



**Department of Energy**  
Office of Civilian Radioactive Waste Management  
Yucca Mountain Site Characterization Office  
P.O. Box 30307  
North Las Vegas, NV 89036-0307

*Ticket  
for  
M. Bell -*

JAN 08 1998

**OVERNIGHT MAIL**

John T. Greeves, Director  
Division of Waste Management  
Office of Nuclear Material Safety  
And Safeguards  
U.S. Nuclear Regulatory Commission  
Two White Flint North  
Rockville, MD 20852

**IDENTIFICATION OF KEY DOCUMENTS RELEVANT TO U.S. DEPARTMENT OF ENERGY'S (DOE) VIABILITY ASSESSMENT (VA)**

As you know, the Office of Civilian Radioactive Waste Management (OCRWM) will issue the VA in late FY 1998. The VA will reference supporting technical documents prepared by OCRWM and our contractors. In order to facilitate your review of the VA we plan to make these supporting documents available to you as they are accepted by DOE.

There is a subset of these documents that we believe will be especially useful in facilitating such review. Enclosed is a list of these key supporting documents and a schedule for their availability. The list also shows the schedule for completing the VA. Our goal is to ensure the U.S. Nuclear Regulatory Commission (NRC) is aware of these supporting documents to enable you to focus reviews on these key areas prior to DOE's transmittal of the VA to Congress. After the Congressional submittal, the NRC and other interested parties will have the opportunity to examine the VA.

As you receive these documents, we can schedule meetings between our staffs, as needed, to discuss any feedback you may have. We propose that the technical areas discussed in these products could contribute to the framework and schedule for future interactions on the VA.

In addition to the document list, we have included a table with the relevant NRC Key Technical Issue (KTI) listed for each document. This table is not meant to indicate that these documents will explicitly or completely address the related KTI, but that the document contains information that is relevant to that KTI. The table is included for the convenience of your staff and reviewers.

As you are aware, DOE will continue to evaluate the science, design, and performance assessment of Yucca Mountain after the VA. We expect to update information from these evaluations after the VA and will, of course, continue to focus our interactions on these evaluations as we approach License Application.

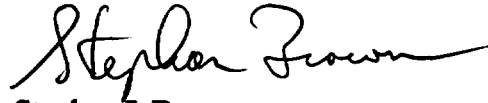
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JAN 08 1998

Please direct comments on this letter or the enclosures to J. Timothy Sullivan, at (702) 794-5589 or April V. Gil, of my staff at (702) 794-5578.



Stephan J. Brocoun  
Assistant Manger for Licensing

AML:AVG-0396

Enclosures:

1. Key Fiscal Year 1997 and 1998 Deliverables  
Relevant To The Viability Assessment
2. Correlation Between Key Fiscal Year 1997  
And 1998 Deliverables Relevant To The VA  
And The NRC KTI

cc w/encls:

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**KEY FISCAL YEAR 1997 AND 1998 DELIVERABLES  
RELEVANT TO THE VIABILITY ASSESSMENT  
U.S. Department of Energy - Yucca Mountain Site Characterization Office**

**I. VIABILITY ASSESSMENT DESIGN**

*Fiscal Year 1997*

**RP120MG1R1      VA Design and Review Plan      3/14/97**

A description of the design-related topics and issues important to the VA and a description of the issue resolution strategy and planned progress.

**RP120M3E      Subsurface Engineered Barrier      3/31/97**  
**Segment Design**

Includes underground portion of the engineered barrier segment design - integrated with performance assessment, seismic and testing needs, materials identification, structural needs and engineered barrier placement methods.

**WP0035A3      Waste Form Characteristics Report,      4/7/97**  
**Rev 1**

Up-to-date information on waste form materials testing and modeling activities. Preliminary models will be presented for spent fuel oxidation, spent fuel and HLW glass dissolution, and release under both saturated and unsaturated conditions.

**RP120M3      Subsurface Development Design      7/31/97**

Depicts information on subsurface development design including layout and configuration of ramps, shafts, and drifts; alcoves and support areas. Will show the emplacement area, design basis maximum thermal load, and emplacement strategy.

**WP220754      EBS/WP Materials Selection Analysis      8/15/97**

Describes the materials selection process, selection criteria, results ratings, and the selected materials for components of the engineered barriers.

**SE9272M4**

**Reference Design Description for  
a Geologic Repository - Update**

**9/30/97**

Describes the current design expectations for a potential repository that could be located at Yucca Mountain. Includes surface, subsurface, and disposal container design descriptions.

*Fiscal Year 1998*

**RP742BM3**

**Site Layout Analysis**

**5/2/98\***

This analysis will be developed, as necessary, as a revision to an existing analysis to reflect changes to the site layout including: location of surface facilities, site infrastructure, site facilities, and major site features.

**SE420M3**

**Final VA Test and Evaluation Plan**

**5/31/98**

Update the current revision of the VA T&EP to 1) incorporate the latest design information to be used for VA, and 2) refine to the extent possible the test identification and description sheets contained in the appendices of the draft VA T&EP.

**SE422AM3**

**MGDS-Requirements Document  
Update for Final VA Design**

**8/1/98**

This Document will capture the applicable program and project requirement changes that have occurred since the last revision. Applicable laws and regulations identified in Appendix C of the CRWMS Requirements Document, Revision 3, will be evaluated for applicability to the MGDS and specifically included in the MGDS-RD.

**RP240M3**

**Subsurface HVAC**

**8/31/98**

Preliminary design for the subsurface ventilation system to be used during construction of the mains, emplacement drifts, ventilation raises, shafts, and other openings.

**WP20BM3**

**Waste Form Characteristics  
Report Update**

**9/31/98**

Preliminary degradation process models and up-to-date test data that describe the performance of commercial spent fuel, borosilicate glass waste, and the degradation behavior of additional waste forms (e.g., DOE SNF, Naval fuel, and surplus weapons-useable fissile materials). Also includes cladding degradation, colloid stability testing, and actinide solubility tests and parameters.

**WP20AM3**

**Engineered Materials Characteristics  
Report Update**

**9/31/98**

Most recent test data and model development for humid air, aqueous film, dripping, microbial, and radiolytic environments. Also degradation due to pitting, stress corrosion cracking, oxidation, and hydrogen embrittlement. Corrosion-allowance and corrosion-resistant barriers; ceramic and zirconium outer layers; and galvanic protection also included.

*Fiscal Year 1999*

**RP237M3**

**Waste Emplacement Design**

**10/14/98**

Drawings that depict the latest information on waste emplacement design, showing changes and revisions in the waste package and thermal management strategy and design. The drawings will also depict and approach for utilizing several emplacement drifts to facilitate distribution of the waste packages to meet desired thermal loading goals.

**II. TOTAL SYSTEM PERFORMANCE ASSESSMENT - VIABILITY ASSESSMENT**

*Fiscal Year 1997*

**SL5X4B1M**

**Unsaturated-Zone Flow Model  
Expert Elicitation Project**

**5/30/97**

Expert Elicitation report to quantify uncertainties in the UZ flux estimates.

**SP24CBM3**

**Site Saturated Zone Site  
Flow Model**

**6/9/97**

The unsaturated-zone three-dimensional, site-scale flow model, including model code, inputs and outputs, calibration results, possible uses and limitations, sensitivities and uncertainties.

**SLSR500M**

**First Interim Report - Total System  
Performance Assessment Peer Review  
Panel (Submit TSPA Orientation Peer  
Review Interim Report)**

**6/18/97**

The TSPA-VA Peer Review provides interim reports on their comments, concerns, conclusions and recommendations at the conclusion of each of the first three phases of the review. The first phase of the review focuses on the an orientation for the review panel on the TSPAs completed to date (through TSPA-1995) and the project in general.

**SL230B1D                      TSPA-VA Methods and Assumptions                      8/13/97**

Discusses the approach to be taken in TSPA-VA, the major assumptions adopted, a description of the software to be used, appropriate verification tests of the software. Also discusses the features, event, and processes (FEPs) to be evaluated, the rationales for FEPs not evaluated.

**SL5X4E1M                      Waste Package Degradation                      8/15/97**  
**Expert Elicitation Project**

Expert Elicitation Panel report on waste package degradation.

**SP25BM3                      Site-Scale Unsaturated-Zone Transport                      8/29/97**  
**Model of Yucca Mountain**

Contains a conceptual model of the transport of radionuclides in the unsaturated zone, including 2- and 3-D integrated transport calculations and sensitivity analyses. Both equivalent continuum and dual permeability calculations will be made.

**SP25CM3A                      Saturated-Zone Radionuclide                      8/29/97**  
**Transport Model**

Includes a conceptual model of the transport of radionuclides in the saturated zone down-gradient from Yucca Mountain to the accessible environment, including 2- and 3-D integrated transport calculations and sensitivity analyses. Both equivalent continuum and dual permeability calculations will be made.

**SP3100M3                      Near-Field and Altered-Zone                      9/19/97**  
**Environment Report, Vol. 1:**  
**Technical Bases for EBS Design,**  
**Rev. 1**

The input to the Near-Field Environment Report (NFER) will include appropriate updates of the existing NFER Vol 1, Rev 0 chapters and new chapters as required.

***Fiscal Year 1998***

<b>SL5X4AM3</b>	<b>Saturated-Zone Flow and Transport Expert Elicitation Report</b>	<b>10/31/97</b>
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Expert Elicitation Panel report on saturated-zone and transport.

<b>M2ER</b>	<b>Second Interim Report - Total System Performance Assessment Peer Review Panel (Complete Process Model Review/Second Interim Report)</b>	<b>2/15/98</b>
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The TSPA-VA Peer Review provides interim reports on their comments, concerns, conclusions and recommendations at the conclusion of each of the first three phases of the review. The second phase of the review focuses on the modeling, scenarios, and abstractions that provide the bases for developing the TSPA-VA.

<b>SL230GM3</b>	<b>TSPA-VA Base Case Results</b>	<b>3/30/98</b>
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Presents the results of the TSPA-VA base case analyses. Includes a discussion of the final structure of the TSPA base case, with inputs and results, a preliminary list of sensitivities, and a discussion of the follow-up work needed to complete the TSPA-VA.

<b>SP3100M3</b>	<b>Near-Field Environment Models Report</b>	<b>6/30/98</b>
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The near-field models include: (1) thermomechanics; (2) thermohydrology; (3) thermochemistry; (4) near-field transport. These models describe the NFE and provide input to the TSPA-VA.

<b>SL5X41CM</b>	<b>Thermohydrology Expert Report</b>	<b>7/29/98</b>
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Expert Elicitation Panel report on thermohydrology.

<b>SL5X40M3</b>	<b>Waste Form Dissolution Expert Report</b>	<b>7/29/98</b>
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Expert Elicitation Panel report on waste form dissolution.

<b>SP39FBM3</b>	<b>Site Description Document</b>	<b>8/31/98</b>
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The Site Description Document will present information on the natural system at Yucca Mountain with an emphasis on those aspects that are relevant to waste containment and isolation, and that support design of a potential geologic repository and the assessment of its performance.



**M21M**

**Third Interim Report - Total System  
Performance Assessment Peer Review  
Panel**

**9/15/98**

The TSPA-VA Peer Review provides interim reports on their comments, concerns, conclusions and recommendations at the conclusion of each of the first three phases of the review. The third phase of the review focuses on the draft and final documentation of abstraction activities and the preliminary results of the TSPA-VA calculations.

**III. LICENSE APPLICATION PLAN**

*Fiscal Year 1997*

**SL300H**

**License Application Management Plan**

**9/24/97**

Describes the work planned between Viability Assessment and License Application, including the associated costs and schedules.

*Fiscal Year 1998*

**SL05X7A9**

**Repository Safety Strategy: Strategy for  
Protecting Public Health and Safety after  
Permanent Closure, Rev 1 (Waste  
Containment and Isolation Strategy)**

**2/1/98\*\***

Presents highlights of the DOE's SPPHS (WCIS), which is the process for iteratively developing the safety case for the postclosure repository system. This Document is updated as new site, design, and performance information dictates, or when regulatory changes provide impetus for rethinking aspects of the strategy.

**[DOE/HQ]**

**Strategic Plan and Program Plan Update**

**3/98**

OCRWM portion of DOE strategic plan to accompany FY99 Congressional budget submittal.

SL05X7B7

**Repository Safety Strategy: Strategy for  
Protecting Public Health and Safety after  
Permanent Closure, Rev 2 (Waste  
Containment and Isolation Strategy)**

9/15/98

Presents highlights of the DOE's SPPHS (WCIS), which is the process for iteratively developing the safety case for the postclosure repository system. This Document is updated as new site, design, and performance information dictates, or when regulatory changes provide impetus for rethinking aspects of the strategy.

**IV. VIABILITY ASSESSMENT LIFE CYCLE COST ESTIMATE**

The DOE understands that the NRC has no interest in the VA Cost Estimate and has no intention of reviewing this product. Therefore, no supporting deliverables are identified here.

**V. VIABILITY ASSESSMENT MANAGEMENT PLAN**

*Fiscal Year 1998*

[TBD]

**Annotated Outline for the Viability  
Assessment Product Management Plan**

2/98

The VA management plan provides a detailed road map of the M&O and DOE's development of the VA product elements.

*\*: Product dates indicated are anticipated delivery dates to the NRC (baseline date plus one month)*

*\*\* : Estimate*

**Correlation Between Key Fiscal Year 1997 and 1998 Deliverables Relevant to the Viability Assessment and the U.S. Nuclear Regulatory Commission Key Technical Issues**

Deliverable Identification	Title	Complete Date	NRC KTIs <sup>1</sup>									
			1	2	3	4	5	6	7	8	9	10
VIABILITY ASSESSMENT DESIGN												
RP120MG1R1	VA Design and Review Plan	4/14/97										
RP120M3E	Subsurface EBS Design	4/31/97										
WP0035A3	Waste Form Characteristics Report, Rev 1	5/7/97										
RP120M3	Subsurface Development Design	8/31/97										
WP220754	EBS/WP Materials Selection Analysis	9/15/97										
SE9272M4	Reference Design Description for a Geologic Repository, Rev 1	10/30/97										
RP742BM3	Site Layout Analysis	4/2/98										
SE420M3	Final VA Test and Evaluation Plan	4/31/98										
SE422AM3	MGDS-Requirements Design Document Update for Final VA Design	7/1/98										
WP20BM3	Waste Form Characteristics Report Update	7/31/98										
WP20AM3	Engineered Materials Characteristics Report Update	7/31/98										
RP240M3	Subsurface HVAC	8/31/98										
RP237M3	Waste Emplacement Design	9/14/98										
TOTAL SYSTEM PERFORMANCE ASSESSMENT - VIABILITY ASSESSMENT												
SL5X4B1M	Unsaturated-Zone Flux Uncertainty Characterization Report	6/30/97										
SP24BM3	Unsaturated-Zone Site Flow Model	7/9/97										
SLSR500M	First Interim Report - TSPA Peer Review Panel	7/20/97										
SL5X4E1M	Waste Package Degradation Report	9/15/97										
SP300M3	Near-Field Environment Report, Vol 1, Rev 1	9/19/97										
SP25BM3	Final Unsaturated-Zone Transport Model	9/29/97										
SP25CM3A	Final Saturated-Zone Transport Model	9/29/97										
SL230B1D	TSPA-VA Methods and Assumptions	12/13/97										
SLX4AM3	Saturated-Zone Flow and Transport Expert Report	11/30/97										

Deliverable Identification	Title	Complete Date	NRC KTIs <sup>1</sup>									
			1	2	3	4	5	6	7	8	9	10
SR520M2	Second Interim Report - TSPA-VA Peer Review Panel	1/15/97										
SL230GM3	TSPA-VA Base Case Results	2/28/98										
SP3100M3	Near-Field Environment Models Report	4/30/98										
SLX41CM	Thermohydrology Expert Report	6/29/98										
SL5XDM3	Waste Form Dissolution Expert Report	6/29/98										
SR520M2	Third Interim Report - TSPA-VA Peer Review Panel	8/15/98										
SP39FBM3	Site Description Document	8/31/98										
LICENSE APPLICATION PLAN												
SL300H	Work Description for Multi-Year Project Summary Schedule	10/30/97	Not Applicable									
SL05X7A9	Repository Safety Strategy: Strategy for Protecting Public Health and Safety after Permanent Closure (WCIS), Rev 1	12/17/97	Not Applicable									
[DOE/HQ]	Strategic Plan and Program Plan Update	2/98	Not Applicable									
SL05X7B7	Repository Safety Strategy: Strategy for Protecting Public Health and Safety after Permanent Closure (WCIS), Rev 2	8/15/98	Not Applicable									
VIABILITY ASSESSMENT MANAGEMENT PLAN												
[TBD]	VA Management Plan Annotated Outline	1/98	Not Applicable									

<sup>1</sup> U.S. Nuclear Regulatory Commission Key Technical Issues:

- 1 = Igneous activity
- 2 = Structural deformation and seismicity
- 3 = Evolution of the near-field environment
- 4 = Container life and source term
- 5 = Thermal effects on flow
- 6 = Repository design and thermomechanical effects
- 7 = Total system performance assessment and integration
- 8 = Activities related to development of EPA Yucca Mountain standard
- 9 = UZ and saturated flow under isothermal conditions
- 10 = Radionuclide transport

# Summary Schedule for Completion of the Viability Assessment

