

**DOE Reports Involving Seismic  
Activity At Yucca Mountain**

**Prepared For:**

**Lincoln County Nuclear Waste Oversight Office**

**And**

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**September 2007**

## Examples of DOE Reports Involving Seismic Activity At Yucca Mountain





### 1988

**DOE** [NUCLEAR WASTE POLICY ACT \(SECTION 113\) -- SITE CHARACTERIZATION PLAN, YUCCA MOUNTAIN SITE, NEVADA RESEARCH AND DEVELOPMENT AREA DOE/RW-0199 VOLUMES I - IX \(C\)](#)

LSN #: DEN000873004 Participant #: HQO.19881201.0002 Document Date: 12/01/1988     NUCLEAR WASTE POLICY ACT (SECTION 113) -- SITE CHARACTERIZATION PLAN, YUCCA MOUNTAIN SITE, NEVADA RESEARCH AND DEVELOPMENT AREA DOE/RW-0199 VOLUMES I - IX (C). Table 8.3.3.2-2.





### 1991

**DOE** [DEPARTMENT OF ENERGY RESPONSES TO RECOMMENDATIONS IN THE NUCLEAR WASTE TECHNICAL REVIEW BOARD'S SECOND REPORT EFFECTS OF SEISMICITY AND FAULTING ON FACILITY DESIGN AND SUITABILITY PRELIMINARY DRAFT](#)





LSN #: DEN001297908 Participant #: ALC.20040511.4142 Document Date: 02/27/1991     Response The DOE agrees that the engineering, public safety, and environmental consequences of seismic events and other natural hazards are included in the basis for determining the suitability of a site or a design.

### 1995

**DOE** [SEISMIC RESPONSE OF ROCK JOINTS AND JOINTED ROCK MASS](#)





LSN #: DN2002324900 Participant #: MOL.20061108.0330 Document Date: 06/01/1995     SEISMIC RESPONSE OF ROCK JOINTS AND JOINTED ROCK MASS All seismic events did not produce measurable hydrologic effects during the field studies. In general, the magnitude of groundwater pressure change increased as the event magnitude increased.

**DOE** [SIGNIFICANT SITE AND DESIGN ISSUES IDENTIFIED IN TOTAL SYSTEM PERFORMANCE ASSESSMENTS OF YUCCA MOUNTAIN; NRCTEPA.PPT](#)

LSN #: DEN001400750 Participant #: ALB.20040610.8139 Document Date: 11/07/1995     SIGNIFICANT SITE AND DESIGN ISSUES IDENTIFIED IN TOTAL SYSTEM PERFORMANCE ASSESSMENTS OF YUCCA MOUNTAIN; NRCTEPA.PPT . Significant Site and Design Issues Identified in Total System Performance Assessments of Yucca Mountain Dr. Abraham Van Luik Team

### 1996





**DOE** [YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT LONG-RANGE PLAN B00000000-01717-4600-00061 REVISION 00 AUGUST 1996](#)

LSN #: DN2001967932 Participant #: MOL.19970211.0056 Document Date: 08/01/1996     YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT

LONG-RANGE PLAN B00000000-01717-4600-00061 REVISION 00 AUGUST 1996.  
Long Range Plan/Integrated Project Schedule Activity Description and Supporting  
Information PSS ID No: WP050 PSS Title: EBS Design –

**1999**





**DOE** [ANNOTATED OUTLINE CONSEQUENCES OF TECTONIC EVENTS FOR PERFORMANCE ASSESSMENT & ANNOTATED TABLE OF CONTENTS/OUTLINE CONSEQUENCES OF TECTONIC EVENTS FOR PERFORMANCE ASSESSMENT; Annotated Outline-Disruptive Events Report-RevA](#)

LSN #: DN2000716165 Participant #: ALE.20050228.6625 Document Date: 04/17/1999    

The consequence analyses will rely on inputs from the probabilistic volcanic and probabilistic seismic hazard analyses to describe the frequency of disruptive events. Incremental effects of seismic ground motion on rockfall will be described.





**DOE** [DRAFT I & TETONIC HAZARDS PROCESS MODEL REPORT; Tec Haz PMR AO-I](#)

LSN #: DN2001447901 Participant #: ALJ.20050308.5065 Document Date: 05/16/1999

    SUMMARY OF OTHER VIEWS & ALTERNATIVE CONCEPTUAL MODELS This section documents credible alternative views to the approaches and methods used to model and describe the effects of seismic and volcanic events on a geologic repository at Yucca Mountain.





**DOE** [Tec Haz PMR AO-I](#)

LSN #: DN2001746211 Participant #: ALI.20040615.5335 Document Date: 05/16/1999

    Tec Haz PMR AO-I. 3.6 SUMMARY OF OTHER VIEWS & ALTERNATIVE CONCEPTUAL MODELS This section documents credible alternative views to the approaches and methods used to model and describe the effects of seismic and volcanic events on a geologic





**DOE** [SPECIFICATION DEFINITION SHEET & SPECIFICATION TITLE: DISRUPTIVE EVENTS MODELING REPORT & ELEMENT TITLE: PROCESS MODEL REPORTS & SUBPRODUCT TITLE: SUITABILITY CRITERIA COMPLIANCE EVALUATION & PRODUCT TITLE: SITE RECOMMENDATION; Disruptive Events Revised 7-13-99](#)

LSN #: DEN001460399 Participant #: ALM.20040612.2923 Document Date:

05/28/1999     In the case of seismic and volcanic activity, the report will summarize the consequences of seismic and volcanic events that potentially could affect a geologic repository at Yucca Mountain.





**DOE** [1,000 YEAR SEISMIC RECURRENCE INTERVAL INVOLVED IN PFS'S REQUEST FOR EXEMPTION TO 72.102\(F\)\(1\) SEISMIC DESIGN REQUIREMENT FOR THE PRIVATE FUEL STORAGE FACILITY; LOGIC](#)

LSN #: DN2001353387 Participant #: ALC.20050308.4572 Document Date:

07/08/1999     As stated above, risk is determined by factoring the probability of an event and its consequences. Since there are no radiological consequences of seismic events, an earthquake produces zero risk.





**DOE** [YUCCA MOUNTAIN PROJECT SUMMARY SCHEDULE MILESTONE DESCRIPTION AND SUPPORTING INFORMATION & PSS TITLE: INTEGRATED SITE MODEL PROCESS MODEL REPORT FOR SR \(INTEGRATED SITE MODEL PMR FOR SR\) & PSS TITLE: UNSATURATED ZONE PROCESS MODEL REPORT FOR SR \(UZ PMR FOR SR\) & PSS TITLE: SATURATED ZONE PROCESS MODEL REPORT FOR SR \(SZ PMR FOR SR\) & PSS TITLE: TECTONICS PROCESS MODEL REPORT FOR SR \(TECTONICS PMR FOR SR\); CR99RAS2](#)

LSN #: DN2001338428 Participant #: ALA.20050321.4176 Document Date:

08/04/1999     Disruptive events to be considered include seismic and volcanic activity, human intrusion, and criticality. The consequence models for those disruptive events included in the TSPA analyses must be clearly documented, defensible and traceable.





**DOE** [ELEMENT DEFINITION SHEET & ELEMENTS TITLE: SITE CHARACTERIZATION DESCRIPTION FOR SR & SUBPRODUCT TITLE: YUCCA MOUNTAIN SITE CHARACTERIZATION & REPOSITORY DESIGN \(SR REPORT VOLUME 1\) & PRODUCT TITLE: SITE RECOMMENDATION & SPECIFICATION DEFINITION SHEET & SPECIFICATION TITLE: YUCCA MOUNTAIN SITE DESCRIPTION, REV. 01 & ELEMENT TITLE SITE CHARACTERIZATION DESCRIPTION FOR SR & SUBPRODUCT TITLE: YUCCA MOUNTAIN SITE CHARACTERIZATION & REPOSITORY DESIGN \(SR REPORT VOLUME 1\) & PRODUCT TITLE: SITE RECOMMENDATION & SPECIFICATION TITLE: NATURAL ANALOGUES & SPECIFICATION TITLE: NATIONAL RESOURCES & GEOLOGIC/HYDROLOGICAL TECHNICAL INPUTS TO THE FINAL ENVIRONMENTAL IMPACT STATEMENT & ELEMENT DEFINITION SHEET & ELEMENT TITLE SURFACE DESIGN DESCRIPTION & SUBPRODUCT TITLE: YUCCA MOUNTAIN SITE CHARACTERIZATION & REPOSITORY DESIGN \(SR REPORT VOLUME 1\) & PRODUCT TITLE: SITE RECOMMENDATION & ELEMENT TITLE SYSTEM ELEMENT FOR DESIGN & SPECIFICATION DEFINITION SHEET & SPECIFICATION TITLE: INTEGRATED](#)

LSN #: DN2001021163 Participant #: ALB.20040617.6410 Document Date:

08/20/1999     In the case of seismic and volcanic activity, the report will summarize the consequences of seismic and volcanic events that potentially could affect a geologic repository at Yucca Mountain.





**DOE** [Large magnitude earthquakes](#)

LSN #: DEN001279936 Participant #: ALY.20040617.3943 Document Date:





10/01/1999     I think the problem here may lie in some unfortunate preconceptions about how seismic event screening would turn out. We could even get fancy, and allow multiple seismic events, changing the seepage field accordingly.

**2000**





**DOE** [ADDRESSING NUCLEAR REGULATORY COMMISSION KEY TECHNICAL ISSUES & TABLE 4-1. NRC IRSR KTIS & TABLE 4-2. IRSR KTI TOTAL SYSTEM PERFORMANCE ASSESSMENT AND INTEGRATION SUBISSUES ADDRESSED BY DISRUPTIVE EVENTS ANALYSIS AND MODEL REPORTS AND CALCULATION & TABLE 4-3. IRSR KTI TOTAL SYSTEM PERFORMANCE ASSESSMENT AND INTEGRATION IRSR SUBISSUE 31 MODEL ABSTRACTION, ENGINEERED BARRIER SUBSYSTEM KEY ELEMENTS OF SUBSYSTEM NHE+R^ +INN COMPONENT, INTEGRATED SUBISSUES& ADDRESSED BY DISRUPTIVE EVENTS ANALYSES AND THE CALCULATION & TABLE 4-4. IRSR KTI IGNEOUS ACTIVITY PROBABILITY SUBISSUE ACCEPTANCE CRITERIA & TABLE 4-5. CONSEQUENCES SUBISSUE ACCEPTANCE CRITERIA FROM IRSR KTI: IGNEOUS ACTIVITY & TABLE 4-6. IRSR KTI STRUCTURAL DEFORMATION AND SEISMICITY REVISION 2 SUBISSUE FAULTING COMPONENTS ADDRESSED BY DISRUPTIVE EVENTS ANALYSIS AND MODEL REPORTS AND CALCULATION & TABLE 4-7. IRSR KTI STRUCTURAL DEFORMATION AND SEISMICITY REVISION 2 SUBISSUE SEISMICITY COMPONENTS ADDRESSED BY DISRU; DE PMR](#)

LSN #: DN2002005592 Participant #: ALA.20050423.2147 Document Date: 04/01/2000     Disruptive Events analyses contribute to feedback as models are analyzed, but do not address directly. Disruptive Events analyses use the models, but do TDR-NBS-MD-000002 REV 00 4-37 April 2000 ,





**DOE** [ANALYSES AND DEVELOPMENT OF CONCEPTUAL MODELS FOR DISRUPTIVE EVENTS; DE PMR Section 3 Rev 00C-COPY](#)

LSN #: DN2001762147 Participant #: ALB.20040615.6003 Document Date: 04/01/2000     ANALYSES AND DEVELOPMENT OF CONCEPTUAL MODELS FOR DISRUPTIVE EVENTS; DE PMR Section 3 Rev 00C-COPY In this 38 section of the Disruptive Events PMR, FEPs related to seismicity and structural deformation 39 will be discussed together.

**DOE** [PROPOSED INTERPRETATION OF SEISMIC CRITERIA FOR THE MGR; Seismic Criteria for the MGR](#)





LSN #: DN2000594659 Participant #: ALC.20050214.3712 Document Date: 03/08/2000     Design solution must mitigate the event or its consequences. Note 2--Interaction caution, If the Frequency Category-2 event causes radiological releases, which exceed limits of QL-1 or criticality, FC-2 seismic criteria must be applied. ,

**DOE** [APPENDIX B SUMMARY OF SCREENING DECISION AND BASIS INFORMATION CONTAINED REVISION 00 OF THE YUCCA MOUNTAIN PROJECT AND FEATURES, EVENTS, AND PROCESSES DATABASE; FEPS Screening Appendix B Redline\\_rev.doc](#)





LSN #: DEN001097328 Participant #: ALD.20040610.0419 Document Date: 08/01/2000     APPENDIX B SUMMARY OF SCREENING DECISION AND BASIS INFORMATION CONTAINED REVISION 00 OF THE YUCCA MOUNTAIN

PROJECT AND FEATURES, EVENTS, AND PROCESSES DATABASE; FEPS  
Screening Appendix B Redline\_rev.doc





**DOE** [OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT  
ANALYSIS/MODEL COVER SHEET & FEATURES, EVENTS, AND PROCESSES:  
DISRUPTIVE EVENTS; DE ANL-WIS-MD-000005 REV 00 ICN 1](#)

LSN #: DN2001069854 Participant #: ALM.20040617.2025 Document Date:  
11/01/2000     With the exception of fuel-rod-cladding damage, seismic  
vibration is of low consequence to dose. Ground motion associated with seismic events  
has the potential to disrupt the integrity of components of the EBS and waste packages.





**DOE** [OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT  
ANALYSIS/MODEL COVER SHEET & 4. TITLE: FEATURES, EVENTS, AND  
PROCESSES: DISRUPTIVE EVENTS & ATTACHMENT I GLOSSARY &  
ATTACHMENT II PRIMARY FEPS RELATIONSHIP TO SECONDARY FEPS KEY  
TECHNICAL ISSUES, AND INTEGRATED SUBISSUES; DE ANL-WIS-MD-000005  
REV 00 ICN 1](#)

LSN #: DN2001050925 Participant #: ALM.20040617.8816 Document Date:  
11/01/2000     With the exception of fuel-rod-cladding damage, seismic  
vibration is of low consequence to dose. Ground motion associated with seismic events  
has the potential to disrupt the integrity of components of the EBS and waste packages.





**DOE** [WHITE PAPER WITH COMMENTS FROM THE MRT ON 07.06-01,  
REVISION 00B CONSEQUENCES OF DISRUPTIVE EVENTS \(C\)](#)

LSN #: DN2001664926 Participant #: MOL.20020503.0390 Document Date:  
11/05/2001     SCR0515, EIS001888/0377, EIS001222/0001 } 14 Response 15  
The DOE considered disruptive events including seismic activity, volcanic (magmatic)  
intrusion and 16 volcanic eruption as part of their assessment of the repository  
performance.

**DOE** [FINAL CHECK AND PCG REVIEW COPY WITH DIRS SHEETS FOR  
REVISION 00, ICN 1E, ANL-WIS-MD-000005, FEATURES, EVENTS, AND  
PROCESSES: DISRUPTIVE EVENTS \(C\)](#)

LSN #: DEN001450430 Participant #: MOL.20010205.0334 Document Date:  
11/10/2000     Ground motion associated with seismic events has the potential to  
disrupt the integrity of components of the EBS and waste packages. With the exception  
of fuel-rod-cladding damage, seismic vibration is of low consequence to dose.




**DOE** [DISRUPTIVE EVENTS PROCESS MODEL REPORT, TDR-NBS-MD-000002,  
REVISION 00, ICN 02 \(C\)](#)

LSN #: DN2001640006 Participant #: MOL.20001220.0047 Document Date:  
12/01/2000     An example of a feature of interest in disruptive events analysis is  
fractures. Consequence is another term that is relevant to the discussion of disruptive  
events analysis and is defined in different ways by different entities.

## 2002





### **DOE** [PRECLOSURE SAFETY ANALYSIS GUIDE](#)

LSN #: DN2001908663 Participant #: ALF.20040511.2548 Document Date: 02/01/2002

   Each cutset will include, in addition to the initiating earthquake, one or more seismically-induced failures or random events. The list of minimal cutlets for each sequence reveals the seismically-induced failures that can result in the top event.





### **DOE** [PROPOSED SEISMIC SCENARIO DESIGN FOR TSPA-LA; TSPA-LA Seismic Design](#)

LSN #: DEN001489705 Participant #: ALY.20040617.7776 Document Date:



02/04/2002     Back to the Proposed TSPA Seismic Scenario Â· Can the seismic event be modeled as a single computational scenario with the event frequency and consequence distributions sampled independently?




### **DOE** [FIRST DRAFT COMPUTATIONAL STRATEGY FOR REPRESENTING SEISMIC EVENTS WITHIN THE NOMINAL SCENARIO; Seismic Sampling Strategy](#)

LSN #: DEN001492849 Participant #: ALY.20040617.7953 Document Date:

03/12/2002     The proposed approach is based on random sampling of a modified hazard curve that provides the proper representation for large magnitude seismic events, but under-represents small, low consequence seismic events.





### **NRC** [Part 2 of 2, DOE, Transmittal of Reports Addressing Key Technical Issues \(KT\), Appendix 7A Bibliography of Information Sources.](#)

LSN #: NRC000015064 Participant #: ML020980522 Document Date: 03/27/2002  

   Part 2 of 2, DOE, Transmittal of Reports Addressing Key Technical Issues (KT), Appendix 7A Bibliography of Information Sources.. EXTERNAL EVENTS 10-1 10.1SEISMIC ANALYSIS 10-1 10.1.1 Introduction 10-1 10.1.2 Overview of Approach 10-1 10.1.3 Details

### **DOE** [IMPLEMENTATION OF POSTCLOSURE GROUND MOTION ANALYSIS AND APPROACH FOR INCORPORATING GROUND MOTION HAZARD INITIATED EVENTS IN THE TSPA-LA MODEL; POSTCLOSURE GM TSPA\\_CS](#)

LSN #: DN2001858998 Participant #: ALH.20050308.1933 Document Date:

04/12/2002     The difference in sampling methods is illustrated in Table 1 for a hazard an event curve that spans annual frequencies of 10<sup>-4</sup> events per year to 1 event per year.


### **DOE** [SEISMIC CONSEQUENCE ANALYSIS FOR POSTCLOSURE VIBRATORY GROUND MOTION IN TSPA-LA; Seismic Scenario for TSPA-LA Rev06](#)

LSN #: DN2001991428 Participant #: ALA.20050426.7908 Document Date:


05/31/2002     SEISMIC CONSEQUENCE ANALYSIS FOR POSTCLOSURE VIBRATORY GROUND MOTION IN TSPA-LA; Seismic Scenario for TSPA-LA

Rev06 Given the similarities between igneous and seismic events, it is reasonable to follow a similar approach for seismic events.


**DOE** [Seismic Scenario for TSPA-LA Rev06](#)

LSN #: DN2001328327 Participant #: ALA.20050325.9831 Document Date: 07/11/2002  Given the similarities between igneous and seismic events, it is reasonable to follow a similar approach for seismic events. An alternate definition of event is an external process that does have a significant consequence on EBS components.


**DOE** [YUCCA MOUNTAIN PROJECT POSITION PAPER PRECLOSURE SEISMIC STRATEGY FOR CLASSIFICATION AND DESIGN OF SSC IMPORTANT TO SAFETY & YUCCA MOUNTAIN PROJECT POSITITON PAPER PRECLOSURE SEISMIC STRATEGY; Preclosure Seismic Design Strategy Doc w attach A](#)

LSN #: DN2002027803 Participant #: ALH.20040617.4281 Document Date: 09/16/2002  The frequency, or annual probability of occurrence, is estimated for each event sequence. Once PSA event sequences have been identified and their dose consequences evaluated, the PSA process identifies important-to-safety SSCs.





**DOE** [EXAMPLE OF SEISMIC EVENT TREE & APPLICATION OF SEISMIC EVENT TREE TO ASSIGNMENT OF DBGM FREQUENCY CATEGORIES TO SSCS ITS & LIMITED SCOPE SEISMIC RISK ANALYSIS EXAMPLE OF MODELING SEISMIC FAILURE EVENTS IN FAULT TREES; seismic event trees](#)

LSN #: DN2001387743 Participant #: ALD.20050308.8958 Document Date: 10/31/2002  Application of Seismic Event Tree to Assignment of DBGM Frequency Categories to SSCs ITS Seismic event sequences are defined using event tree. Cat. 2 ( $1 \times 10^{-4}$ ) to preclude the initiating event; confinement remains Freq.

**DOE** [ENCLOSURE 1 YUCCA MOUNTAIN PROJECT - PRECLOSURE SEISMIC STRATEGY FOR CLASSIFICATION AND DESIGN OF SYSTEMS, STRUCTURES, AND COMPONENTS IMPORTANT TO SAFETY & TABLE 1 RELATIVE RISK MATRIX DERIVED FROM 10 CFR 63 & TABLE 2. RELATIONSHIP BETWEEN RISK SIGNIFICANCE OF SSCS IMPORTANT TO SAFETY AND DESIGN BASIS GROUND MOTION LEVELS & TABLE 3. COMPARISON OF SEISMIC DESIGN BASES, RR, AND FAILURE PROBABILITIES & ATTACHMENT A EXAMPLES OF APPLICATION OF PRECLOSURE SEISMIC STRATEGY - HYPOTHETICAL CASESL. POSTULATED COLLAPSE OF HOTCELL CEILING ONTO RACK OF STAGED SPENT FUEL ASSEMBLIES \(DRY FACILITY\); Preclosure Seismic Design Strategy rev 00A7 DDO3x](#)





LSN #: DN2002027178 Participant #: ALD.20040615.5358 Document Date: 11/07/2002  The purpose of this additional category will allow the project to select appropriate medium and high risk significant SSCs important to safety for enhanced seismic design, based on a review of seismic event sequences and associated dose estimates.

**DOE** [ENGINEERED BARRIER SYSTEM DRAFT SUBMITTAL FOR MILESTONE TYPE 1 COMPLETE FEEDS OF PRELIMINARY INFORMATION TO TSPA-LA & 5. TSPA-LA MODEL COMPONENTS; Section-5 pbi ms1 ebs\\_rev00b](#)





LSN #: DN2001188737 Participant #: ALT.20040617.4035 Document Date: 12/11/2002     ENGINEERED BARRIER SYSTEM DRAFT SUBMITTAL FOR MILESTONE TYPE 1 COMPLETE FEEDS OF PRELIMINARY INFORMATION TO TSPA-LA & 5. TSPA-LA MODEL COMPONENTS; Section-5 pbi ms1 ebs\_rev00b . EBS MS Type 1 Rev00b, 12/11/02 LAMBDA\_MIN Minimum annual Seismic

## 2003





**DOE** [EBS TWP \(TWP-MGR-MD-000015 REV 03A\) VERBAGE COVERING THE SEISMIC CONSEQUENCE ANALYSIS. & YMRP ACCEPTANCE CRITERIA ADDRESSED IN AMRS WORK PACKAGE AEBM04/DRIFT DEGRADATION ANALYSIS MODEL; EBS TWP seismic info](#)

LSN #: DN2001318754 Participant #: ALC.20040612.7616 Document Date: 01/21/2003     EBS TWP (TWP-MGR-MD-000015 REV 03A) VERBAGE COVERING THE SEISMIC CONSEQUENCE ANALYSIS. Provide design support to TSPA for the seismic scenario. Table 19. TSPA-SR FEPs Associated with W P AEBM04/Seismic Consequences for EBS Components FEPs No.





**DOE** [YUCCA MOUNTAIN PROJECT - PRECLOSURE SEISMIC STRATEGY FOR CLASSIFICATION AND DESIGN OF SYSTEMS, STRUCTURES, AND COMPONENTS IMPORTANT TO SAFETY; PSS Report Final Rev 0](#)

LSN #: DN2002143795 Participant #: ALH.20040617.3979 Document Date: 02/01/2003     Some SSCs become ITS only because of potential seismically initiated event sequences, while other SSCs ITS will have been identified from analysis of event sequences initiated by non-seismic events.

**DOE** [Preclosure-Seismic-Strategy.doc](#)


LSN #: DN2001606959 Participant #: ALD.20040610.8932 Document Date: 02/07/2003     Some SSCs become ITS only because of potential seismically initiated event sequences while other SSCs ITS will have been identified from analysis of event sequences initiated by non-seismic events.

**DOE** [PSS Report Final Rev 0](#)


LSN #: DN2001748388 Participant #: ALD.20040615.5226 Document Date: 03/04/2003     Some SSCs become ITS only because of potential seismically initiated event sequences, while other SSCs ITS will have been identified from analysis of event sequences initiated by non-seismic events.

**DOE** [ANL-WIS-MD-000005 REVISION 02, FEATURES, EVENTS, AND PROCESSES: DISRUPTIVE EVENTS, NOVEMBER 2004 \(C\)](#)


LSN #: DN2001640013 Participant #: DOC.20041108.0002 Document Date:

11/08/2004  ANL-WIS-MD-000005 REVISION 02, FEATURES, EVENTS, AND PROCESSES: DISRUPTIVE EVENTS, NOVEMBER 2004 (C) Consequently, the FEP "Hydrologic response to igneous activity" is excluded from the TSPA-LA based on low consequence.


**DOE** [SEISMIC CONSEQUENCE ABSTRACTION & ATTACHMENT I SPREADSHEET FOR POINT B HAZARD CURVE & ATTACHMENT II REVIEW COMMENTS ON RESPONSE SURFACE FOR WASTE PACKAGE DAMAGE FROM VIBRATORY GROUND MOTION & ATTACHMENT III SPREADSHEET FOR WASTE PACKAGE DAMAGE ABSTRACTION & ATTACHMENT IV SPREADSHEET FOR DRIP SHIELD DAMAGE ABSTRACTION FROM ROCKFALL & ATTACHMENT V SPREADSHEET FOR FAULT DISPLACEMENT DAMAGE ABSTRACTION & ATTACHMENT VI REPRESENTATION OF ALEATORY AND EPISTEMIC UNCERTAINTY IN THE CALCULATION OF EXPECTED DOSE FROM SEISMIC EVENTS AT THE PROPOSED YUCCA MOUNTAIN FACILITY FOR THE DISPOSAL OF HIGH LEVEL RADIOACTIVE WASTE; Seismic Consequence 05-25-03 MDL-WIS-PA-000003 REV00b BackCheck](#)

LSN #: DN2001983965 Participant #: ALA.20050421.5176 Document Date: 05/01/2003  exp - t (VI-1) A A A MDL-WIS-PA-000003 REV 00B VI-7 of VI-20 May 2003 , Back Check Copy Seismic Consequence Abstraction is the probability that exactly n seismic events with a PGV exceeding v occur over a time interval of length t (yr).


**DOE** [1.2.5 SEISMIC CONSEQUENCES FOR EBS COMPONENTS & 1.2.6 MANAGEMENT AND INTEGRATION; TWP Section 1.2.5 Revisions 5-21-03](#)

LSN #: DN2000994600 Participant #: ALA.20050330.6837 Document Date: 05/21/2003  MDL- waste container WIS-PA-00003 1.2.03.01.0A Seismic Activity Engineered Barrier System: Seismic Consequence Model. MDL- WIS-PA-00003 1.2.03.02.0A Seismic vibration causes Engineered Barrier System: Seismic Consequence Model.




**DOE** [PRELIMINARY DRAFT & SEISMIC CONSEQUENCE ABSTRACTION; MDL-WIS-PA-000003 \(2.14 Copy with CSO Changes\)](#)

LSN #: DN2002133484 Participant #: ALA.20040617.5805 Document Date: 07/01/2003  PRELIMINARY DRAFT & SEISMIC CONSEQUENCE ABSTRACTION; MDL-WIS-PA-000003 (2.14 Copy with CSO Changes) that, in essence, defines the  $i$ th is the vector of properties (e.g., time seismic event occurring between MIN and MAX.




**DOE** [seismic-rockfall\\_feps](#)

LSN #: DN2001154920 Participant #: ALS.20040617.6494 Document Date: 07/14/2003  A seismic event can breach these barriers, which are the drip shield and the waste package outer barrier. The process discusses sampling the mean annual frequency for a seismic event to obtain a PGV value.




**DOE** [TOPICAL REPORT YMP/TR-003-NP PRE CLOSURE SEISMIC DESIGN METHODOLOGY FOR A GEOLOGIC REPOSITORY AT YUCCA MOUNTAIN & APPENDIX A NOTE: BEING REVISED AND MAY BE DELETED DEVELOPMENT AND APPLICATION OF A RISK-INFORMED APPROACH TO SEISMIC DESIGN REQUIREMENTS & APPENDIX B BEYOND-DESIGN BASIS EARTHQUAKE GROUND MOTIONS ANALYSIS & APPENDIX C DEVELOPMENT OF HCLPF SEISMIC MARGIN ESTIMATES; STR#2 Rev 03A](#)

LSN #: DN2001408442 Participant #: ALD.20050308.7078 Document Date: 08/01/2003    Such seismic event sequences are postulated to cause initiating events that also could occur from random failures (i.e., independent of an earthquake), such as drop of waste forms by handling equipment, loss of offsite power, and fires.




**DOE** [6.2.6 SEISMIC EVENTS & 6.2.6.1 SEISMIC DESIGN OF SSC ITS & 6.2.6.2 SEISMIC MARGIN AND EVENT SEQUENCE COMPLIANCE ANALYSIS & REFS FOR SEISMIC; Section 6.2.6 of Event Sequ Cat](#)

LSN #: DN2001049411 Participant #: ALD.20040615.5349 Document Date: 08/04/2003    SEISMIC EVENTS & 6.2.6.1 SEISMIC DESIGN OF SSC ITS & 6.2.6.2 SEISMIC MARGIN AND EVENT SEQUENCE COMPLIANCE ANALYSIS & REFS FOR SEISMIC; Section 6.2.6 of Event Sequ Cat




**DOE** [SEISMIC-ANALYSIS-00Ac DDO](#)

LSN #: DN2001043300 Participant #: ALD.20040615.5577 Document Date: 09/16/2003    This result means that the conditional probability of a seismically initiated event sequence having radiological consequences is less than or equal to 0.01 for the ground motions associated with a seismic margins earthquake.




**DOE** [seismic analysis 00A - final check+DDO](#)

LSN #: DN2001038748 Participant #: ALD.20040615.5523 Document Date: 09/29/2003    Seismic event sequences have the potential for the concurrent release of radioactivity from multiple waste forms. In the case of canisters containing DOE SNF, no dose information is input because consequence analyses are not performed.

**DOE** [FEATURES, EVENTS, AND PROCESSES IN SZ FLOW AND TRANSPORT; Check Copy REV 02D -10-14 PM](#)





LSN #: DN2001030965 Participant #: ALD.20040617.5462 Document Date: 10/01/2003    FEATURES, EVENTS, AND PROCESSES IN SZ FLOW AND TRANSPORT; Check Copy REV 02D -10-14 PM Consequently, future seismic events will not alter the range of existing fault permeability and porosity values incorporated in the SZ flow and transport model.

**DOE** [EXCELOUTPUT FEPS](#)





LSN #: DN2002026047 Participant #: ALB.20040615.9997 Document Date: 10/10/2003    Long Info full description of the treatment of seismic consequences in TSPA-LA. OUTPUT BSC (Bechtel SAIC Company) 2003. Seismic

Consequence Abstraction. BSC (Bechtel SAIC Company) 2003. Seismic Consequence Abstraction.





**DOE** [DIRS REPORT & DOCUMENT TITLE ENGINEERED BARRIER SYSTEM FEATURES, EVENTS AND PROCESSES; EXCELOUTPUT FEPS](#)

LSN #: DN2001749897 Participant #: ALB.20040615.9955 Document Date: 10/12/2003     MDL-W IS-PA-000003 REV 00. Las Vegas, Nevada: Seismic Consequence Abstraction MDL-W IS-PA-000003 (BSC 161812 Bechtel SAIC Company. Damages EB BSC (Bechtel SAIC Company) 2003. Seismic Consequence Abstraction.





**DOE** [SEISMIC CONSEQUENCE ABSTRACTION; Seismic Consequences MDL-WIS-PA-000003 \(Control Copy\)](#)

LSN #: DN2001747712 Participant #: ALK.20040612.9341 Document Date: 10/22/2003     SEISMIC CONSEQUENCE ABSTRACTION; Seismic Consequences MDL-WIS-PA-000003 (Control Copy) Initially, the calculation of expected doses that result from aleatory uncertainty in the occurrence and properties of seismic events is considered (Sect.

**DOE** [INTRODUCTION; SeismicTBDocSec1 MBGcmts](#)





LSN #: DN2000829608 Participant #: ALC.20050302.6707 Document Date: 11/05/2003     low-probability events because less severe but more likely seismic events do not have the potential to disrupt repository postclosure performance. Each of these seismic-related FEPs and its screening status are discussed briefly next.

**DOE** [OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT SCIENTIFIC ANALYSIS COVER SHEET & 2. SCIENTIFIC ANALYSES TITLE FEATURES, EVENTS, AND PROCESSES: DISRUPTIVE EVENTS; DE FEPS REV01](#)




LSN #: DN2001071531 Participant #: ALB.20040618.2067 Document Date: 12/01/2003     ANL-WIS-MD-000005 REV 01 76 , Features, Events and Processes: Disruptive Events In summary, the potential for fault displacement to damage EBS components has been examined.

## 2004




**DOE** [TECHNICAL WORK PLAN FOR: ENGINEERED BARRIER SYSTEM DEPARTMENT MODELING & TESTING FYXX/XX/2004 WORK ACTIVITIES; EBS TWP Rev 05 final E \(RLS\)](#)

LSN #: DN2001773228 Participant #: ALC.20040621.5582 Document Date: 02/01/2004     FEPs Subject Document 1.2.02.03.0A Fault displacement Engineered Barrier System: Seismic Consequence Model. MDL- damages EBS components WIS-PA-00003 1.2.03.02.0A Seismic ground motion Engineered Barrier System: Seismic Consequence Model.




**DOE** [SEISMIC CONSEQUENCE ABSTRACTION; MDL-WIS-PA-000003 Initial Tech Review](#)

LSN #: DN2001813572 Participant #: ALC.20040824.6584 Document Date: 04/01/2004    SEISMIC CONSEQUENCE ABSTRACTION; MDL-WIS-PA-000003 Initial Tech Review VI.2, VI.3) are predicated on the assumption that the occurrence of a seismic event has no effect on doses that derive from any subsequent seismic event.




**DOE** [DESIGN CALCULATION OR ANALYSIS COVER SHEET & 5. TITLE SEISMIC ANALYSIS FOR PRECLOSURE SAFETY & ATTACHMENT I SKETCH OF SURFACE LAYOUT & ATTACHMENT II IDENTIFICATION OF POTENTIAL SEISMIC EVENT SEQUENCES & ATTACHMENT III SSCS ITS WITH DBGM ASSIGNMENTS & ATTACHMENT IV GENERALIZED SEISMIC EVENT TREES & ATTACHMENT V FAULT TREES; seismic analysis for preclosure safety - version c](#)

LSN #: DN2001102354 Participant #: ALD.20040824.3089 Document Date: 05/20/2004    Identification of Seismic Fault and Event Trees .40 6.3.2 Dose Consequences of Seismic Event Sequences .48 6.3.3 Assigning Design Basis Ground Motions to SSCs ITS .50 6.4 ANALYSIS OF WORKER DOSE III-1 ATTACHMENT IV GENERALIZED SEISMIC EVENT TREES




**DOE** [TECHNICAL BASIS DOCUMENT NUMBER 14: LOW PROBABILITY SEISMIC EVENTS, REVISION 1 \(C\)](#)

LSN #: DN2002065461 Participant #: MOL.20040828.0260 Document Date: 06/01/2004    TECHNICAL BASIS DOCUMENT NUMBER 14: LOW PROBABILITY SEISMIC EVENTS, REVISION 1 (C) More detailed discussion and supporting references are provided in Features, Events, and Processes: Disruptive Events (BSC 2004b).





**DOE** [SEISMIC CONSEQUENCE ABSTRACTION; MDL-WIS-PA-000003 Rev01d07-08-2004](#)

LSN #: DN2001774947 Participant #: ALA.20040903.5537 Document Date: 06/01/2004    SEISMIC CONSEQUENCE ABSTRACTION; MDL-WIS-PA-000003 Rev01d07-08-2004 Finally, the presentation ends 4811 with a discussion of the representation of expected doses when synergisms between multiple 4812 seismic events are possible (Sect.





**DOE** [TOTAL SYSTEM PERFORMANCE ASSESSMENT \(TSPA\) MODEL/ANALYSIS FOR THE LICENSE APPLICATION & 6.5 TSPA-LA MODEL FOR THE SEISMIC SCENARIO CLASS; S 6.5 I 06-06-04 sds](#)

LSN #: DN2000574858 Participant #: ALB.20040824.2693 Document Date: 06/06/2004    The log-uniform sampling ensures adequate coverage of low frequency events. Because of drift degradation at the time of the seismic event, the seepage flux in lithophysal zones can vary through time differently than if the event had not occurred.





**DOE** [PVHRevs01\(6-10-04\)-SeismicConseqRptMDL-WIS-PA-000003 Rev01c0](#)

LSN #: DN2001755179 Participant #: ALA.20040831.2639 Document Date: 06/10/2004     For this representation, the occurrence of multiple seismic events between tMIN and tMAX is assumed to be possible. The representation for D(a) allows the potential for synergistic interactions involving two or more seismic events.





**DOE** [SE-3 TREATMENT OF CRACK PLUGGING AND DOWN STREAM FLOW REGIMES IN THE DS AND WP AFTER A SEISMIC EVENT. & SE-4 ADEQUACY OF MEAN HAZARD CURVE FOR TSPA-LA.; MBG Response to Seismic Events Issues 040904 sds](#)

LSN #: DN2000558429 Participant #: ALA.20040824.8975 Document Date: 06/10/2004     SE 7 Seismic events occurring beyond the 10,000 year regulatory period. That is, the conditional probability of a seismic event is 1 for each realization." The seismic scenario class is internally consistent as it is currently defined.





**DOE** [DRAFT K ANALYSIS AND MODEL REPORTS SUPPORTING TECTONIC HAZARDS PMR; TEC3.10Q Rev K](#)

LSN #: DEN001217121 Participant #: ALA.20040617.0133 Document Date: 06/10/2004     Identify the conceptual models and data required by PA for seismic disruptive events probability modeling.

**NRC** [Technical Basis Document No. 14: Low Probability Seismic Events,' Revision 1, Chapter 1 Through Chapter 4.](#)





LSN #: NRC000026521 Participant #: ML041880094 Document Date: 06/29/2004     No. 14: Seismic Events 1-3 June 2004 Cad Page 19 Revision 1 Seismic events that have this probability of occurrence have been analyzed and are discussed in this technical basis document.

**DOE** [DRAFT D & SEISMIC CONSEQUENCE ABSTRACTION; PVH 07-13-2004 MDL-WIS-PA-000003 Rev01d](#)





LSN #: DN2001769077 Participant #: ALA.20040903.3164 Document Date: 07/01/2004     F2, F3) are predicated on the assumption that the occurrence of a 4710 seismic event has no effect on doses that derive from any subsequent seismic event. that, in essence, 4722 defines the ith seismic event occurring between tMIN and tMax

**DOE** [PEF NO. 1 SOURCE: DTN: MO0306SPASL14E.001 AND AMR: ANL-WIS-MD-000010 REV02 REFERENCE DOCUMENT: DISSOLVED CONCENTRATION LIMITS OF RADIOACTIVE ELEMENTS & PEF NO. 002 SOURCE: DTN: MO0306SPACLDG.002 AND AMR: ANL-WIS-MD-000021 REV 00 REFERENCE DOCUMENT: CLAD DEGRADATION - SUMMARY AND ABSTRACTION FOR LA & PEF NO. 003 SOURCE: DTN: MO0404SPAIPCHM.005 AND AMR:ANL-EBS-MD-000037 REV03 REFERENCE DOCUMENT: IN-PACKAGE CHEMISTRY ABSTRACTION & PEF NO. 004 SOURCE:DTN: LA0307BY831811.001 AND AMR: ANL-MGR-GS-000001 REV01](#)





[REFERENCE DOCUMENT: CHARACTERIZE FRAMEWORK FOR IGNEOUS ACTIVITY AT YUCCA MOUNTAIN, NV; Parameters](#)

LSN #: DN2000569863 Participant #: ALA.20040824.9581 Document Date: 06/17/2004     MDL-W IS-PA- 00003 REV01 Seismic Consequence Abstraction 005 MO0405SPACALSS.004 lambda\_max Seismic: Maximum annual exceedance frequency of a seismic hazard.





**DOE** [AP-2.14Q CONCURRENCE COPY - SEISMIC CONSEQUENCE ABSTRACTION, DI: MDL-WIS-PA-000003 REVISION 01 DRAFT F, AUGUST 2004 \(C\)](#)

LSN #: DN2001901652 Participant #: MOL.20041210.0210 Document Date: 08/01/2004     Table 4-1. Direct Input Information for Seismic Consequence Abstractions (Continued) Table 6.1-1. Corroborating Input Information for Seismic Consequence Abstractions





**DOE** [PRECLOSURE SEISMIC DESIGN METHODOLOGY FOR A GEOLOGICAL REPOSITORY AT YUCCA MOUNTAIN; STR#2 TDR-WHS-MD-000004 Rev 01B track DDO](#)

LSN #: DN2002076791 Participant #: ALB.20041227.1062 Document Date: 08/01/2004     The assignment of DBGM levels to SSCs ITS proceeds in stages (BSC 2003a4 [DIRS 165043168317]): 1. Calculate the public and worker dose consequences associated with each individual seismic event sequence.





**DOE** [SCREENING ANALYSIS OF CRITICALITY FEATURES, EVENTS, AND PROCESSES FOR LICENSE APPLICATION; ANL-EBS-NU-000008 Report REV 01c](#)

LSN #: DN2002071289 Participant #: ALA.20050322.2835 Document Date: 08/01/2004     SCREENING ANALYSIS OF CRITICALITY FEATURES, EVENTS, AND PROCESSES FOR LICENSE APPLICATION; ANL-EBS-NU-000008 Report REV 01c This was done so as not to modify the 262 seismic sub-event probabilities of top events SEIS-RANGE and SEIS-DAMAGE.





**DOE** [FEATURES, EVENTS, AND PROCESSES: DISRUPTIVE EVENTS; RIT DE FEPS C AP 214](#)

LSN #: DN2001749632 Participant #: ALA.20050323.1284 Document Date: 09/01/2004     Any possible changes to topography and soils from extrusive activity are 3467 also of low consequence.





**DOE** [TOTAL SYSTEM PERFORMANCE ASSESSMENT MODEL/ANALYSIS FOR THE LICENSE APPLICATION & 6.5 MODEL FOR THE SEISMIC SCENARIO CLASS; S 6.5 AP-2.14 Conc 10-28-04-GAB](#)

LSN #: DN2000888033 Participant #: ALD.20050321.4551 Document Date: 10/01/2004     In particular, before 613 the event, the intact seepage response surface would be applicable, but after the event, the 614 collapsed seepage response surface would be applicable.





**DOE** [ANL-WIS-MD-000005 REVISION 02, FEATURES, EVENTS, AND PROCESSES: DISRUPTIVE EVENTS, NOVEMBER 2004 \(C\)](#)

LSN #: DN2001640013 Participant #: DOC.20041108.0002 Document Date: 11/08/2004     ANL-WIS-MD-000005 REVISION 02, FEATURES, EVENTS, AND PROCESSES: DISRUPTIVE EVENTS, NOVEMBER 2004 (C) Consequently, the FEP "Hydrologic response to igneous activity" is excluded from the TSPA-LA based on low consequence.





**DOE** [TOPICAL REPORT YMP/TR-003-NP PRECLOSURE SEISMIC DESIGN METHODOLOGY FOR A GEOLOGIC REPOSITORY AT YUCCA MOUNTAIN REVISION 3; STR2 a](#)

LSN #: DN2002374458 Participant #: ALA.20061030.3175 Document Date: 10/12/2004     Such seismic event sequences are postulated to cause initiating events that also could occur, otherwise, from random failures (i.e., independent of an earthquake) such as drop of waste forms by handling equipment, loss of offsite power, and fires.





**DOE** [DESIGN CALCULATION OR ANALYSIS COVER SHEET & 5. TITLE SEISMIC ANALYSIS FOR PRECLOSURE SAFETY; revised seismic analysis for preclosure safety ver Bc 2-14 Review](#)

LSN #: DN2002062852 Participant #: ALB.20050323.2397 Document Date: 10/13/2004     I-1 ATTACHMENT II DESCRIPTION OF ANALYSIS METHODS .II-1 ATTACHMENT III IDENTIFICATION OF POTENTIAL SEISMIC EVENT SEQUENCES IV-1 ATTACHMENT V GENERALIZED SEISMIC EVENT TREES

**DOE** [CRITERIA AND BASES FOR ASSIGNING DESIGN BASIS GROUND MOTIONS TO SSCS ITS SUMMARY & CRITERIA AND BASES FOR ASSIGNING DESIGN BASIS GROUND MOTIONS TO SSCS ITS DETAILS; Seismic design basis 11-1-04](#)





LSN #: DN2001382941 Participant #: ALD.20050321.7272 Document Date: 11/01/2004     The most stringent DBGGM assignment is given to a particular SSC after the seismic event sequences have been evaluated.

**DOE** [METHOD FOR ASSIGNING DESIGN BASIS GROUND MOTIONS TO SSC'S ITS SUMMARY & CRITERIA AND BASES FOR ASSIGNING DESIGN BASIS GROUND MOTIONS TO SSCS ITS DETAILS; Seismic design basis 11-1-04\\_DDO](#)

LSN #: DN2001403860 Participant #: ALD.20050321.7273 Document Date: 11/01/2004     Therefore, the design c. protects the worker from Category 1 event sequences. As shown below, doses are also summed over multiple seismic event sequences, as appropriate, to ensure compliance with 10 CFR 63.111.





**DOE** [CHECKER FINAL BACK CHECK - DEVELOPMENT OF EARTHQUAKE GROUND MOTION INPUT FOR PRECLOSURE SEISMIC DESIGN AND POSTCLOSURE PERFORMANCE ASSESSMENT OF A GEOLOGIC REPOSITORY](#)

[AT YUCCA MOUNTAIN, NV - MDL-MGR-GS-000003, REVISION 01G,NOVEMBER 2004 \(C\)](#)





LSN #: DN2001961081 Participant #: MOL.20050117.0587 Document Date: 12/17/2004     Section 2.1.1.5.2.3 1. Consequence analyses include Category 2 event sequences as well as factors that allow an event sequence to propagate within the geologic repository operations area.

## 2005





**DOE** [ANALYSIS AND MODEL REPORTS SUPPORTING TECTONIC HAZARDS PMR; TEC3.10QMay14](#)

LSN #: DN2000957782 Participant #: ALK.20050308.2986 Document Date: 02/17/2005     Identify the conceptual models and data required by PA for seismic disruptive events probability modeling.





**DOE** [DRAFT K, 03/12/2005 ANALYSIS AND MODEL REPORTS SUPPORTING TECTONIC HAZARDS PMR; TEC Formatted AMR 6-30mtg](#)

LSN #: DN2000754931 Participant #: ALA.20050321.3282 Document Date: 03/12/2005     Identify the conceptual models and data required by PA for seismic disruptive events probability modeling.





**DOE** [RECENT CHANGES TO THE SEISMIC SCENARIO CLASS FOR TSPA-LA MICHAEL GROSS POSTCLOSURE SEISMIC TEAM MARCH 31, 2005; OR Discussion of Seismic Scenario 03-31-05](#)

LSN #: DN2001982178 Participant #: ALA.20050722.2773 Document Date: 03/31/2005     However, it does not include the effect of changes in the system configuration after the first event, such a drift collapse.

**DOE** [DOE MANAGEMENT REVIEW DRAFT FOR VOLUME I, SECTIONS 1, 5, 6, 6.1, 6.1.1, 6.1.2, 6.1.3, AND 6.1.4 FOR TOTAL SYSTEM PERFORMANCE ASSESSMENT MODEL/ANALYSIS FOR THE LICENSE APPLICATION \(C\)](#)





LSN #: DN2002200656 Participant #: MOL.20051026.0073 Document Date: 05/10/2005     Iw igneous activity and low-probability seismic activity. occurrence of both an igneous and seismic event during the same 10,000-year realization is not pre-conditions from the earlier event, or correlation between the two events.

**DOE** [FEATURES, EVENTS, AND PROCESSES: DISRUPTIVE EVENTS; ANL-WIS-MD-00005 DraftAA](#)





LSN #: DN2002084858 Participant #: ALA.20050801.4551 Document Date: 06/01/2005     Any possible changes to topography and soils from extrusive activity are also of low consequence. Consequently, the FEP "Hydrologic response to igneous activity" is excluded from the TSPA-LA based on low consequence.

**DOE** [ITEM 3: AGGREGATION OF EVENT SEQUENCE PROBABILITIES FOR MULTIPLE HANDLING CELLS; Consideration of Aggregation of Event Sequence](#)





## Probabilities

LSN #: DN2002001232 Participant #: ALA.20050722.2496 Document Date: 06/15/2005     By so doing, several other seismically initiated event sequences are driven to BC2. Otherwise, the offsite public doses for some seismically induced event sequences (that do not involve a dropped assembly) could exceed the 5 rem limit.





### **DOE** DESIGN CALCULATION OR ANALYSIS COVER SHEET & 5. TITLE PROBABILITY OF POSTCLOSURE CRITICALITY; CAL-MGR-NU-000012 Rev 00AaCheck

LSN #: DN2002087502 Participant #: ALA.20050801.4475 Document Date: 06/27/2005     As indicated by the top event "SEIS-RANGE", the seismic disruptive event has been divided into four sub-events, each representing a seismic frequency CAL-MGR-NU-000012 REV 00Aa v

### **DOE** INTERDISCIPLINARY CONCURRENCE COPY FOR CATEGORIZATION OF EVENT SEQUENCES FOR LICENSE APPLICATION (C)





LSN #: DN2002194581 Participant #: MOL.20050802.0158 Document Date: 08/03/2005     This reassignment provides a more conservative seismic design and reduces the number of seismically-initiated Category 2 event sequences that have to be addressed in the consequences analyses.

### **DOE** TOTAL SYSTEM PERFORMANCE ASSESSMENT MODEL/ANALYSIS FOR THE LICENSE APPLICATION 6.5 TSPA-LA MODEL FOR THE SEISMIC SCENARIO CLASS; S\_6.5.0





LSN #: DN2002205222 Participant #: ALA.20060111.0380 Document Date: 12/28/2005     Each realization is associated with seismic 791 disruption of the repository system. The log-uniform sampling ensures adequate coverage of low 808 Deleted: frequency, high consequence events.

## 2006

### **DOE** DE FEPS FROM DE: IGNEOUS ACTIVITY TWP (TWP-WIS-MD-000007, REV. 9B) 2.5 FEATURES, EVENTS, AND PROCESSES; DE FEPs in TWPs

LSN #: DN2002235806 Participant #: ALA.20060525.1189 Document Date: 04/18/2006     The EBS components Seismic components experience related movement or Consequence displacement such that performance Abstraction is degraded by such things as tilting of components, component to component contact, or drip shield separation.

### **DOE** PRECLOSURE SEISMIC DESIGN AND PERFORMANCE DEMONSTRATION METHODOLOGY FOR A GEOLOGIC REPOSITORY AT YUCCA MOUNTAIN TOPICAL REPORT

LSN #: DN2002340073 Participant #: DOC.20061205.0004 Document Date: 11/30/2006     The measure of acceptable risk is expressed in terms of allowable consequences for particular categories of event sequences.

**2007**





**DOE** [FINAL INPUT TO TSPA ON INCLUDED AND EXCLUDED FEATURES, EVENTS, AND PROCESSES \(FEPS\)](#)

LSN #: DN2002376447 Participant #: LLR.20070314.0008 Document Date: 01/05/2007

    FINAL INPUT TO TSPA ON INCLUDED AND EXCLUDED FEATURES, EVENTS, AND PROCESSES (FEPS)





**DOE** [SCON-1 REV00A](#)

LSN #: DN2002400027 Participant #: ALA.20070426.9306 Document Date:

01/22/2007     SCON-1 REV00A . Total System Performance Assessment Data Input Package for Seismic Consequence Abstraction Plate Thickness PGV Level (m/s) 0-mm 2-mm 5-mm 10-mm 15-mm Probability of Failure with 100% Rockfall Load (FRAC\_RUBBLE\_LITH = 1.00): 0.2 1

**DOE** [6.1.1](#)

LSN #: DN2002371340 Participant #: ALA.20070426.9899 Document Date:

01/23/2007     Significant consequences (beyond what is already considered in the independent Seismic and Igneous Scenario Classes) only occur if a seismic event, with peak ground velocity (PGV) sufficient to collapse drifts, precedes an igneous event.