PMVictoriaESPPEm Resource

From: Govan, Tekia
Sent: Friday, April 08, 2011 4:24 PM
To: 'david.distel@exeloncorp.com'
Cc: VictoriaESP Resource
Subject: RAI Letter Number 7
Attachments: VCS ESP RAI Ltr#07 04-08-11.doc; VCS ESP RAI Ltr#07 04-08-11.pdf

David:

Please find attached a courtesy copy of RAI Letter number 7 (in PDF and WORD) which has been sent officially via US Postal mail. The document can also be found in ADAMS by Accession number ML110980634.

Thanks
Tekia

Tekia V. Govan, Project Manager
U.S. Nuclear Regulatory Commission
Office of New Reactors
MS T-6-D48
Washington DC 20555-0001
301-415-6197
Tekia.Govan@nrc.gov

Hearing Identifier: Victoria_ESP_Public
Email Number: 227

Mail Envelope Properties (F5A4366DF596BF458646C9D433EA37D780CB82548A)

Subject: RAI Letter Number 7
Sent Date: 4/8/2011 4:24:16 PM
Received Date: 4/8/2011 4:24:18 PM
From: Govan, Tekia

Created By: Tekia.Govan@nrc.gov

Recipients:
"VictoriaESP Resource" <VictoriaESP.Resource@nrc.gov>
Tracking Status: None
"'david.distel@exeloncorp.com'" <david.distel@exeloncorp.com>
Tracking Status: None

Post Office: HQCLSTR01.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	478	4/8/2011 4:24:18 PM
VCS ESP RAI Ltr#07 04-08-11.doc	84986	
VCS ESP RAI Ltr#07 04-08-11.pdf	168893	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

April 8, 2011

Ms. Marilyn C. Kray
Vice President
New Plant Development
Exelon Generation
200 Exelon Way
Kennett Square, PA 19348

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 07 (SRP SECTIONS: 02.04.05 – PROBABLE MAXIMUM TSUNAMI FLOODING, 02.05.02–VIBRATORY GROUND MOTION, AND 11.02-LIQUID WASTE MANAGEMENT SYSTEM) RELATED TO THE VICTORIA COUNTY STATION EARLY SITE PERMIT APPLICATION

Dear Ms. Kray:

By letter dated March 25, 2010, Exelon Nuclear Texas Holdings, LLC (Exelon) submitted an early site permit application for Victoria County Station pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application.

The staff has identified that additional information is needed to continue portions of the review and the request for additional information (RAI) is contained in the enclosure to this letter. The Exelon staff has requested the following response times for each question:

30 days	**45 days**	**75 days**	**90 days**	**120 days**
02.04.06-1	02.04.06-2	02.05.02-6 c	02.04.06-3	02.05.02-3 a
02.05.02-1	02.05.02-3 d		02.05.02-10	02.05.02-3 b
02.05.02-2	02.05.02-4			02.05.02-3 c
02.05.02-7	02.05.02-5			
02.05.02-8	02.05.02-6 a			
11.02-3	02.05.02-6 b			
11.02-4	02.05.02-9			

If the RAI response involves changes to application documentation, Exelon is requested to include the associated revised documentation with the response.

Should you have questions, please contact Tekia Govan at (301) 415-6197 or Tekia.Govan@nrc.gov.

Sincerely,

/RA/

Tekia V. Govan, Project Manager
BWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-042

Enclosure: As stated

Should you have questions, please contact Tekia Govan at (301) 415-6197 or Tekia.Govan@nrc.gov.

Sincerely,

/RA/

Tekia V. Govan, Project Manager
BWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-042

Enclosure: As stated

Docket No. 52-042

E-RAI Tracking No: 5553, 5512, 5545 and 5631

Enclosure: Request for Additional Information

Distribution:

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ADAMS Accession No.: ML110980634

OFFICE	BC: NRO/RGS2	BC: NRO/CHPB	BC: NRO/RHEB	PM:DNRL:BWR
NAME	CCook*	ERoach*	RRaione*	TGovan*
DATE	3/1/2011	3/1/2011	3/10/2011	4/8/2011

*Approval captured electronically in the electronic RAI system.

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Request for Additional Information No. 5631 Revision 0

Victoria County Station ESP
Exelon Texas
Docket No. 52-042
SRP Section: 02.04.06 - Probable Maximum Tsunami Flooding
Application Section: 2.4.6

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.06-1

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, an assessment of the Probable Maximum Tsunami (PMT) for the proposed site should be provided in the application. Section C.I.2.4.6.3 of Regulatory Guide 1.206 (RG 1.206) provides specific guidance with respect to the source characteristics needed to determine the PMT. These characteristics include detailed geo-seismic descriptions of the controlling local tsunami generators, including location, source dimensions, and maximum displacement. Provide additional information, evaluation and a discussion in the SSAR of the following:

(1) Why major Gulf of Mexico and Caribbean landslides other than the East Breaks slump were excluded as potential tsunamigenic sources for the PMT, particularly those landslides along the Mississippi Canyon, west Florida Slope/Escarpment, and Campeche Escarpment.

(2) The differences in maximum earthquake magnitudes used in Section 2.4.6.1 and in Section 2.5.2 and why the lower maximum magnitudes are used in regard to tsunami source parameters. Also, provide discussion of the source parameters of recent earthquakes that have occurred in the Gulf of Mexico in regard to tsunami generation.

(3) Clarification and justification of the dissipation statement that assume the amplitude of any tsunami wave from outside the Gulf of Mexico (specifically Caribbean sources) would be reduced by traveling through the Florida Straits or would be blocked by the Bahamas.

(4) The location and the tsunamigenic potential of volcanoes near the coast of the Gulf of Mexico in relation to their potential as a PMT source.

(5) Clarification on how the mid-Holocene age of the Mississippi Canyon landslide relates to establishing this region as potentially active, especially in terms of the whether the age is used to exclude the landslide from consideration as a potential PMT source and if so, why.

(6) Updated information, using recently published sources or independent evaluation, on the tsunami source parameters used for the East Breaks slump.

02.04.06-2

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, an assessment of the Probable Maximum Tsunami (PMT) for the proposed site should be provided in the application. Section C.1.2.4.6.2 of Regulatory Guide 1.206 (RG 1.206) provides specific guidance with respect to the historical tsunami record, including paleo-tsunami evidence. Provide in the SSAR information regarding geologic evidence of tsunami deposits at the Victoria County site or at nearby regions, such as from borings or other subsurface information collected by the applicant. Cross-reference with Section 2.5 of the SSAR where applicable. Additionally, indicate whether there are geologically conducive locations for the deposition and preservation of tsunami deposits in the vicinity of the Victoria County site. If such paleo-tsunami evidence exists, indicate how they are distinguished from storm wash-over deposits.

02.04.06-3

To meet the requirements of GDC 2, 10 CFR 52.17, and 10 CFR Part 100, an assessment of the Probable Maximum Tsunami (PMT) for the proposed site should be provided in the application. Section C.I.2.4.6.4 of Regulatory Guide 1.206 (RG 1.206) provides specific guidance with respect to tsunami analysis. This includes providing a complete description of the analysis procedure used to calculate tsunami wave height and period at the site, including the theoretical bases of the models, their verification and the conservatism of all input parameters. Specifically, for this site, the applicant should provide in the SSAR a quantitative analysis regarding:

(1) Choice of the East Breaks slide as the PMT source over other potential sources.

Section C.I.2.4.6.3 of RG 1.206 provides specific guidance with respect to the source characteristics needed to determine the PMT. These characteristics include detailed geo-seismic descriptions of the controlling local and distant tsunami generators, including location, source dimensions, fault orientation, and maximum displacement. Provide these characteristics for seismogenic tsunamis originating in the Caribbean and Gulf of Mexico as used in the analysis. Also provide the location, source volume and dimensions, and maximum displacement information for landslides in the Gulf of Mexico used in the analysis. In addition, provide a rationale for choosing the East Breaks slide as the PMT source among other potential sources based on analysis of estimated tsunami water levels at the VCS site for each source.

(2) Propagation of the PMT from the source to the site, using bathymetric, coastline, and topographic information specific to the site.

Section C.I.2.4.6.4 of RG 1.206 provides specific guidance with respect to tsunami analysis. This includes providing a complete description of the analysis procedure used to calculate tsunami wave height and period specific to the bathymetry and topography between the PMT source and the VCS site. Provide a clear presentation of all equations used, discussion of assumptions inherent in these equations and the associated conservatism, and the procedure to calculate the provided values. In addition, provide all input data sources, calculation packages, and any associated modeling input files.

Request for Additional Information No. 5545 Revision 0

Victoria County Station ESP
Exelon Texas
Docket No. 52-042
SRP Section: 02.05.02 - Vibratory Ground Motion
Application Section: 2.5.2

QUESTIONS for Geosciences and Geotechnical Engineering Branch 2 (RGS2)

02.05.02-1

In SSAR Section 2.5.2.1, the applicant discussed its seismicity catalog. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its seismicity catalog.

a) The following four earthquakes are reported by the USGS PDE earthquake catalog and occur within 320-km (200-mi) of the VCS site. These four earthquakes do not appear in the applicant's updated seismicity catalog in SSAR Table 2.5.2-3.

PDE	1991	0720233819.2	28.91	-98.04	10	3.40LgTUL	3.60LgGS
PDE	1993	0409122919.1	28.81	-98.12	5		4.30LgGS
PDE	1993	0516153019.3	28.81	-98.17	5		3.00LgGS
PDE	1997	0324223134.5	27.72	-98.05	5		3.80LgGS

In addition, SSAR Figure 2.5.2-1 appears to show fewer events than a plot of the PDE events within the same investigation window.

Please discuss these apparent discrepancies between the applicant's updated seismicity catalog and USGS PDE catalog and the impact on hazard at the VCS site.

b) In SSAR Section 2.5.2.1.2.1, the applicant stated that "body wave magnitude was related to moment magnitude using the arithmetic average of three equations, or their inversions." Please provide more detail on the magnitude conversion methods and their corresponding inversions.

02.05.02-2

In SSAR Section 2.5.2.1, the applicant discussed its seismicity catalog completeness analysis. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its seismicity catalog.

SSAR Section 2.5.2.1.5 describes how the catalog completeness analysis was extended to the Gulf of Mexico region following the catalog update. A *b*-value of 1.05 is derived, but its region of applicability is not clearly stated. Please provide a map showing EPRI Incompleteness Region 2 and 3 and the region of the Gulf of Mexico where the updated completeness model applies. In addition, please describe in detail the method used to compute the *b*-value and clarify whether the *b*-value of 1.05 applies to the "project seismicity investigation window" region

(SSAR Figure 2.5.2-1), only the “Gulf of Mexico seismicity recurrence area” (SSAR Figure 2.5.2-3), or some other regions.

02.05.02-3

In SSAR Section 2.5.2.2, the applicant discussed the EPRI-SOG model seismic source characterizations used in the PSHA for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its seismic source characterizations.

a) As shown in SSAR Figure 2.5.2-5, the boundary of the Dames and Moore New Mexico source (67) appears to include a reentrant that loops northwestward from the northern boundary of the Quachitas Fold belt through southeastern New Mexico and back. This feature does not appear to be represented by any of the Dames and Moore sources but encloses the January 2, 1992, and April 14, 1995, earthquakes [magnitudes (Emb) 5.0 and 5.6, respectively]. Please discuss this source’s contribution to the VCS site hazard in light of this reentrant feature.

b) SSAR Figure 2.5.2-7 demonstrates that the Rondout background 50 zone encloses the January 2, 1992, and April 14, 1995, earthquakes [magnitudes (Emb) 5.0 and 5.6, respectively]. These magnitudes are greater than m_b 4.8, the smallest value in the Mmax distribution for the Rondout zone (SSAR Table 2.5.2-10). Please explain why the Rondout background 50 zone was not updated to reflect these two recent earthquakes.

c) SSAR Section 2.5.2.4.3 describes the applicant's interpretation of the tectonic environment that produced the moderate-sized (Emb 5.6) earthquake on April 14, 1995 in Western Texas. The applicant created a new seismic source to accommodate potential hazard that results from the Rio Grande Rift (RGR). Please discuss how the applicant reached the conclusion that the April 14, 1995 earthquake is tectonically related to the RGR system. Please also provide further information on how the hazard calculated at the VCS site would be impacted if the applicant updated the EPRI source model parameters that encompass the earthquake rather than attributing the event to an eastward extension of the RGR.

d) Provide the Rondout zone 50, Law engineering 124 and Weston Geophysical Corporation 109 source zone geometries.

02.05.02-4

In SSAR Section 2.5.2.4, the applicant discussed the probabilistic seismic hazard analysis (PSHA) conducted for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its PSHA.

SSAR Section 2.5.2.4.1 describes software validation using EPRI hazard calculations. The applicant indicated that the lower overall hazard calculated for each of the EPRI ESTs at the VCS site relative to the STP site is attributed to three factors, 1) ~60-mile difference in location; 2) the VCS site lying within a geographical degree cell that has lower seismicity than that of the STP site; and 3) undocumented modeling assumptions. Please explain, in detail, how these three factors combine to produce a lower hazard at the VCS site relative to the STP site.

02.05.02-5

In SSAR Section 2.5.2.4.4.3, the applicant described its characterization of a new seismic source for the Rio Grande Rift (RGR). In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding the applicant's seismic source characterization.

a) In SSAR Section 2.5.2.4.4.3.2, the applicant discussed simplified USGS RGR model parameters including maximum magnitudes and recurrence intervals to characterize the southern extension of the source into Mexico. Please provide the basis for applying the USGS RGR source model parameters to this southern extension. In addition, provide the basis for the applicant's simplification of the USGS RGR model parameters. For example, why did the applicant replace the maximum magnitude range from Mw 7.1 to 7.5 with a single value of Mw 7.3 for 20% of the fault population? Also, explain why the applicant replaced the otherwise lognormal-distributed RGR fault recurrence interval with discretized points. Finally, provide the line-source geometry for the hypothetical RGR southern extension.

b) In SSAR Section 2.5.2.4.4.3.2, the applicant described its characterization of the RGR in southernmost Texas and Mexico. The applicant stated that it determined the position of the modeled RGR faults using relationships between topography, gravitational potential energy, the extent of the region of tensile stress related to the RGR, and the location of RGR-related earthquakes. SSAR Figure 2.5.2-10 shows the applicant's RGR fault characterizations overlain on a topographic map. South of "Fault 10" in SSAR Figure 2.5.2-10 and within the applicant's updated seismicity region, topographic trends continue southeastward as does the seismic activity. Please discuss the characterization of the southern extent and termination of the modeled RGR faults at Fault 10.

02.05.02-6

In SSAR Section 2.5.2.5, the applicant describes its characterization of the seismic wave transmission characteristics for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding the applicant's site-specific seismic wave transmission characterization.

a) SSAR Section 2.5.2.5 describes the soil column used in soil response analysis and also referred to SSAR Section 2.5.4 for detailed soil parameters. The SSAR describes that "the base soil column for each of the two units using site-specific geotechnical and geophysical data to a depth of about 615 feet (187 m), augmented to a depth of about 8115 feet (2473 m) with deep velocity profiles taken from industry or educational resources." However, the SSAR also states that "one resource identified was oil /gas sonic well log records for deep wells drilled in the vicinity of the VCS site. Shear wave velocity data at varying depths, ranging from 117 feet (36 m) to 15860 feet (4834 m) were obtained from 6 sonic well logs located in the proximity to the VCS site." SSAR Table 2.5.4-52 lists the profile depth to 15860 ft in 200-foot intervals. Please clarify which depth was used as the bottom of the deeper soil profile for the VCS site, 8115 feet or 15860 ft.

b) Several tables in SSAR Section 2.5.4 list different shear wave velocity values for the site specific layers, for example, SSAR Table 2.5.4-232 and SSAR Table 2.5.4-251. Please clarify these discrepancies.

c) Please describe the resonant features shown in SSAR Figures 2.5.2-58, -63, and -68 and whether they result from the truncated soil column used by the applicant to model the site's seismic-wave transmission.

02.05.02-7

In SSAR Section 2.5.2.4, the applicant discussed the probabilistic seismic hazard analysis (PSHA) conducted for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its PSHA.

SSAR Section 2.5.2.4.7 describes how the applicant developed its low-frequency (LF) and high-frequency (HF) Uniform Hazard Spectral (UHS) shapes. Please explain the methodology used by the applicant to develop the smooth UHS. In addition, explain why the LF spectrum might exceed the HF spectrum at high frequencies and why this was not allowed.

02.05.02-8

In SSAR Section 2.5.2.4, the applicant discussed the probabilistic seismic hazard analysis (PSHA) conducted for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its PSHA.

Please discuss and justify which EPRI 2004 ground motion model (Mid-Continental, Gulf Coastal, or others) the applicant used to characterize the VCS rock hazard for each seismic source – the individual EPRI sources, the NMSZ, the Meers fault, and the RGR.

02.05.02-9

In SSAR Section 2.5.2.4, the applicant discussed the probabilistic seismic hazard analysis (PSHA) conducted for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its PSHA. SSAR Section 2.5.2.4.7 describes the applicant's incorporation of site-specific hazard at the VCS site.

a) SSAR Figure 2.5.2-18 shows the 10 Hz mean rock hazard curves for the New Madrid seismic zone (NM) only and the EPRI-SOG+NM. SSAR Figure 2.5.2-24 shows the mean rock seismic hazard curves by source for each EPRI EST source and the New Madrid source. Please explain why the total hazard [EPRI-SOG+NM curve] in SSAR Figure 2.5.2-18 does not appear to reflect the sum of the individual hazard curves in SSAR Figure 2.5.2-24.

b) In SSAR Figure 2.5.2-38, the mean hazard curve exceeds the 95 percentile hazard curve at 0.09 g and above. Please explain this result.

02.05.02-10

In SSAR Section 2.5.2, the applicant characterizes seismic hazard for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its seismic hazard characterization.

SSAR Figure 2.5.1-51 shows locations of oil and gas wells in southern Victoria County. Oil and gas exploration and extraction are capable of inducing seismic events. In SSAR Section 2.5.2, the applicant did not discuss human-induced seismicity resulting from gas and oil extraction. Please discuss the history of any induced seismicity from oil and gas extraction in the region and the future potential for increased seismic hazard at the VCS site.

Request for Additional Information No. 5553 Revision 0

Victoria County Station ESP
Exelon Texas
Docket No. 52-042
SRP Section: 11.02 - Liquid Waste Management System
Application Section: 11.2

QUESTIONS for Health Physics Branch (CHPB)

11.02-3

10 CFR 20, 10 CFR 50 Appendix I, SRP 11.2, and RG 1.109 require that certain parameters to calculate the liquid effluent off-site dose to the public be identified for review and evaluation on a per unit basis.

In Table 11.2.3-1 (Sheet 1 of 3), the Discharge Flow Rate value is listed as 480 cubic feet per second (cfs), but does not specify in the basis whether this flow rate is used for one unit, two units, or the site.

Please verify and note in the application whether the value listed for the Discharge Flow Rate in Table 11.2.3-1 is for one unit, two units or the site. Please explain the following parameters within the application, 1) the river flow rate and 2) the liquid effluent release rate. Please verify and note in the application table that a discharge flow rate value on a per unit basis will be used in this application since the release source term and effluent doses are calculated on a per unit basis.

Request for Additional Information No. 5512 Revision 0

Victoria County Station ESP
Exelon Texas
Docket No. 52-042
SRP Section: 11.02 - Liquid Waste Management System
Application Section: 11.2

QUESTIONS for Health Physics Branch (CHPB)

11.02-4

40 CFR 190 requires that the individual dose equivalent to any member of the public from all nuclear fuel cycle facilities be considered against the limits of 40 CFR 190 and 10 CFR 20.1301(e). Table 11.2.3-6 in the VCS ESP application lists the total dose to any member of the public from all facilities, but does not give a breakdown of each facility and its contribution to each total dose.

Please include a breakdown of all doses: total body, thyroid and any other organ, to any member of the public as the result of exposures to planned discharges of radioactive material for each nuclear fuel facility included within the ESP application. Also, compare the total of these breakdowns to the 40 CFR 190 limits.

April 8, 2011

Ms. Marilyn C. Kray
Vice President
New Plant Development
Exelon Generation
200 Exelon Way
Kennett Square, PA 19348

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 07 (SRP SECTIONS: 02.04.05 – PROBABLE MAXIMUM TSUNAMI FLOODING, 02.05.02–VIBRATORY GROUND MOTION, AND 11.02-LIQUID WASTE MANAGEMENT SYSTEM) RELATED TO THE VICTORIA COUNTY STATION EARLY SITE PERMIT APPLICATION

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02.05.02-1	02.05.02-3 d		02.05.02-10	02.05.02-3 b
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11.02-4	02.05.02-9			

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Should you have questions, please contact Tekia Govan at (301) 415-6197 or Tekia.Govan@nrc.gov.

Sincerely,

/RA/

Tekia V. Govan, Project Manager
BWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-042

Enclosure: As stated

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Sincerely,

/RA/

Tekia V. Govan, Project Manager
BWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-042

Enclosure: As stated

Docket No. 52-042

E-RAI Tracking No: 5553, 5512, 5545 and 5631

Enclosure: Request for Additional Information

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ADAMS Accession No.: ML110980634

OFFICE	BC: NRO/RGS2	BC: NRO/CHPB	BC: NRO/RHEB	PM:DNRL:BWR
NAME	CCook*	ERoach*	RRaione*	TGovan*
DATE	3/1/2011	3/1/2011	3/10/2011	4/8/2011

*Approval captured electronically in the electronic RAI system.

OFFICIAL RECORD COPY

Request for Additional Information No. 5631 Revision 0

Victoria County Station ESP
Exelon Texas
Docket No. 52-042
SRP Section: 02.04.06 - Probable Maximum Tsunami Flooding
Application Section: 2.4.6

QUESTIONS for Hydrologic Engineering Branch (RHEB)

02.04.06-1

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02.04.06-3

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(1) Choice of the East Breaks slide as the PMT source over other potential sources.

Section C.I.2.4.6.3 of RG 1.206 provides specific guidance with respect to the source characteristics needed to determine the PMT. These characteristics include detailed geo-seismic descriptions of the controlling local and distant tsunami generators, including location, source dimensions, fault orientation, and maximum displacement. Provide these characteristics for seismogenic tsunamis originating in the Caribbean and Gulf of Mexico as used in the analysis. Also provide the location, source volume and dimensions, and maximum displacement information for landslides in the Gulf of Mexico used in the analysis. In addition, provide a rationale for choosing the East Breaks slide as the PMT source among other potential sources based on analysis of estimated tsunami water levels at the VCS site for each source.

(2) Propagation of the PMT from the source to the site, using bathymetric, coastline, and topographic information specific to the site.

Section C.I.2.4.6.4 of RG 1.206 provides specific guidance with respect to tsunami analysis. This includes providing a complete description of the analysis procedure used to calculate tsunami wave height and period specific to the bathymetry and topography between the PMT source and the VCS site. Provide a clear presentation of all equations used, discussion of assumptions inherent in these equations and the associated conservatism, and the procedure to calculate the provided values. In addition, provide all input data sources, calculation packages, and any associated modeling input files.

Request for Additional Information No. 5545 Revision 0

Victoria County Station ESP
Exelon Texas
Docket No. 52-042
SRP Section: 02.05.02 - Vibratory Ground Motion
Application Section: 2.5.2

QUESTIONS for Geosciences and Geotechnical Engineering Branch 2 (RGS2)

02.05.02-1

In SSAR Section 2.5.2.1, the applicant discussed its seismicity catalog. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its seismicity catalog.

a) The following four earthquakes are reported by the USGS PDE earthquake catalog and occur within 320-km (200-mi) of the VCS site. These four earthquakes do not appear in the applicant's updated seismicity catalog in SSAR Table 2.5.2-3.

PDE	1991	0720233819.2	28.91	-98.04	10	3.40LgTUL	3.60LgGS
PDE	1993	0409122919.1	28.81	-98.12	5		4.30LgGS
PDE	1993	0516153019.3	28.81	-98.17	5		3.00LgGS
PDE	1997	0324223134.5	27.72	-98.05	5		3.80LgGS

In addition, SSAR Figure 2.5.2-1 appears to show fewer events than a plot of the PDE events within the same investigation window.

Please discuss these apparent discrepancies between the applicant's updated seismicity catalog and USGS PDE catalog and the impact on hazard at the VCS site.

b) In SSAR Section 2.5.2.1.2.1, the applicant stated that "body wave magnitude was related to moment magnitude using the arithmetic average of three equations, or their inversions." Please provide more detail on the magnitude conversion methods and their corresponding inversions.

02.05.02-2

In SSAR Section 2.5.2.1, the applicant discussed its seismicity catalog completeness analysis. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its seismicity catalog.

SSAR Section 2.5.2.1.5 describes how the catalog completeness analysis was extended to the Gulf of Mexico region following the catalog update. A *b*-value of 1.05 is derived, but its region of applicability is not clearly stated. Please provide a map showing EPRI Incompleteness Region 2 and 3 and the region of the Gulf of Mexico where the updated completeness model applies. In addition, please describe in detail the method used to compute the *b*-value and clarify whether the *b*-value of 1.05 applies to the "project seismicity investigation window" region

(SSAR Figure 2.5.2-1), only the “Gulf of Mexico seismicity recurrence area” (SSAR Figure 2.5.2-3), or some other regions.

02.05.02-3

In SSAR Section 2.5.2.2, the applicant discussed the EPRI-SOG model seismic source characterizations used in the PSHA for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its seismic source characterizations.

a) As shown in SSAR Figure 2.5.2-5, the boundary of the Dames and Moore New Mexico source (67) appears to include a reentrant that loops northwestward from the northern boundary of the Quachitas Fold belt through southeastern New Mexico and back. This feature does not appear to be represented by any of the Dames and Moore sources but encloses the January 2, 1992, and April 14, 1995, earthquakes [magnitudes (Emb) 5.0 and 5.6, respectively]. Please discuss this source’s contribution to the VCS site hazard in light of this reentrant feature.

b) SSAR Figure 2.5.2-7 demonstrates that the Rondout background 50 zone encloses the January 2, 1992, and April 14, 1995, earthquakes [magnitudes (Emb) 5.0 and 5.6, respectively]. These magnitudes are greater than m_b 4.8, the smallest value in the Mmax distribution for the Rondout zone (SSAR Table 2.5.2-10). Please explain why the Rondout background 50 zone was not updated to reflect these two recent earthquakes.

c) SSAR Section 2.5.2.4.3 describes the applicant's interpretation of the tectonic environment that produced the moderate-sized (Emb 5.6) earthquake on April 14, 1995 in Western Texas. The applicant created a new seismic source to accommodate potential hazard that results from the Rio Grande Rift (RGR). Please discuss how the applicant reached the conclusion that the April 14, 1995 earthquake is tectonically related to the RGR system. Please also provide further information on how the hazard calculated at the VCS site would be impacted if the applicant updated the EPRI source model parameters that encompass the earthquake rather than attributing the event to an eastward extension of the RGR.

d) Provide the Rondout zone 50, Law engineering 124 and Weston Geophysical Corporation 109 source zone geometries.

02.05.02-4

In SSAR Section 2.5.2.4, the applicant discussed the probabilistic seismic hazard analysis (PSHA) conducted for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its PSHA.

SSAR Section 2.5.2.4.1 describes software validation using EPRI hazard calculations. The applicant indicated that the lower overall hazard calculated for each of the EPRI ESTs at the VCS site relative to the STP site is attributed to three factors, 1) ~60-mile difference in location; 2) the VCS site lying within a geographical degree cell that has lower seismicity than that of the STP site; and 3) undocumented modeling assumptions. Please explain, in detail, how these three factors combine to produce a lower hazard at the VCS site relative to the STP site.

02.05.02-5

In SSAR Section 2.5.2.4.4.3, the applicant described its characterization of a new seismic source for the Rio Grande Rift (RGR). In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding the applicant's seismic source characterization.

a) In SSAR Section 2.5.2.4.4.3.2, the applicant discussed simplified USGS RGR model parameters including maximum magnitudes and recurrence intervals to characterize the southern extension of the source into Mexico. Please provide the basis for applying the USGS RGR source model parameters to this southern extension. In addition, provide the basis for the applicant's simplification of the USGS RGR model parameters. For example, why did the applicant replace the maximum magnitude range from Mw 7.1 to 7.5 with a single value of Mw 7.3 for 20% of the fault population? Also, explain why the applicant replaced the otherwise lognormal-distributed RGR fault recurrence interval with discretized points. Finally, provide the line-source geometry for the hypothetical RGR southern extension.

b) In SSAR Section 2.5.2.4.4.3.2, the applicant described its characterization of the RGR in southernmost Texas and Mexico. The applicant stated that it determined the position of the modeled RGR faults using relationships between topography, gravitational potential energy, the extent of the region of tensile stress related to the RGR, and the location of RGR-related earthquakes. SSAR Figure 2.5.2-10 shows the applicant's RGR fault characterizations overlain on a topographic map. South of "Fault 10" in SSAR Figure 2.5.2-10 and within the applicant's updated seismicity region, topographic trends continue southeastward as does the seismic activity. Please discuss the characterization of the southern extent and termination of the modeled RGR faults at Fault 10.

02.05.02-6

In SSAR Section 2.5.2.5, the applicant describes its characterization of the seismic wave transmission characteristics for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding the applicant's site-specific seismic wave transmission characterization.

a) SSAR Section 2.5.2.5 describes the soil column used in soil response analysis and also referred to SSAR Section 2.5.4 for detailed soil parameters. The SSAR describes that "the base soil column for each of the two units using site-specific geotechnical and geophysical data to a depth of about 615 feet (187 m), augmented to a depth of about 8115 feet (2473 m) with deep velocity profiles taken from industry or educational resources." However, the SSAR also states that "one resource identified was oil /gas sonic well log records for deep wells drilled in the vicinity of the VCS site. Shear wave velocity data at varying depths, ranging from 117 feet (36 m) to 15860 feet (4834 m) were obtained from 6 sonic well logs located in the proximity to the VCS site." SSAR Table 2.5.4-52 lists the profile depth to 15860 ft in 200-foot intervals. Please clarify which depth was used as the bottom of the deeper soil profile for the VCS site, 8115 feet or 15860 ft.

b) Several tables in SSAR Section 2.5.4 list different shear wave velocity values for the site specific layers, for example, SSAR Table 2.5.4-232 and SSAR Table 2.5.4-251. Please clarify these discrepancies.

c) Please describe the resonant features shown in SSAR Figures 2.5.2-58, -63, and -68 and whether they result from the truncated soil column used by the applicant to model the site's seismic-wave transmission.

02.05.02-7

In SSAR Section 2.5.2.4, the applicant discussed the probabilistic seismic hazard analysis (PSHA) conducted for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its PSHA.

SSAR Section 2.5.2.4.7 describes how the applicant developed its low-frequency (LF) and high-frequency (HF) Uniform Hazard Spectral (UHS) shapes. Please explain the methodology used by the applicant to develop the smooth UHS. In addition, explain why the LF spectrum might exceed the HF spectrum at high frequencies and why this was not allowed.

02.05.02-8

In SSAR Section 2.5.2.4, the applicant discussed the probabilistic seismic hazard analysis (PSHA) conducted for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its PSHA.

Please discuss and justify which EPRI 2004 ground motion model (Mid-Continental, Gulf Coastal, or others) the applicant used to characterize the VCS rock hazard for each seismic source – the individual EPRI sources, the NMSZ, the Meers fault, and the RGR.

02.05.02-9

In SSAR Section 2.5.2.4, the applicant discussed the probabilistic seismic hazard analysis (PSHA) conducted for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its PSHA. SSAR Section 2.5.2.4.7 describes the applicant's incorporation of site-specific hazard at the VCS site.

a) SSAR Figure 2.5.2-18 shows the 10 Hz mean rock hazard curves for the New Madrid seismic zone (NM) only and the EPRI-SOG+NM. SSAR Figure 2.5.2-24 shows the mean rock seismic hazard curves by source for each EPRI EST source and the New Madrid source. Please explain why the total hazard [EPRI-SOG+NM curve] in SSAR Figure 2.5.2-18 does not appear to reflect the sum of the individual hazard curves in SSAR Figure 2.5.2-24.

b) In SSAR Figure 2.5.2-38, the mean hazard curve exceeds the 95 percentile hazard curve at 0.09 g and above. Please explain this result.

02.05.02-10

In SSAR Section 2.5.2, the applicant characterizes seismic hazard for the VCS site. In accordance with 10 CFR 100.23, the staff requests the applicant provide additional information regarding its seismic hazard characterization.

SSAR Figure 2.5.1-51 shows locations of oil and gas wells in southern Victoria County. Oil and gas exploration and extraction are capable of inducing seismic events. In SSAR Section 2.5.2, the applicant did not discuss human-induced seismicity resulting from gas and oil extraction. Please discuss the history of any induced seismicity from oil and gas extraction in the region and the future potential for increased seismic hazard at the VCS site.

Request for Additional Information No. 5553 Revision 0

Victoria County Station ESP
Exelon Texas
Docket No. 52-042
SRP Section: 11.02 - Liquid Waste Management System
Application Section: 11.2

QUESTIONS for Health Physics Branch (CHPB)

11.02-3

10 CFR 20, 10 CFR 50 Appendix I, SRP 11.2, and RG 1.109 require that certain parameters to calculate the liquid effluent off-site dose to the public be identified for review and evaluation on a per unit basis.

In Table 11.2.3-1 (Sheet 1 of 3), the Discharge Flow Rate value is listed as 480 cubic feet per second (cfs), but does not specify in the basis whether this flow rate is used for one unit, two units, or the site.

Please verify and note in the application whether the value listed for the Discharge Flow Rate in Table 11.2.3-1 is for one unit, two units or the site. Please explain the following parameters within the application, 1) the river flow rate and 2) the liquid effluent release rate. Please verify and note in the application table that a discharge flow rate value on a per unit basis will be used in this application since the release source term and effluent doses are calculated on a per unit basis.

Request for Additional Information No. 5512 Revision 0

Victoria County Station ESP
Exelon Texas
Docket No. 52-042
SRP Section: 11.02 - Liquid Waste Management System
Application Section: 11.2

QUESTIONS for Health Physics Branch (CHPB)

11.02-4

40 CFR 190 requires that the individual dose equivalent to any member of the public from all nuclear fuel cycle facilities be considered against the limits of 40 CFR 190 and 10 CFR 20.1301(e). Table 11.2.3-6 in the VCS ESP application lists the total dose to any member of the public from all facilities, but does not give a breakdown of each facility and its contribution to each total dose.

Please include a breakdown of all doses: total body, thyroid and any other organ, to any member of the public as the result of exposures to planned discharges of radioactive material for each nuclear fuel facility included within the ESP application. Also, compare the total of these breakdowns to the 40 CFR 190 limits.