	Technical Data Report Error Resolution Document *Complete only applicable items.*	QA: QA Page 1 of 15

INITIATION

1. Originator:	2. Date:	3. ERD No.
Paul W. Reimus/Ming Zhu	4/11/08	TDR-CRW-GS-000001 ERD 01

4. Document Identifier:	5. Document Title:
TDR-CRW-GS-000001 REV 02 ICN 01	Yucca Mountain Site Description

6. Description of and Justification for Change (Identify applicable CRs and TBVs):

I Background Information Summary

This ERD is prepared to resolve CRs 2656 and 6826 associated with *Yucca Mountain Site Description*, TDR-CRW-GS-000001 REV02 ICN 01 (YMSD) (see below). There are no open TBVs associated with this document.

CR 2656: This CR was originally written to document a concern that Rev 02 of the YMSD does not include information from Rev 01 that is necessary to support the License Application (LA). However, because of developments over time involving the LA and, in particular, GI-5 of the LA, and management decisions related to these developments (see CR 2656 details in CAP system), the resolution of this CR is now a matter of correcting several editorial/typographical errors in the YMSD or suggested improvements for clarification and/or consistency between the safety analysis report (SAR) and its supporting documentation and the YMSD. The specific errors and suggested improvements are not listed here because they can be inferred from the list of corrections provided below.

CR 6826: The following typographical error in Table 4-8 of the YMSD needs to be addressed: The location of the Fairview Peak earthquake is given as Fairview Peak, CA, but it should be Fairview Peak, NV. The condition associated with this CR is actually incorporated into CR 2656 in the CAP system.

The editorial and minor typographical errors identified by these two CRs should be corrected as indicated in the list that follows. All of the following citations of figures, tables, and sections are made with respect to those in the YMSD, unless otherwise specifically noted. Attachment A contains corrections of selected figures and tables that are more easily shown in revised figures or tables than by written description. The number(s) in parentheses preceding each item in the following list indicate the comment number(s) from CR 2656 or CR 6826 that is/are addressed by the stated correction(s). Also, the comments that are

(see attached)

CONCURRENCE

	Printed Name	Signature	Date
7. Checker	Roger Henning	Roger J. Henning	4/16/2008
8. QCS/QA Reviewer	Charles Beach	Charles D. Beach	4-16-08
APPROVAL			
9. Originator	Paul Reimus Ming Zhu For	Paul W. Reimus Paul W.	4/16/08 4-17-08
10. Responsible Manager	Paul Dixon	Paul W.	4-17-08

(Continued from Block 6)

addressed by each corrected figure/table in Attachment A are noted in brackets ([ ]) at the end of the figure/table caption.

- (1) In Figure 4-18, "Galaxy Lake" should be "Galway Lake". See figure revision in Attachment A.

- (2) In response to a comment about the Kern County and Dixie Valley earthquakes being inconsistently presented in Figure 4-18 and Table 4-8, and also being more than 300 km from Yucca Mountain (contrary to what the figure caption and table title state), the Dixie Valley earthquake should be deleted from the table and from part (b) of the figure, and the following should be added to the figure caption: "In (a), although they lie more than 300 km from Yucca Mountain, the 1954 Dixie Valley earthquake (M_w 6.8) and the 1952 Kern County earthquake (M_w 7.5) are shown because of their historical and seismological significance." See figure revision in Attachment A.

- (3, 4, 13) In response to two comments that Table 4-8 includes the 1999 Scotty's Junction and 1999 Hector Mine earthquakes, and that the 1999 Hector Mine earthquake is discussed in the text but does not appear in Figure 4-18, these two earthquakes should be added to Figure 4-18. Note that there is an incorrect statement in comment (3) indicating that Figure 4-18 shows seismicity occurring in 1997 and 1998 as well as the Hector Mine event. The figure does not show seismicity occurring in 1997 and 1998, although the Hector Mine event has been added to the figure. See figure revision in Attachment A.

- (5, 7) In response to two comments that "significant" is not defined in the context of earthquake magnitude, the Table 4-8 title should be changed to "Earthquakes with M_w Greater than 5.0 within 300 Kilometers of Yucca Mountain", and "Significant earthquakes" in the Figure 4-18 caption should be changed to "Earthquakes of note". See figure revision in Attachment A.

- (6) In response to a comment that the text mentions that Figure 4-18 shows seismicity that occurred in 1997 and 1998, but Figure 4-18 only shows events through 1996, the following sentence should be deleted from p. 4-32: "The figure also shows seismicity that occurred in 1997 and 1998 and the earthquakes associated with the 1999 Hector Mine event, which had a magnitude of M_w 7.1." The figure does not show seismicity occurring in 1997 and 1998, although the Hector Mine event has been added to the figure. The inclusion of the Hector Mine event should be mentioned in the figure notes, so that there is no need to mention it in the text at this location. See figure revision in Attachment A.

- (8, 9, 10, 11, 12) In response to five comments about consistency of fault names between the SAR and the YMSD, Figure 4-23 should be replaced with Figure 5-36 from GI-5 (with changes of "Gold Mountain" to "Gold Mountains", "Grapevine Mountain" to "Grapevine Mountains", and "Spotted Ridge" to "Spotted Range" – see revised Figure 4-23 in Attachment A), and fault names in Table 4-11 should be

corrected as follows: Peace Camp Fault should be changed to Peace Camp (South Ridge) Fault. Yucca Fault should be changed to Yucca (Yucca Butte) Fault. Oak Spring Butte Faults should be changed to Oak Springs Butte Fault.

- (14) In Section 3.7.5, on p. 3-106, 3.7 MPa should be changed to 4.7 MPa at the end of the sentence, "Because vertical stress was not measured, it was approximated as the weight of the overburden at the depth of the tests as follows (SNL 1997 [DIRS 106854]): σ_v (vertical stress) = 3.7 MPa."

- (15) In Table 3-29, the error for Maximum Horizontal Stress from DTN SN0308F3710195.003 (first set of columns) should be +/- 0.4 MPa instead of +/- 0.1 MPa.

- (16) In Section 5.2.2.5.7, on p. 5-38, (Figure 5-27) should be changed to (Figure 5-6) at the end of the sentence, "Data supporting this conceptual model of 234U/238U evolution were obtained from water samples collected during the Single Heater Test (SHT) conducted in the Thermal Test Facility (ESF Alcove 5) (Figure 5-27)."

- (17) In response a comment about Figure 4-22, "Local Magnitude (M_L)" should be added to the legend of this figure, and it should be mentioned in the figure caption that the circle corresponds to a 10 km (6 mi) radius from Yucca Mountain. See revised figure in Attachment A.

- (18) The sources to Figure 4-28 taken from CRWMS M&O 1996 should be Figures 7-4 and 7-6 from that document instead of Figures 7-10 and 7-12.

- (19, 20) In response to comments about the YMSD not including the most recent interpretations of geologic and hydrologic units and their correlations to other property-based model units, the existing Table 7-1 should be replaced with a new Table 7-1 (Attachment A). Also, minor changes should be made to Tables 3-1 and 3-5, as shown in the attached tables (Attachment A).

- (21 and comment 22 from the original list of CR 2656 comments) In Section 5.4.4.4.1, on lines 4 and 5 of p. 5-146, the temperature range in the series of experiments should be changed to 90 to 250°C (from 90 to 350°C). That is, the maximum temperature should be 250°C.

- (CR 6826 and comment 24 of updated CR 2656 list – see below) In Table 4-8, the location of the Fairview Peak earthquake should be changed to Fairview Peak, NV (from Fairview Peak, CA). This change would resolve CR 6826.

In addition to the above changes to address CRs 2656 and 6826, the following items address comments that were added to the list of CR 2656 comments (referred to here as the "updated CR 2656 list") after the CR was originally issued:

- (comment 22 of updated CR 2656 list) To avoid confusion in Figure 4-21, the following sentence should be deleted from the Notes to this figure: "Lower hemisphere equals angle projection of the principal stress axes."

- (comment 23 of updated CR 2656 list) The label "Solitario Canyon-Bow Ridge/Paintbrush Canyon" in Figure 3-21 should be changed to just "Solitario Canyon-Bow Ridge". See revised figure in Attachment A.

- (comment 25 of updated CR 2656 list) In Section 3.4.6.4, p. 3-57, the statement that the maximum and mean depths of erosion in the study area were about 1.8 m and 5 cm (6 and 1.6 ft), respectively, should be changed to "1.8 m and 5 cm (6 and 0.16 ft), respectively." 5 cm is equal to 0.16 ft, not 1.6 ft.

- (License Application review comment added to most recent version of the CR 2656 list) In Section 7.9.1.2, p. 7-100, in the 5th line of this section, "TSw" should be changed to "TCw". Also, the reference to Section 7.3 in the 7th line of this section should be changed to Section 7.3.2.1.

The errors identified in CRs 2656 and 6826 are analyzed herein for potential impact on the parent report as well as on any technical products that use the information from the parent report. The following controlled documents were evaluated for impacts:

DOE/EIS-0250-S1D, Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada - Chapter 3

DOE/EIS-0250-S1D, MiscId 04, Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada - Chapter 4

000-00C-MGR0-00500-000-00C, External Events Hazards Screening Analysis

000-00C-WHS0-00100-000-00C, Extreme Wind/Tornado/Tornado Missile Hazard Analysis

000-PSA-MGR0-01500-000-00A, Industrial/Military Activity-Initiated Accident Screening Analysis

190-MAC-VN00-00400-000-00B, Thermal Analysis of the Canister Handling Facility Canister Pits and Staging Area

800-K0C-SS00-00200-000-00A, Lithophysal Rock Mass Mechanical Properties of the Repository Host Horizon

860-K0C-SSD0-00100-000-00B, Shaft Liner Design

ANL-EBS-GS-000002 Rev. 01, Geochemistry Model Validation Report: External Accumulation Model

ANL-EBS-MD-000033 Rev. 06, Engineered Barrier System: Physical and Chemical Environment

ANL-EBS-MD-000038 Rev. 01, ICN 00, Evaluation of Potential Impacts of Microbial Activity on Drift Chemistry

ANL-MGR-GS-000004 Rev. 00, ICN 00, Peak Ground Velocities of Seismic Events at Yucca Mountain, Nevada

ANL-MGR-GS-000005 Rev. 00, Magma Dynamics at Yucca Mountain, Nevada

ANL-MGR-MD-000011 Rev. 05, Evaluation of Features, Events, and Processes (FEP) for the Biosphere Model

ANL-NBS-HS-000005 Rev. 03, In Situ Field Testing of Processes

ANL-NBS-HS-000055 Rev. 00, Data Analysis for Infiltration Modeling: Development of Soil Units and Associated Hydraulic Parameter Values

ANL-NBS-MD-000001 Rev. 04, Features, Events, and Processes in UZ Flow and Transport

ANL-SSD-GE-000001 Rev. 00, Subsurface Geotechnical Parameters Report

ANL-WIS-MD-000005 Rev. 03, Features, Events, and Processes: Disruptive Events

ANL-WIS-MD-000019 Rev. 02, Features, Events, and Processes: System-Level

ANL-WIS-MD-000027 Rev. 00, Features, Events, and Processes for the Total System Performance Assessment: Analyses

DIE-MGR-PA-000001 Rev. 00, Determination of Importance Evaluation for Communications Towers on the Crest of Yucca Mountain and on Exile Hill

MDL-MGR-GS-000003 Rev. 01, 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-000005 Rev. 02, Dike/Drift Interactions

MDL-MGR-GS-000007 Rev. 000, Supplemental Earthquake Ground Motion Input for a Geologic Repository at Yucca Mountain, NV

MDL-MGR-MD-000001 Rev. 02, Biosphere Model Report

MDL-NBS-GS-000002 Rev. 02, Geologic Framework Model (GFM2000)

MDL-NBS-HS-000006 Rev. 03, Uz Flow Models and Submodels

MDL-NBS-HS-000008 Rev. 02, Radionuclide Transport Models Under Ambient Conditions

MDL-NBS-HS-000011 Rev. 03, Saturated Zone Site-Scale Flow Model

MDL-NBS-HS-000019 Rev. 01, Abstraction of Drift Seepage

MDL-NBS-HS-000020 Rev. 02, Addendum 01, Particle Tracking Model and Abstraction of Transport Processes

MDL-WIS-PA-000005 Rev. 00, MiscId 01, Total System Performance Assessment Model/Analysis for the License Application - Volume I

MDL-WIS-PA-000005 Rev. 00, MiscId 02, Total System Performance Assessment Model/Analysis for the License Application - Volume II

MDL-WIS-PA-000005 Rev. 00, MiscId 03, Total System Performance Assessment Model/Analysis for the License Application - Volume III

TDR-MGR-MD-000056 Rev. 00, Performance Confirmation Annual Report Fiscal Year 2007

TDR-MGR-MM-000002 Rev. 000, Local Meteorology of Yucca Mountain, Nevada: 1994-2006

TDR-PCS-SE-000001 Rev. 05, ACN 01, Addendum 01, Performance Confirmation Plan

TDR-PCS-SE-000001 Rev. 05, Performance Confirmation Plan

TDR-WIS-PA-000014 Rev. 00, TSPA Information Package for the Draft SEIS

800-30R-SS00-00200-000-00A, Subsurface Geotechnical Baseline Report

DIE-MGR-PA-000001 Rev. 00, ICN 01, Determination of Importance Evaluation for Communications Towers on the Crest of Yucca Mountain and on Exile Hill

DOE/EIS-0250-S1D, Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada - Chapter 3

DOE/EIS-0250-S1D MiscId 04, Draft Supplemental Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada - Chapter 4

DOE/EIS-0369, Environmental Impact Statement for the Alignment, Construction, and Operation of a Rail Line to a Geologic Repository at Yucca Mountain, Nye County, Nevada

DOE/EIS-0369D, Draft Environmental Impact Statement for the Alignment, Construction, and Operation of a Rail Line to a Geologic Repository at Yucca Mountain, Nye County, Nevada

LAGI-1, LA General Information Section 1

LAGI-5, LA General Information Section 5

LASAR-1.01, LA Safety Analysis Report Section 1.1

LASAR-2.02, LA Safety Analysis Report Section 2.2

LASAR-2.03.01, LA Safety Analysis Report Section 2.3.1

LASAR-2.03.02, LA Safety Analysis Report Section 2.3.2

LASAR-2.03.03, LA Safety Analysis Report Section 2.3.3

LASAR-2.03.04, LA Safety Analysis Report Section 2.3.4

LASAR-2.03.08, LA Safety Analysis Report Section 2.3.8

LASAR-2.03.10, LA Safety Analysis Report Section 2.3.10

LASAR-4, LA Safety Analysis Report Chapter 4

LASAR-5.08, LA Safety Analysis Report Chapter 5.8

The analyses and updates to resolve CRs 2656 and 6826 have no impacts on the analyses or conclusions of downstream technical products.

II Inputs and/or Software

There are no direct inputs to this error resolution analysis.

No software controlled under IM-PRO-003, *Software Management*, is used in this analysis.

III Impact Evaluation for CRs 2656 and 6826

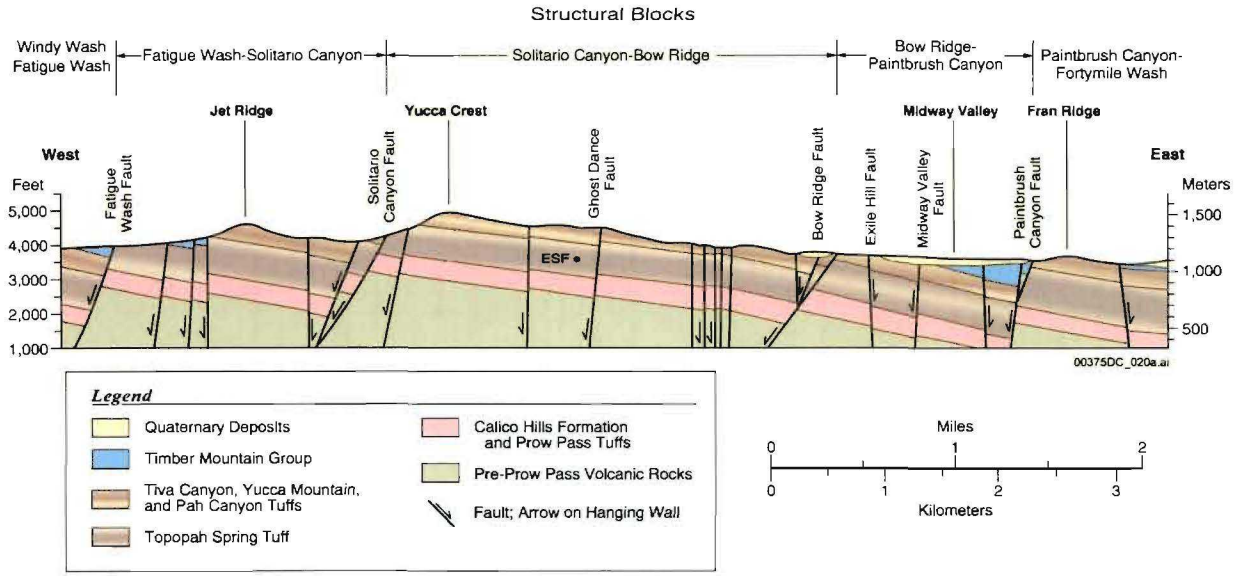
CRs 2656 and 6826 identified only minor editorial/typographical errors or suggested improvements for clarification and/or consistency between the SAR and its supporting documentation. There are no impacts to the analyses or conclusions in TDR-CRW-GS-000001 REV 02 ICN 01 or to any downstream technical products.

IV Analysis Results and Conclusions

The remainder of this ERD consists of revised figures and tables, which address various comments from CR 2656. The descriptions of the changes relative to the original figures and tables are provided in Section I. None of these changes result in impacts to the analyses or conclusions in TDR-CRW-GS-000001 REV 02 ICN 01 or to any downstream technical products.

ATTACHMENT A

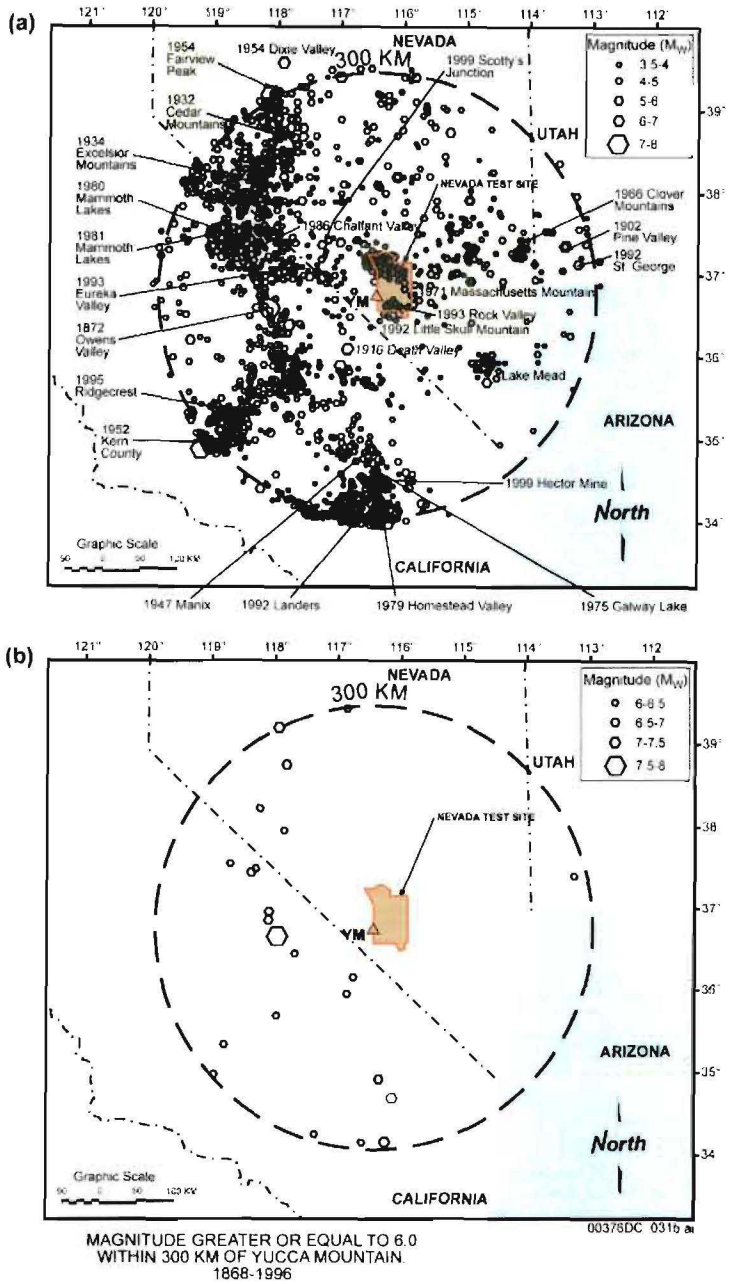
Revisions to Figures and Tables of TDR-CRW-GS-000001 REV 02 ICN 01



Source: Simplified from Day et al. 1998 [DIRS 100027], Cross Section B-B'.

NOTE: Line of section shown in Figure 3-20; ESF = Exploratory Studies Facility (location of intersection along line of section). Not all faults shown are plotted in Figure 3-20.

Figure 3-21[a]. East-West Structure Section across Yucca Mountain Site Area [Addresses CR 2656, comment 23]



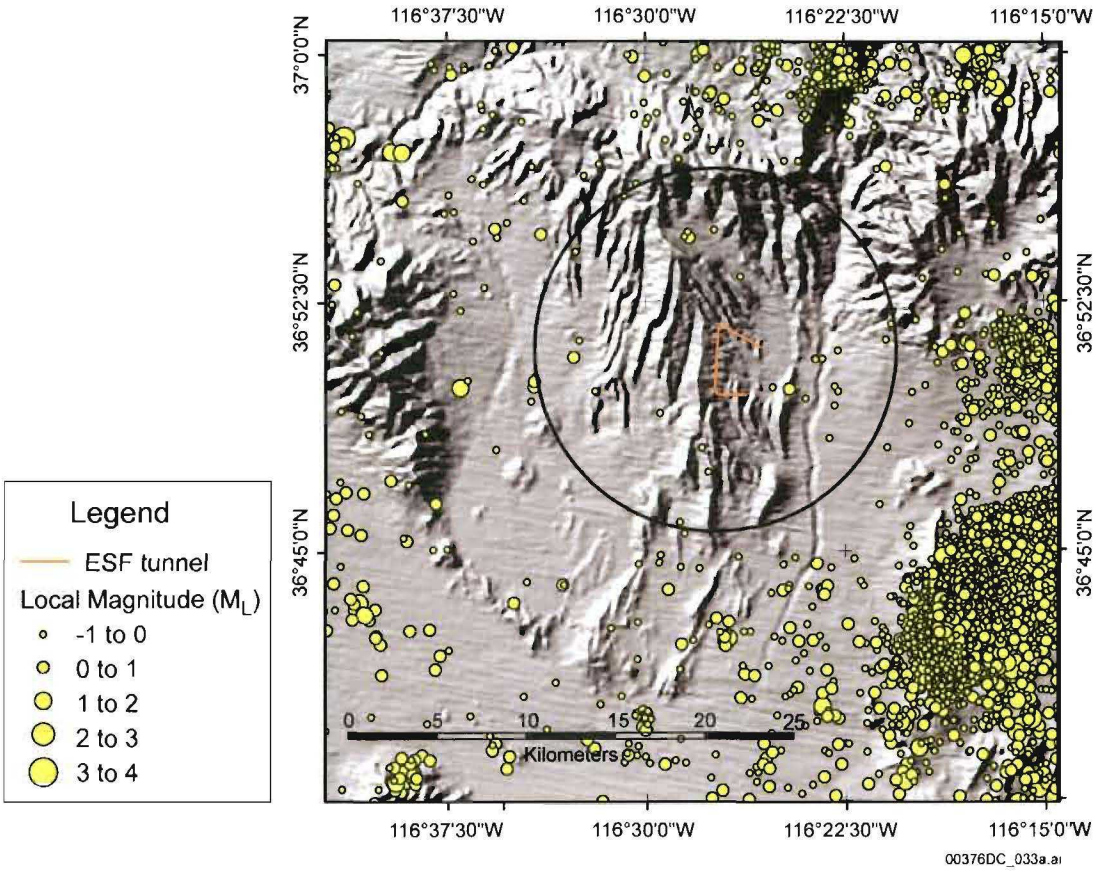
MAGNITUDE GREATER OR EQUAL TO 6.0
WITHIN 300 KM OF YUCCA MOUNTAIN.
1868-1996

DTNs: MO9906COV99279.000 [DIRS 166582]; MO0006COV00226.000 [DIRS 166581]

Source: DOE 2002 [DIRS 155943], Figure 4-162

NOTES: Shown are earthquakes from 1868 to 1996, plus the 1999 Scotty's Junction and Hector Mine events. This seismicity catalog was compiled from a variety of sources. Coverage of older seismicity is sparse because of the absence or limited availability of seismographic coverage in the late 1800s and early 1900s. The cluster of earthquakes near the southern boundary of the Nevada Test Site represents the 1992 Little Skull Mountain earthquake and its numerous aftershocks. Many of the events in the northern part of the Nevada Test Site occurred in response to underground nuclear weapons tests. Earthquakes of note are labeled with year of occurrence. In (a), although they lie more than 300 km from Yucca Mountain, the 1954 Dixie Valley earthquake (Mw 6.8) and the 1952 Kern County earthquake (Mw 7.5) are shown because of their historical and seismological significance.

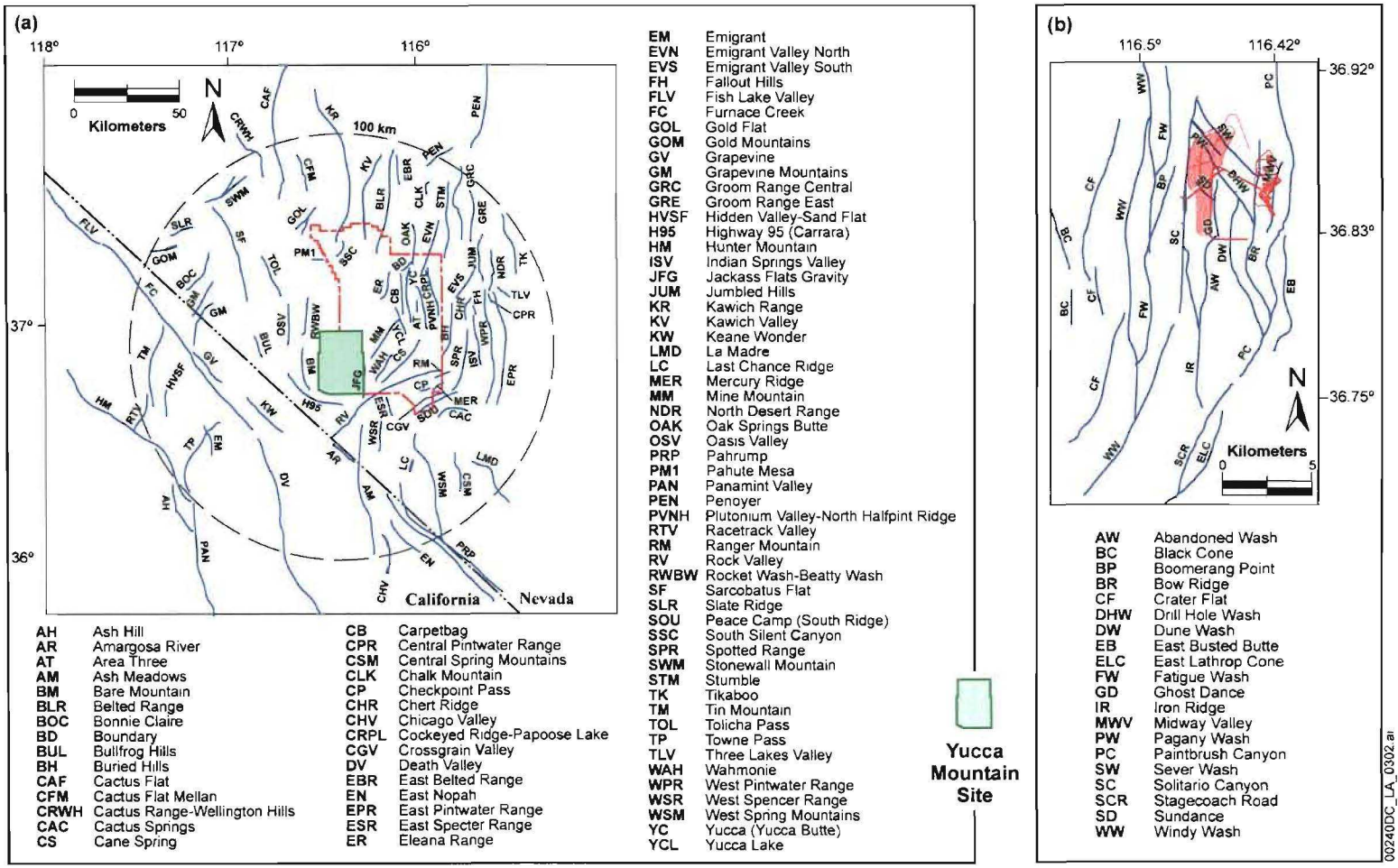
Figure 4-18[a]. Historical Earthquake Epicenters within 300 km of Yucca Mountain
[Addresses CR 2656, comments 1, 2, 3, 4, 5, 6, 7, and 13]



DTNs: MO970483117412.002 [DIRS 150037]; MO9906SEISYMNV.000 [DIRS 166387]; UN0007SPA012DV.002 [DIRS 166388]; UN0106SPA012JB.001 [DIRS 166389]; MO0205UCC012DV.008 [DIRS 166390]; MO0305UCC012DV.014 [DIRS 166391]

NOTE: Circle corresponds to 10 km (6 mi) radius from approximate center of proposed Yucca Mountain repository horizon.

Figure 4-22[a]. Seismicity at Yucca Mountain from October 1, 1995, to September 30, 2002 [Addresses CR 2656, comment 17]



Source: Faults included in the probabilistic seismic hazard analyses (CRWMS M&O 1998 [DIRS 103731]) and/or considered relevant by Pezzopane (1996 [DIRS 106524], Table 11-1)

Figure 4-23[a]. Known or Suspected Quaternary Faults and Other Notable Local Faults within 100 km of Yucca Mountain [Addresses CR 2656, comments 8, 9, 10, 11, 12]

Table 3-1[a]. Generalized Stratigraphic Column of Tertiary Volcanic Rocks in the Yucca Mountain Site Area [Addresses CR 2656, comments 19 and 20]

Group	Formation/Unit		Thickness in Site Area (meters)	General Lithology
Timber Mountain	Ammonia Tanks Tuff		Not present in area	Welded to nonwelded rhyolite tuff
	Rainier Mesa Tuff		Generally <30	High-silica rhyolite and quartz latite tuffs
	Pre-Rainier Mesa Tuff bedded tuff		17[a]	Nonlithified pyroclastic-flow deposits
Paintbrush	Rhyolite of Comb Peak		<130	Rhyolite lava flows and related tephra; pyroclastic-flow deposits
	Tuff Unit "X"		6–23[b]	
	Rhyolite of Vent Pass		0–150	
	Post-Tiva Canyon Tuff bedded tuff		<2–4.5	Pyroclastic-flow and fallout tephra deposits
	Tiva Canyon Tuff	Crystal-rich member	<50–175	Compositionally zoned (rhyolite to quartz latite) tuff sequence; each member divided into several zones and subzones[c]
		Crystal-poor member		
	Pre-Tiva Canyon Tuff bedded tuff		<1–3[d]	Pyroclastic fallout tephra deposits with thin weathered zones
	Yucca Mountain Tuff		0–55	Nonwelded to densely welded pyroclastic-flow deposit
	Rhyolite of Black Glass Canyon		2–14	Rhyolite lava flows and related tephra
	Rhyolite of Delirium Canyon		<250 (lava) <100 (pyroclastic flow deposits)	
	Rhyolite of Zig Zag Hill		<10	
	Pre-Yucca Mountain Tuff bedded tuff		<1–46[d]	Nonwelded pyroclastic-flow deposits
	Pah Canyon Tuff		0–79	Pyroclastic-flow deposits; abundant large pumice clasts
	Pre-Pah Canyon Tuff bedded tuff		3–10[d]	Vitric to devitrified and altered fallout tephra and pyroclastic flow deposits
	Topopah Spring Tuff	Crystal-rich member	0–381	Compositionally zoned (rhyolite to quartz latite) tuff sequence; each member divided into several zones and subzones[c]. Repository host rock is within crystal-poor member[e]
		Crystal-poor member		
	Pre-Topopah Spring Tuff bedded tuff		0–17[d]	Bedded tuffaceous deposits
	Calico Hills Formation		15–457	Rhyolite tuffs and lavas; contains five pyroclastic units
	Pre-Calico Hills Formation bedded tuff		9–39[d]	Pyroclastic-flow and coarse-grained fallout deposits

NOTE: Yellow-shading indicates changes.

Table 3-5[a]. Comparison of Several Stratigraphic Subdivisions of Mid-Tertiary Volcanic Rocks at Yucca Mountain [Addresses CR 2656, comments 19 and 20]

Lithostratigraphic Units[a,d,e,f]		Thermal-Mechanical Units[a,b]
Timber Mountain Tuff (Tm)	Rainier Mesa member (Tmr)	Undifferentiated overburden (UO)
	Pre-Rainier Mesa bedded tuff (Tmbt1)	
PAINTBRUSH GROUP (Tp)		
	rhyolite of Comb Peak (Tpk); includes the pyroclastic flow deposit (Tpki) that is informally referred to as tuff unit "X" (Tpki)	
	post-Tiva Canyon bedded tuff (Tpbt5)	
Tiva Canyon Tuff (Tpc)	crystal-rich member (Tpcr) vitric zone (Tpcrv) -nonwelded subzone (Tpcrv3) -moderately welded subzone (Tpcrv2) -densely welded subzone (Tpcrv1) nonlithophysal zone (Tpcrn) lithophysal zone (Tpcrl)	Tiva Canyon welded (TCw)[d]
	crystal-poor member (Tpcp) upper lithophysal zone (Tpcpul) middle nonlithophysal zone (Tpcpmn) lower lithophysal zone (Tpcpll) lower nonlithophysal zone (Tpcpln) -hackly subzone (Tpcplnh) -columnar subzone (Tpcplnc) vitric zone (Tpcpv) -densely welded subzone (Tpcpv3)[c] -moderately welded subzone (Tpcpv2) -nonwelded subzone (Tpcpv1)	
	pre-Tiva Canyon bedded tuff (Tpbt4)	Paintbrush nonwelded (PTn)
Yucca Mountain (Tpy)	Yucca Mountain Tuff (Tpy)	
	pre-Yucca Mountain bedded tuff (Tpbt3)	
Pah Canyon Tuff (Tpp)	Pah Canyon Tuff (Tpp)	
	pre-Pah Canyon bedded tuff (Tpbt2)	

NOTE: Yellow-shading indicates changes (primarily to formatting)

Table 7-1[a]. Major Lithostratigraphic Unit, Hydrogeologic Unit, Detailed Hydrogeologic Unit, Unsaturated Zone Model Layer, and Thermal Mechanical Unit Nomenclatures and Correlations. [Addresses CR 2656, comments 19 and 20]

Lithostratigraphic Unit		Major Hydrogeologic Unit	Detailed Hydrogeologic Unit	Unsaturated Zone Model Layer	Thermal-Mechanical Units
Alluvium and Colluvium	Qal, Qc	Unconsolidated Surface Material			Undifferentiated Overburden (UO)
Rainier Mesa Tuff	Tmr				
Pre-Rainier Mesa Tuff bedded tuff					
Rhyolite of Comb Peak					
Tuff Unit "X"					
Rhyolite of Vent Pass					
Post-Tiva Canyon Tuff bedded tuff					
Tiva Canyon Tuff	Tpcr	Tiva Canyon welded (TCw)	CCR, CUC	tcw11	Tiva Canyon welded (TCw)
	Tpcp		CUL, CW	tcw12	
	Tpcpv3		CMW	tcw13	
	Tpcpv2	Paintbrush nonwelded (PTn)			Paintbrush nonwelded (PTn)
	Tpcpv1		CNW	ptn21	
Bedded Tuff	Tpbt4		BT4	ptn22	
Yucca Mountain Tuff	Tpy		TPY	ptn23	
Bedded Tuff	Tpbt3		BT3	ptn24	
Pah Canyon Tuff	Tpp		TPP	ptn25	
Bedded Tuff	Tpbt2		BT2	ptn26	
	Tptrv3				
	Tptrv2				
	Tptrv1	Topopah Spring welded (TSw)	TC	tsw31	Topopah Spring welded, "lithophysae rich" (TSw1)
	Tptrn		TR	tsw32	
	Tptrl		TUL	tsw33	
Topopah Spring Tuff	Tptpul				Approximate Repository Horizon
	Tptpmn		TMN	tsw34	Topopah Spring welded, "lithophysae poor" (TSw2)
	Tptpll		TLL	tsw35	
	Tptpln		TM2 (upper 2/3)	tsw36	
			TM1 (lower 1/3)	tsw37	
	Tptpv3		PV3	tsw38	Topopah Spring welded, vitrophyre (TSw3)
	Tptpv2	Calico Hills nonwelded (CHn)	PV2	tsw39	Calico Hills nonwelded (CHn1)
	Tptpv1		BT1 or BT1 (altered)	ch1 (vit, zeo)	
Bedded Tuff	Tpbt1				
Calico Hills Formation	Tac		CHV (vitric) or CHZ (zeolitic)	ch2 (vit, zeo)	
				ch3 (vit, zeo)	
				ch4 (vit, zeo)	
				ch5 (vit, zeo)	
Bedded Tuff	Tacbt		BT	ch6	Calico Hills nonwelded (CHn2)
Prow Pass Tuff	Tcpuv		PP4 (zeolitic)	pp4	"Calico Hills" nonwelded (CHn3)
	Tcpuc		PP3 (devitrified)	pp3	Prow Pass welded (PPw)
	Tcpmd		PP2 (devitrified)	pp2	
	Tcplc		PP1 (zeolitic)	pp1	Upper Crater Flat nonwelded (CFUn)
	Tcplv				
Bedded Tuff	Tcpbt				
Bullfrog Tuff	Tcbuv	Crater Flat undifferentiated (CFu)	BF3 (welded)	bf3	Bullfrog welded (BFw)
	Tcbuc				
	Tcbmd				
	Tcblc				
	Tcblv		BF2 (nonwelded)	bf2	Middle Crater Flat nonwelded (CFMn)
Bedded Tuff	Tcbbt				
Tram Tuff	Tctuv		Not Available	tr3	Tram welded (TRw)
	Tctuc				
	Tctmd				
	Tctlc				
	Tctlv & below		Not Available	tr2	

00264DC_LA_0586b.ai

Source: DOE 2002 [DIRS 155943], Table 4-4; DOE 2002 [DIRS 156958], Figure 3-21; Ortiz et al. 1985 [DIRS 101280]; Engstrom and Rautman 1996 [DIRS 100670]; BSC 2007 [DIRS 178693].