

NP-10-0011  
June 15, 2010

10 CFR 52, Subpart A

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Subject: Exelon Nuclear Texas Holdings, LLC  
Victoria County Station  
Early Site Permit Application Site Safety Analysis Report Section 2.5.2  
Revision  
NRC Docket No. 52-042

- References: (1) Exelon Nuclear Texas Holdings, LLC letter to USNRC, Application for Early Site Permit for Victoria County Station, dated March 25, 2010
- (2) Exelon Nuclear Texas Holdings, LLC letter to USNRC, Early Site Permit Application Correction Notification, dated May 13, 2010

Exelon Nuclear Texas Holdings, LLC (Exelon) submitted an application for an early site permit (ESP) in Reference 1 for the Victoria County Station (VCS) site. That submittal consisted of six parts as described in the referenced letter.

Exelon subsequently notified the NRC in Reference 2 of an issue impacting the Site Safety Analysis Report (SSAR) Section 2.5.2. This issue involved a discrepancy in the updated Mmax distribution values for the VCS site. The upper end of the Mmax distribution for source BZ1 of the Bechtel Earth Science Team (EST) (one of the six ESTs of the EPRI-SOG seismic source model) has been corrected, as described in Reference 2. As previously discussed on May 10, 2010, a sensitivity analysis using the corrected Mmax distribution has been performed. This analysis demonstrates that the correction has an insignificant impact on the VCS site seismic hazard.

Additionally, a typographical error is corrected on SSAR Table 2.5.2-7. The analyses described in SSAR Section 2.5.2 are based on the corrected value; therefore, this change has no impact on the analyses or results.

SSAR Section 2.5.2 will be revised to incorporate these corrections as indicated in the SSAR page markups provided in Enclosure 1. This SSAR revision will be included in the next ESPA update submittal.

DOB  
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Regulatory commitments established in this submittal are identified in Enclosure 2. If any additional information is needed, please contact David J. Distel at (610) 765-5517.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 15<sup>th</sup> day of June, 2010.

Respectfully,



Marilyn C. Kray  
Vice President, Nuclear Project Development

Enclosures: (1) Markup Pages of Victoria County Station ESPA  
(2) Summary of Regulatory Commitments

cc: USNRC, Director, Office of New Reactors/NRLPO (w/enclosures)  
USNRC, Project Manager, VCS, Division of New Reactor Licensing  
(w/enclosures)  
USNRC Region IV, Regional Administrator (w/enclosures)

**ENCLOSURE 1**

**MARKUP PAGES OF VICTORIA COUNTY STATION ESPA**

**(Exelon Letter to USNRC No. NP-10-0011, dated June 15, 2010)**

The attached markup represents Exelon's good faith effort to show how the ESPA will be revised in a future ESPA submittal in response to the additional information described above. However, the same ESPA content may be impacted by revisions to the ESPA, responses to ESPA RAIs, other ESPA changes, editorial or typographical corrections, etc. As a result, the final ESPA content that appears in a future submittal may be somewhat different than as presented herein.

**SSAR Section 2.5.2 Pages**

2.5.2-33  
2.5.2-34  
2.5.2-102  
2.5.2-114

possible. Following the original EST methodology ensures consistency between the original distributions and those updated here using more recent seismicity data.

#### 2.5.2.4.3.1.1 Bechtel Group Gulf Coast Source Zone (Zone BZ1)

The Bechtel Group assigned  $M_{max}$  values of 5.4, 5.7, 6.0, and 6.6 to the Gulf Coast source zone (zone BZ1) (Table 2.5.2-19). Because the Emb 5.5 and Emb 6.1 earthquakes from the updated catalog occur well within this zone (Figure 2.5.4-4), and because these magnitudes are greater than the lower-bound  $M_{max}$  values for the source zone, the  $M_{max}$  distribution for this source zone has been updated.

The updated  $M_{max}$  values of 6.1, 6.4, and 6.6, and 6.7 with weightings of 0.1, 0.4, 0.1, and 0.50.4 used here (in Table 2.5.2-19) follow from Bechtel's methodology of defining  $M_{max}$  distributions (Reference 2.5.2-19):

- The lower bound magnitude of the distribution is defined as the greater of either the largest observed earthquake magnitude within the zone, or  $m_b$  5.4.
- The next higher magnitude is 0.3 magnitude units greater than the minimum.
- The third magnitude is 0.6 magnitude units above the minimum.
- The fourth magnitude, and upper bound of the distribution, is  $m_b$  6.6, interpreted as the largest intraplate earthquake in the CEUS with specific exceptions.
- The weightings on the four  $M_{max}$  values are 0.1, 0.4, 0.4, and 0.1, assigned consecutively from the minimum  $M_{max}$  value.

If these guidelines result in an upper bound magnitude or magnitudes greater than  $m_b$  6.6, then the upper  $M_{max}$  distribution is truncated at  $m_b$  6.6, and all weightings for magnitudes greater than or equal to 6.6 are summed and collapsed onto the magnitude 6.6 upper bound.

An  $M_{max}$  distribution for BZ1 of 6.1, 6.4, and 6.6 with weights of 0.1, 0.4, and 0.5, respectively, based on an initial interpretation of the Bechtel methodology, has been used for the development of rock UHRS in Tables 2.5.2-24 and 2.5.2-27. A sensitivity study has been performed showing that the effect of adopting the updated BZ1  $M_{max}$  distribution shown in Table 2.5.2-19 would, over the entire frequency range of interest (0.5 to 100 Hz), and in the  $10^{-4}$  to  $10^{-5}$  mean annual frequency of exceedance range used to determine ground motion design response spectrum values, result in an increase of 0.15% or less. Based on these results, Exelon has concluded that the difference in the rock UHRS incorporating the initial BZ1  $M_{max}$  distribution is

insignificant, and that the design ground motions derived from these spectra remain appropriate for the VCS site.

#### **2.5.2.4.3.1.2 Dames & Moore South Coastal Margin (Zone 20)**

Dames & Moore assigned  $M_{max}$  values of 5.3 and 7.2 to the South Coastal Margin source zone (zone 20) (Table 2.5.2-19). The Emb 5.5 earthquake from the updated catalog is inside this zone, and the Emb 6.1 earthquake is well outside the zone (Figure 2.5.2-5). Because the Emb 5.5 event is within the source zone and has a magnitude larger than the lower bound  $M_{max}$  value, the  $M_{max}$  distribution for this source zone has been revised.

The methodology used to determine the  $M_{max}$  distribution for the South Coastal Margin zone in the EPRI 1989 model does not provide a means of updating the lower-bound 5.3  $M_{max}$  value to reflect the occurrence of the Emb 5.5 earthquake (References 2.5.2-16 and 2.5.2-18). Given the lack of a well-documented methodology to follow, the  $M_{max}$  distribution used here results from increasing the lower-bound  $M_{max}$  to match the magnitude of the observed Emb 5.5 earthquake while maintaining the same upper bound and weightings of the original  $M_{max}$  distribution for the source zone. The updated  $M_{max}$  values are  $m_b$  5.5 and 7.2 with weightings of 0.8 and 0.2, respectively (Table 2.5.2-19).

#### **2.5.2.4.3.1.3 Law Engineering South Coastal Block (Zone 126)**

Law Engineering assigned  $M_{max}$  values of 4.6 and 4.9 to the South Coastal Block source zone (zone 126) (Table 2.5.2-19). The Emb 5.5 earthquake is 22 miles (36 km) outside of the source zone, and the Emb 6.1 earthquake is approximately 100 miles (160 km) outside of the source zone (Figure 2.5.2-6). The Emb 6.1 earthquake was well recorded and clearly lies outside the source zone (Reference 2.5.2-62). The Emb 5.5 earthquake was less well recorded (References 2.5.2-63 and 2.5.2-64), and attempts at relocating the event have resulted in significant (tens of kilometers) variation in the position of the earthquake epicenter (Reference 2.5.2-51, 2.5.2-63, and 2.5.2-65). Although the published location of the Emb 5.5 earthquake is outside the South Coastal Block source zone, the earthquake is conservatively considered to have occurred within the source zone given the uncertainty in the epicentral location of the earthquake. As such, the  $M_{max}$  distribution for the source zone is updated to reflect this earthquake.

The updated  $M_{max}$  values of 5.5 and 5.7, adopted here (Table 2.5.2-19) are derived using Law Engineering's methodology for developing  $M_{max}$  distributions, as follows (Reference 2.5.2-16):

**Table 2.5.2-7  
 Summary of Bechtel Group Seismic Source Zones**

Source	Description	Distance <sup>(a)</sup>		P <sub>a</sub> <sup>(b)</sup>	M <sub>max</sub> (m <sub>b</sub> ) and Wts. <sup>(c)</sup>	Smoothing Options and Wts. <sup>(d)</sup>	New Information to Suggest Change in Source		
		(km)	(mi)				Geometry <sup>(e)</sup>	M <sub>max</sub> <sup>(f)</sup>	RI <sup>(g)</sup>
BZ1	Gulf Coast	0	0	1.0	5.4 [0.1] 5.7 [0.4] 6.0 [0.4] 6.6 [0.1]	1 [0.33] 2 [0.34] 3 [0.33]	No	Yes	No
BZ2	Texas Platform	15	9.3	<del>0.4</del> 1.0	5.4 [0.1] 5.7 [0.4] 6.0 [0.4] 6.6 [0.1]	1 [0.33] 2 [0.34] 4 [0.33]	No	No	No

- (a) Shortest distance between VCS site and source zone.
- (b) Probability of activity (Reference 2.5.2-18).
- (c) Maximum earthquake magnitude (M<sub>max</sub>) in body-wave magnitude (m<sub>b</sub>) and weighting (Wts.) (Reference 2.5.2-18).
- (d) Smoothing options (Reference 2.5.2-18):
  - 1 = constant a, constant b, no b prior
  - 2 = low smoothing on a, high smoothing on b, no b prior
  - 3 = low smoothing on a, low smoothing on b, no b prior
  - 4 = low smoothing on a, low smoothing on b, weak b prior of 1.05
 Weights on magnitude intervals are [1.0, 1.0, 1.0, 1.0, 1.0, 1.0, 1.0]
- (e) No, unless updated geometry supported by post-EPRI-SOG data.
- (f) No, unless greater M<sub>max</sub> supported by post-EPRI-SOG data.
- (g) RI = recurrence interval. Assumed no change unless supported by post-EPRI-SOG data. Rate evaluations based on observed seismicity are not considered here and are described in Subsection 2.5.2.4.2.

**Table 2.5.2-19  
 Comparison of Original EPRI-SOG Gulf Coastal Source Zones Characterizations and  
 Modifications Made for the VCS Site**

EPRI Team	Source	Description	EPRI-SOG Model	Updated Model for VCS Site	
				$M_{max}$ ( $m_b$ ) and Wts. <sup>a</sup>	Smoothing Options and Wts.
Bechtel Group	BZ1	Gulf Coast	5.4 [0.1] 5.7 [0.4] 6.0 [0.4] 6.6 [0.1]	6.1 [0.10] 6.4 [0.40] 6.6 [0.50, 1.0] 6.7 [0.40]	No Update
Dames & Moore	20	South Coastal Margin	5.3 [0.8] 7.2 [0.2]	5.5 [0.80] 7.2 [0.20]	I (0.2) II (0.4) III (0.4)
Law Engineering	126	South Coastal Block	4.6 [0.9] 4.9 [0.1]	5.5 [0.90] 5.7 [0.10]	No Update
Rondout Associates	51	Gulf Coast to Bahamas Fracture Zone	4.8 [0.2] 5.5 [0.6] 5.8 [0.2]	6.1 [0.30] 6.3 [0.55] 6.5 [0.15]	No Update
Weston Geophysical Corporation	107	Gulf Coast	5.4 [0.71] 6.0 [0.29]	6.6 [0.89] 7.2 [0.11]	No Update
Woodward-Clyde Consultants	B43	Central U.S. Background	4.9 [0.17] 5.4 [0.28] 5.8 [0.27] 6.5 [0.28]	No Update	No Update

<sup>a</sup>  $M_{max}$  distribution and weights from EPRI-SOG model Reference 2.5.2-18).

**ENCLOSURE 2**

**SUMMARY OF REGULATORY COMMITMENTS**

**(Exelon Letter to USNRC No. NP-10-0011, dated June 15, 2010)**

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITTED DATE	COMMITMENT TYPE	
		ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
Exelon will revise the ESPA SSAR Section 2.5.2 to incorporate the changes shown in Enclosure 1 correcting the Mmax distribution for source BZ1 of the Bechtel Earth Science Team, and describing the results of the sensitivity analysis using the corrected distribution.	Revision 1 of the ESPA SSAR planned for March 25, 2011	Yes	No