (WMA). Specifically, chapters 8 through 11 seem limited to individual WMAs. The performance assessment (PA) should address the performance of the West Valley site in totality, and a methodology should be developed to integrate, superimpose, or otherwise combine the influences of all WMAs on radiological health and safety. In some instances, there may be radionuclide source term and groundwater flow interactions among WMAs.

In addition to the physical processes that may effect more than one WMA, the total system code should manage interfaces of data and parameters. For example, data transfers among system code modules should be documented, means must be provided to check intermediate results to ensure correct functioning of the code, and the consistent use of parameter values among modules should be demonstrated. The analysis of uncertainty and sensitivity for the total system code results should also be presented.

Comment 4:

Streamline the discussion of computer code quality assurance (QA) measures and expand the scope of QA measures to include data gathering and processing.

Basis:

Standard QA controls for computer code development can be applied generically. The description of these controls could be provided in chapter 2. Subsequent chapters of the PAMD would not need to address generic QA procedures.

QA controls that have been applied to data collection, processing, and analysis should also be presented. Quality of data can become an issue during EIS review and during any subsequent licensing action. Quality controls on data should also be described. It is recognized that over the history of data collection and processing at the West Valley site, not all data may have been properly qualified. Consequently, the quality of data and the process for addressing use of unqualified data should be included in the PAMD.

Comment 5:

Provide clarification of the approach to uncertainty and sensitivity analysis in the Outline.

Basis:

The Outline discusses "prudently conservative" values or estimates. Outline section 2.7.5 and chapter 15 are planned to contain discussions of "deterministic sensitivity analysis." The NRC guidance on PAs recommends the use of probabilistic uncertainty and sensitivity analysis unless conservative, bounding, deterministic analyses can be shown to be appropriate. Considering the complexity of the West Valley site,

a probabilistic method that considers the many combinations of uncertain parameters and that, therefore, gives a more thorough presentation of the range and likelihood of dose values would seem to be most appropriate. The Outline indicates that only individual parameters would be varied to assess the effects on performance, but such an approach may be too simplistic for this site.

The general approach to uncertainty and sensitivity analysis could be presented in one location in the Outline (possibly chapter 2). The individual chapters could then present the details of parameter and model uncertainties for the specific topics being addressed.

The PAMD must contain an adequate rationale for the extent to which probabilistic or deterministic sensitivity or uncertainty analysis will be used.

Comment 6:

Clarify the scope of applicability for the models in chapters 8, 9, and 10.

Basis:

The descriptions of chapters 8, 9, and 10 indicate that they will address individual WMAs or specific groups of WMAs. However, it seems likely that certain WMAs would fit within more than one chapter. For example, the solubility limited release models that are addressed in chapter 9 would seem to be applicable to the release scenarios for the high-level waste tanks that are addressed in chapter 8. If models for certain WMAs will be addressed in more than one chapter, then the Outline should demonstrate that the model results will be appropriately combined and assessed somewhere in the final PAMD.

## **CHAPTER-SPECIFIC COMMENTS**

### Chapter 2: Conceptual Approach to Performance Assessment

- (1) The outline for chapter 2 does not seem to address the combination of effects from the various WMAs. However, there are locations on and off the site where contributions to the radionuclide source term are made from multiple WMAs or where hydrologic influences exist from other WMAs. The CAPA should address these instances to provide an integrated site PA. The integrated site PA would also allow a more useful analysis of the time and value of peak dose, because it would consider the integrated effects from all WMAs over time.
- (2) Chapter 2 should include a discussion of the compliance strategy. This strategy should identify the system components for which credit will be taken in the PA, those for which no credit will be taken, and the manner in which degraded component performance will be addressed in the PA.

### Chapter 3: Site Conceptual Model

- (1) The description of the concept of groundwater hydrology is presented in much greater detail than are the descriptions of the other factors that must be considered for the site. Similar

levels of detail are appropriate for the other factors (e.g., surface water hydrology, meteorology, and earthquakes).

- (2) The review objectives for chapter 3 include evaluations of the results of groundwater modeling. Results of other modeling efforts should be included (e.g., surface water hydrology, meteorology, and earthquakes).

Chapter 12: Erosion and Erosion Scenario Modeling

- (1) The content of this chapter should reflect the requirement to integrate erosion modeling with specific WMA radionuclide release rate modeling and to then integrate release calculations for the entire site.
- (2) Clarify the meaning of the phrase "integrated code for erosion impacts." It is not clear whether this phrase refers to an integration of erosion effects over the entire site or to the integration of erosion modeling with dose modeling.

Chapter 14: Results for Base Cases:

- (1) The Outline description for this chapter implies that the results will be presented for each WMA. This chapter, or a separate chapter, should contain integrated site-wide results.

Chapter 15: Sensitivity and Uncertainty Analysis

- (1) DOE should consider addressing sensitivity and uncertainty analysis not only in this chapter but also in the individual modeling chapters. In that manner, model-specific uncertainties can be adequately presented in other chapters, and chapter 15 can serve as a sensitivity and uncertainty evaluation for the entire site and the total system code results.