PMTurkeyCOLPEm Resource

From:	CHILDRESS, ELWOOD [ELWOOD.CHILDRESS@fpl.com]
Sent:	Tuesday, February 12, 2013 3:15 PM
To:	Williamson, Alicia; Matthews, David; Maher, William; Comar, Manny; Hoeg, Tim; McCree, Victor
Subject:	L-2013-047 RAI Ltr 58 eRAI 6434 Response 01.05-1- Fukushima Near Term Task Force
Attachments:	47_L-2013-047 Signed 02-12-2013 RAI Ltr 58 eRAI 6434 Response.pdf

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Re: Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Response to NRC Request for Additional Information Letter No. 58 (eRAI 6434) - Concerning Implementation of Fukushima Near-Term Task Force Recommendations

References:

1. NRC Letter to FPL dated May 1, 2012, Request for Additional Information Letter No. 58 Concerning Implementation of Fukushima Near-Term Task Force Recommendations for the Turkey Point Units 6 and 7 Combined License Application
2. FPL Letter to NRC dated May 31, 2012, Schedule for Response to NRC Request for Additional Information Letter No. 58 (eRAI 6434) - Concerning Implementation of Fukushima Near-Term Task Force Recommendations
3. FPL Letter to NRC dated November 30, 2012, Revised Schedule for Response to NRC Request for Additional Information Letter No. 58 (eRAI 6434) - Concerning Implementation of Fukushima Near-Term Task Force Recommendations

Florida Power & Light Company (FPL) provides, as an attachment to this letter, its response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) 01.05-1, provided in the referenced letter. The attachment identifies changes that will be made in a future revision of the Turkey Point Units 6 and 7 Combined License Application (if applicable). References 2 and 3 provided a schedule for the response.

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Created By: ELWOOD.CHILDRESS@fpl.com

Recipients:
"Williamson, Alicia" <Alicia.Williamson@nrc.gov>
Tracking Status: None
"Matthews, David" <David.Matthews@nrc.gov>
Tracking Status: None
"Maher, William" <William.Maher@fpl.com>
Tracking Status: None
"Comar, Manny" <Manny.Comar@nrc.gov>
Tracking Status: None
"Hoeg, Tim" <Tim.Hoeg@nrc.gov>
Tracking Status: None
"McCree, Victor" <Victor.McCree@nrc.gov>
Tracking Status: None

Post Office: GOXSA1809.fplu.fpl.com

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February 12, 2013

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If you have any questions, or need additional information, please contact me at 561-691-7490.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 12, 2013.

Sincerely,

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/ETC

Attachment: FPL Response to NRC RAI No. 01.05-1 (eRAI 6434)

cc:
PTN 6 & 7 Project Manager, AP1000 Projects Branch 1, USNRC DNRL/NRO
Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant 3 & 4

NRC RAI Letter No. PTN-RAI-LTR-058 Dated May 1, 2012

SRP Section: 01.05 – Other Regulatory Considerations

Question from Licensing Branch 4

NRC RAI Number: 01.05-1 (eRAI 6434)

This request for additional information (RAI) specifically addresses Recommendation 2.1, of the Fukushima Near-Term Task Force recommendations contained in SECY-12-0025 as it pertains to the seismic hazard evaluation. This recommendation specifies the use of NUREG-2115, “Central and Eastern United States Seismic Source Characterization for Nuclear Facilities,” (CEUS SSC) in a site probabilistic seismic hazard analysis (PSHA). Consistent with Recommendation 2.1, as well as the need to consider the latest available information in the PSHA for Turkey Point Units 6 and 7 planned reactor site, the NRC staff requests that Florida Power and Light:

a) Evaluate the potential impacts of the newly released CEUS SSC model, with potential local and regional refinements as identified in the CEUS SSC model, on the seismic hazard curves and the site-specific ground motion response spectra (GMRS)/foundation input response spectra (FIRS). For re-calculation of the PSHA, please follow either the cumulative absolute velocity (CAV) filter or minimum magnitude specifications outlined in Attachment 1 to Seismic Enclosure 1 of the March 12, 2012 letter " Request for information pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) regarding Recommendations 2.1, 2.3, and 9.3, of the near-term task force review of insights from the Fukushima Dai-Ichi accident." (ML12053A340).
b) Modify the site-specific GMRS and FIRS if you determine changes are necessary given the evaluation performed in part a) above.

FPL RESPONSE:

Part (a) Response

The current seismic hazard model for the Turkey Point Units 6 & 7 planned reactor site as presented in Section 2.5.2 of Rev. 4 of the FSAR consists of two primary groups of seismic sources. One group is associated with seismicity in the central and eastern US (CEUS) and the other group is associated with seismicity in the Caribbean region. The CEUS seismic sources were based on an update to the EPRI-SOG (FSAR Reference 2.5.2-245) seismic source model for the CEUS. The update included augmentation of the source zones as necessary to encompass the region within 200 miles (320 km) of the site, as shown on FSAR Figures 2.5.2-204 through 2.5.2-209. The augmentation of the EPRI-SOG (FSAR Reference 2.5.2-245) seismic source zones in the site region was limited to the area north of the Caribbean seismic sources shown on FSAR Figure 2.5.2-217. The updated EPRI-SOG model also included the Updated Charleston Seismic Source (UCSS) shown on FSAR Figure 2.5.2-212.

Figures 1 and 2 show examples of the source zones of the CEUS Seismic Source Characterization (SSC) model developed in NUREG-2115 (Reference 1). Figure 1 shows example seismotectonic source zones and Figure 2 shows example Mmax source zones. The areal extent of the CEUS SSC model covers the region encompassed by the updated EPRI-SOG seismic sources shown on FSAR Figures 2.5.2-204 through 2.5.2-209. Thus, the CEUS SSC model can be considered as a replacement for the EPRI-SOG (FSAR Reference 2.5.2-245) seismic sources in their entirety. As a consequence, an assessment of the effect of the CEUS SSC model on the total hazard curves for the site can be evaluated by subtracting from the existing total hazard the contribution of the updated EPRI-SOG sources and then adding the hazard contributed by the CEUS SSC model sources to produce total hazard values for the purpose of the sensitivity analysis.

The approach described above allows a direct comparison of the effect of the CEUS SSC model on the hard rock hazard computed for the site. However, the question being asked in Part (a) is what is the effect on the ground motion response spectra (GMRS) and foundation input response spectra (FIRS). Calculation of the GMRS and FIRS requires inclusion of the effects of site amplification in the calculation of hazard curves for the GMRS and FIRS elevations at the site. As discussed in Part (a), the assessment of the hazard should follow either the cumulative absolute velocity (CAV) filter or minimum magnitude specifications outlined in Attachment 1 to Seismic Enclosure 1 of SECY-12-0025 (Reference 2). The current GMRS for the site is based on hazard calculations performed using a minimum magnitude for hazard integration of **M** 5 without use of the CAV filter. Thus, the modification to the application of the CAV filter specified in Attachment 1 to Seismic Enclosure 1 of SECY-12-0025 (Reference 2) does not impact the requested comparison. As a consequence, changes in the hazard at the GMRS are directly proportional to changes in the hard rock hazard (discounting the effect of nonlinearity), and rock hazard results can be used to evaluate the impact of the CEUS SSC model.

The CEUS SSC model was used to compute hard rock hazard at the Turkey Point site. The hazard was computed using the contributions from those portions of all of the CEUS SSC seismic source zones within 620 miles (1,000 km) of the site. In addition, the hazard from the Charleston repeated large magnitude earthquakes (RLME) source (Figure 3) was included in the computation as the Charleston, as characterized by the UCSS model, and was included in the updated EPRI-SOG model (Reference 1). Consistent with the calculations presented in FSAR Subsection 2.5.2.4, the hazard calculations for the seismic source zones and the Charleston RLME used the mid-continent versions of the EPRI (FSAR Reference 2.5.2-242) ground motion models. Similar to the analyses presented in FSAR Subsection 2.5.2.4, the contribution from the New Madrid RLME (Figure 3) was found to be negligible, and this source was not included in the hazard calculations. Consistent with the analysis presented in the FSAR, this calculation was performed using the Gulf Coast version of the EPRI (FSAR Reference 2.5.2-242) ground motion models as most of the travel path from New Madrid to the site is through the Gulf Coast attenuation region. Also, as documented in Chapter 8 of NUREG-2115 (Reference 2), the other RLME sources in the vicinity of the New Madrid RLME were found to have negligible contribution

to the hazard at the Chattanooga demonstration site, and thus would not contribute to the hazard at Turkey Point, which is much further away from these sources.

Figures 4 through 10 compare the total mean hazard from the updated EPRI-SOG plus Caribbean sources presented in Subsection 2.5.2.4 and Table 2.5.2-223 of the FSAR to the total mean hazard from the CEUS SSC model plus Caribbean sources. For structural frequencies of 2.5 Hz and higher, the total hazard computed using the CEUS SSC sources is lower than that computed using the updated EPRI-SOG sources in the important annual exceedance frequency range of 1E-04 to 1E-06. For structural frequencies of 0.5 and 1 Hz, the total hazard computed using the CEUS SSC model sources is higher by about 3 percent at an exceedance frequency of 1E-04 and by about 11 percent at an exceedance frequency of 1E-06. These differences in hazard for structural frequencies of 0.5 and 1 Hz are less than the suggested tolerances for hazard accuracy presented in Chapter 9 of NUREG-2115 (Reference 2).

Figures 11 and 12 show the contribution of the various source types to the total mean hazard for 10 Hz and 1 Hz spectral acceleration, respectively. The solid curves show the total mean hazard for the combined updated EPRI-SOG plus Caribbean sources and the mean hazard from the three major source types: the EPRI-SOG distributed seismicity sources, the Charleston (UCSS) source, and the Caribbean sources. The dashed curves show the total hazard for the combined CEUS SSC plus Caribbean sources and the mean hazard from the CEUS SSC distributed seismicity sources and the Charleston RLME source (the hazard from the Caribbean sources is the same for the two analyses). These results show that the hazard from the Charleston RLME is essentially the same as that from the Charleston USCC source. Thus, the differences in hazard between the updated EPRI-SOG model and the CEUS SSC model are due to differences in the characterization of the distributed seismicity sources within the CEUS. For 10 Hz spectral acceleration, the lower hazard produced by the CEUS SSC model is due to predicted lower frequency of earthquakes in the site region by this model as compared to that predicted by the updated EPRI-SOG model. For 1 Hz spectral acceleration, the CEUS SSC model distributed seismicity sources produce higher hazard than the updated EPRI-SOG distributed seismicity sources. This larger hazard for low frequency motions is likely due to the fact that the maximum magnitudes for the CEUS SSC distributed seismicity sources are generally larger than those for the updated EPRI-SOG seismic sources.

Figure 13 compares uniform hazard response spectra (UHRS) for hard rock conditions computed using the hazard calculated with the CEUS SSC source model to those computed using the updated EPRI-SOG source model presented in FSAR Table 2.5.2-209. For structural frequencies of 2 Hz and higher, the UHRS based on the CEUS SSC sources are lower than those based on the updated EPRI-SOG source model. At lower structural frequencies, the UHRS based on the CEUS SSC source model are about 1 percent higher at 1E-04 mean annual exceedance frequency, about 2 to 2.5 percent higher at 1E-05 mean annual exceedance frequency, and 3 to 5 percent higher at 1E-06 mean annual exceedance frequency. These small differences at low structural frequencies are considered to be negligible because they are similar in magnitude to differences in computed ground motions that are obtained from implementation of the CEUS SSC model

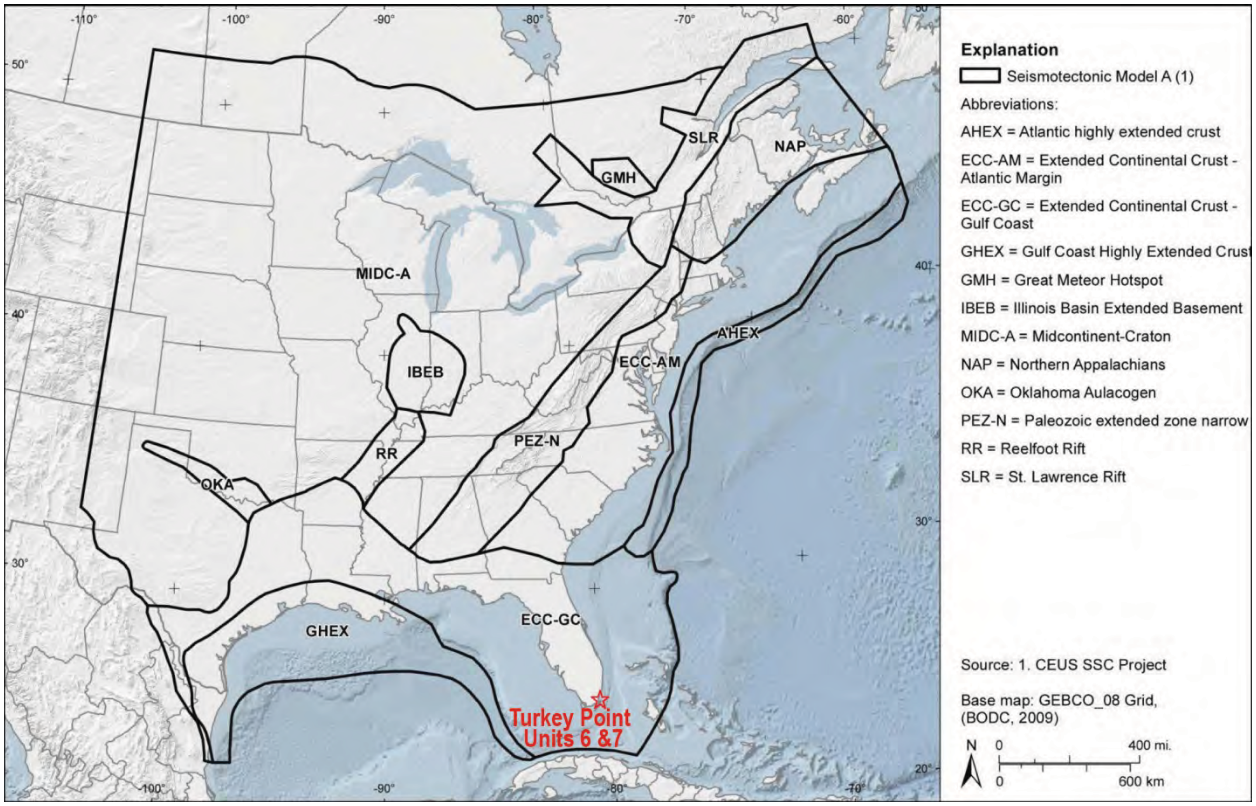
by two different software packages, as documented in hazard calculation for the seven NUREG-2115 demonstration sites documented in Table 2.5.2-232 of Attachment C to the Progress Energy supplemental response for Levy Nuclear Units 1 and 2 to the RAI concerning the Fukushima Near-Term Task Force recommendations contained in SECY-12-0025 (Reference 3).

Thus, the conclusion of the sensitivity calculations is that ground motions for the site computed using the CEUS SSC seismic source model presented in NUREG-2115 (Reference 2) are similar to or enveloped by ground motions computed using the updated EPRI-SOG seismic source model presented in Section 2.5.2 of the FSAR.

Part (b) Response

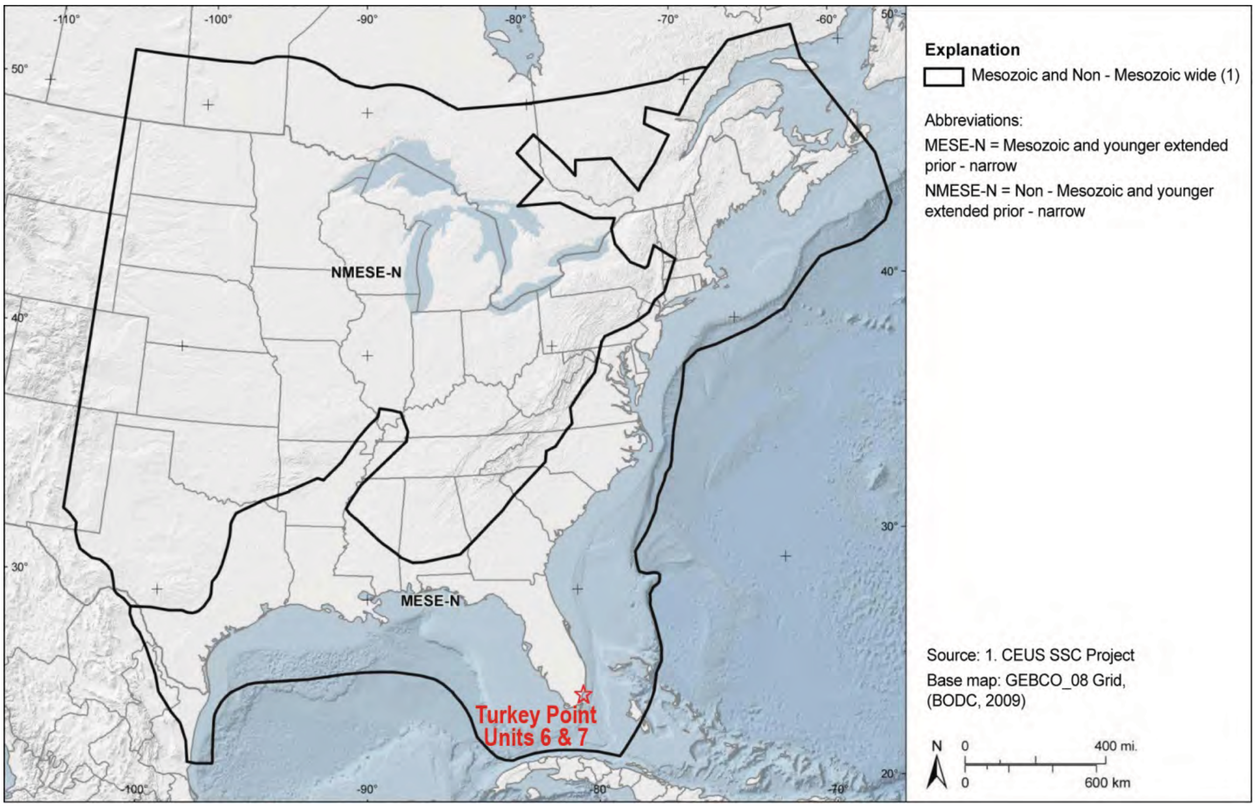
Because the ground motions for the site computed using the CEUS SSC seismic source model presented in NUREG-2115 (Reference 2) are similar to or enveloped by ground motions computed using the updated EPRI-SOG seismic source model presented in Section 2.5.2 of the FSAR, no change to the existing GMRS and FIRS are necessary to address the impact of the CEUS SSC source model.

Figure 1: Seismotectonic Source Zones



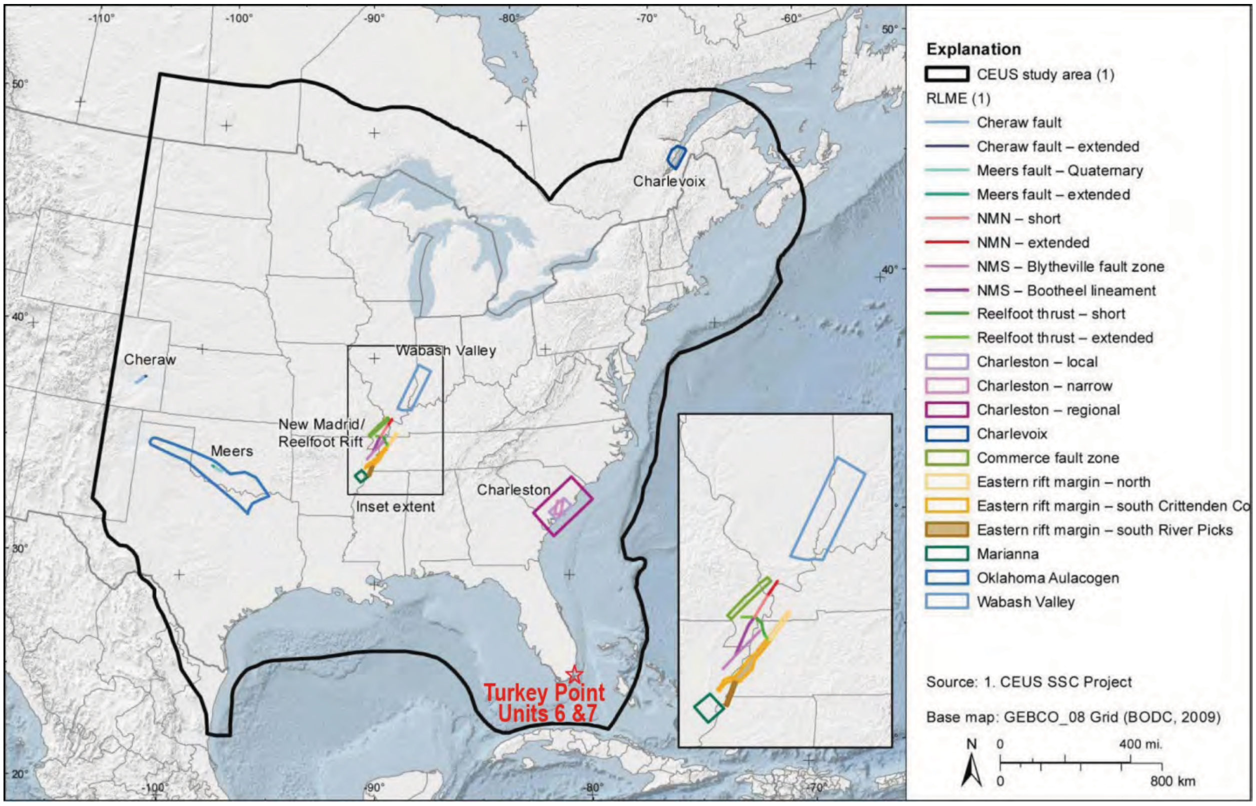
Seismotectonic source zones for the “narrow” interpretation of PEZ and the Rough Creek Graben not included as part of the Reelfoot Rift (RR) source (Figure 4.2.4-2 of NUREG-2115). Approximate location of the Turkey Point Units 6 & 7 site is shown by the red star.

Figure 2: Mmax Source Zones



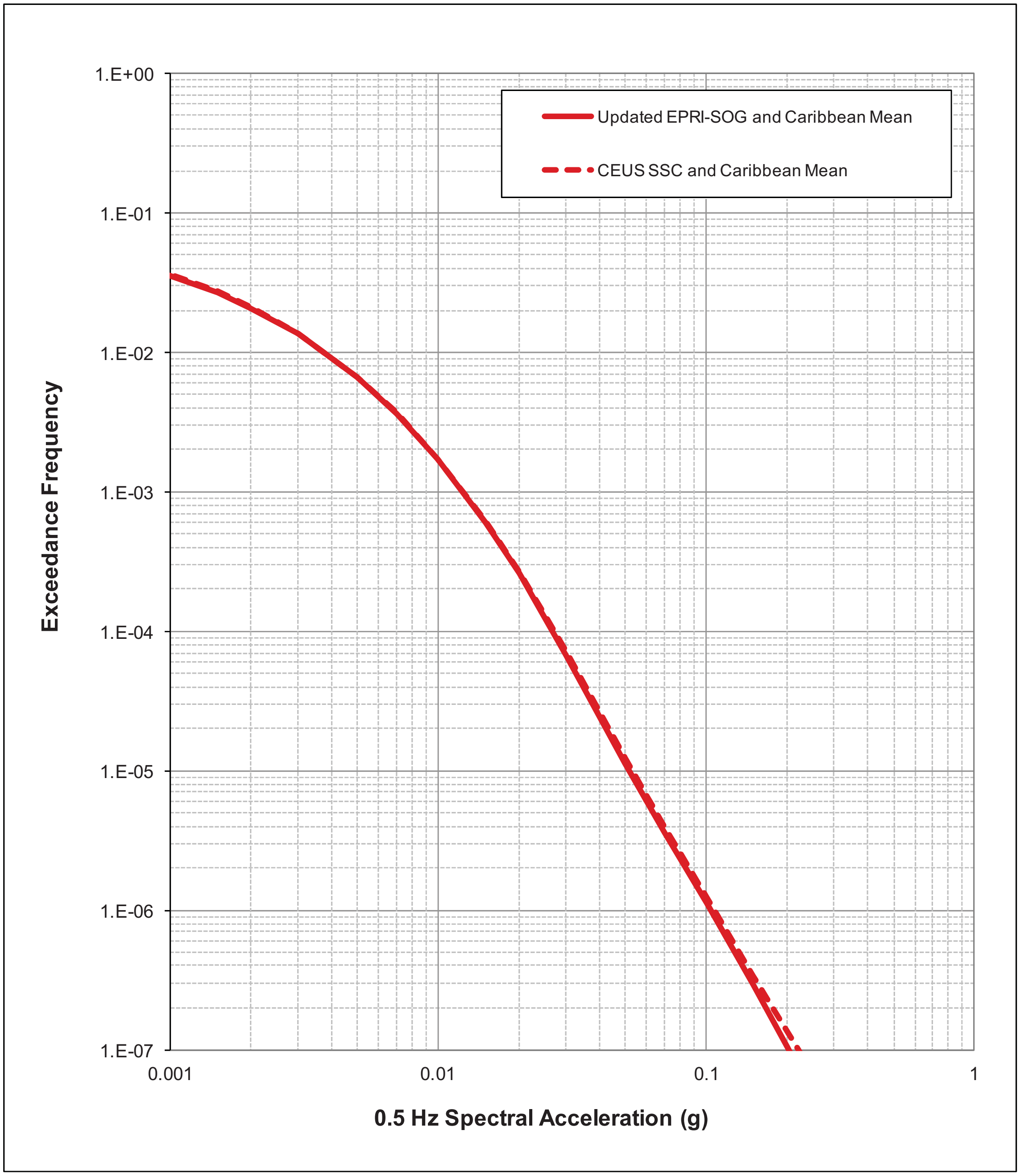
Mmax source zones from the CEUS SSC model for the “narrow” interpretation (Figure 4.2.3-2 of NUREG-2115). Approximate location of the Turkey Point Units 6 & 7 site is shown by the red star.

Figure 3: RLME Sources



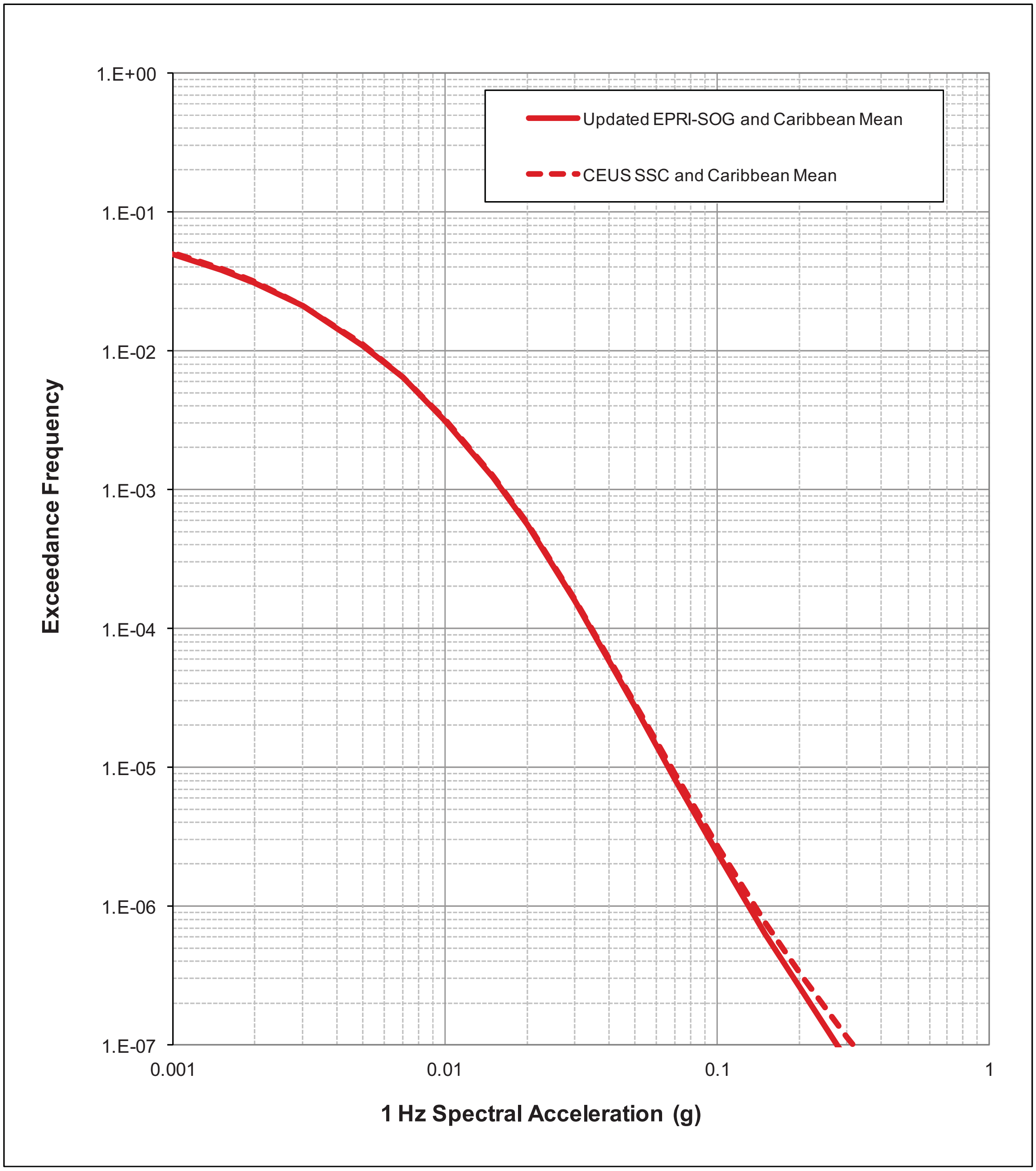
Location of RLME sources in the CEUS SSC model (Figure 4.2.2-2 of NUREG-2115). Approximate location of the Turkey Point Units 6 & 7 site is shown by the red star.

Figure 4: CEUS Hard Rock Hazard Results for 0.5 Hz Spectral Acceleration



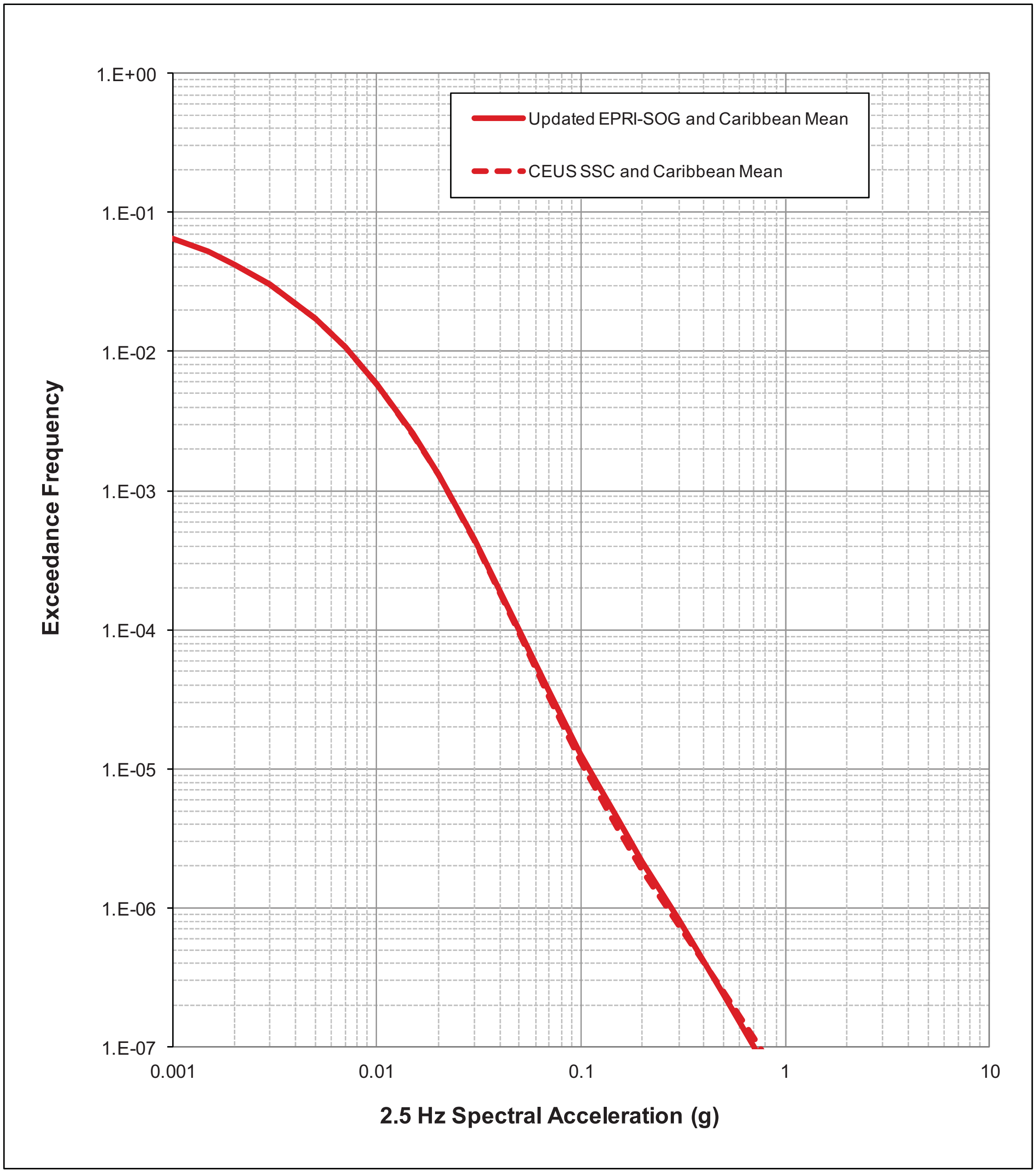
Generic CEUS Hard Rock Hazard Results for 0.5 Hz spectral acceleration for the Turkey Point Units 6 & 7 site comparing results for the updated EPRI-SOG model with those obtained in this analysis using the CEUS SSC model in combination with the hazard from the Caribbean sources.

Figure 5: CEUS Hard Rock Hazard Results for 1 Hz Spectral Acceleration



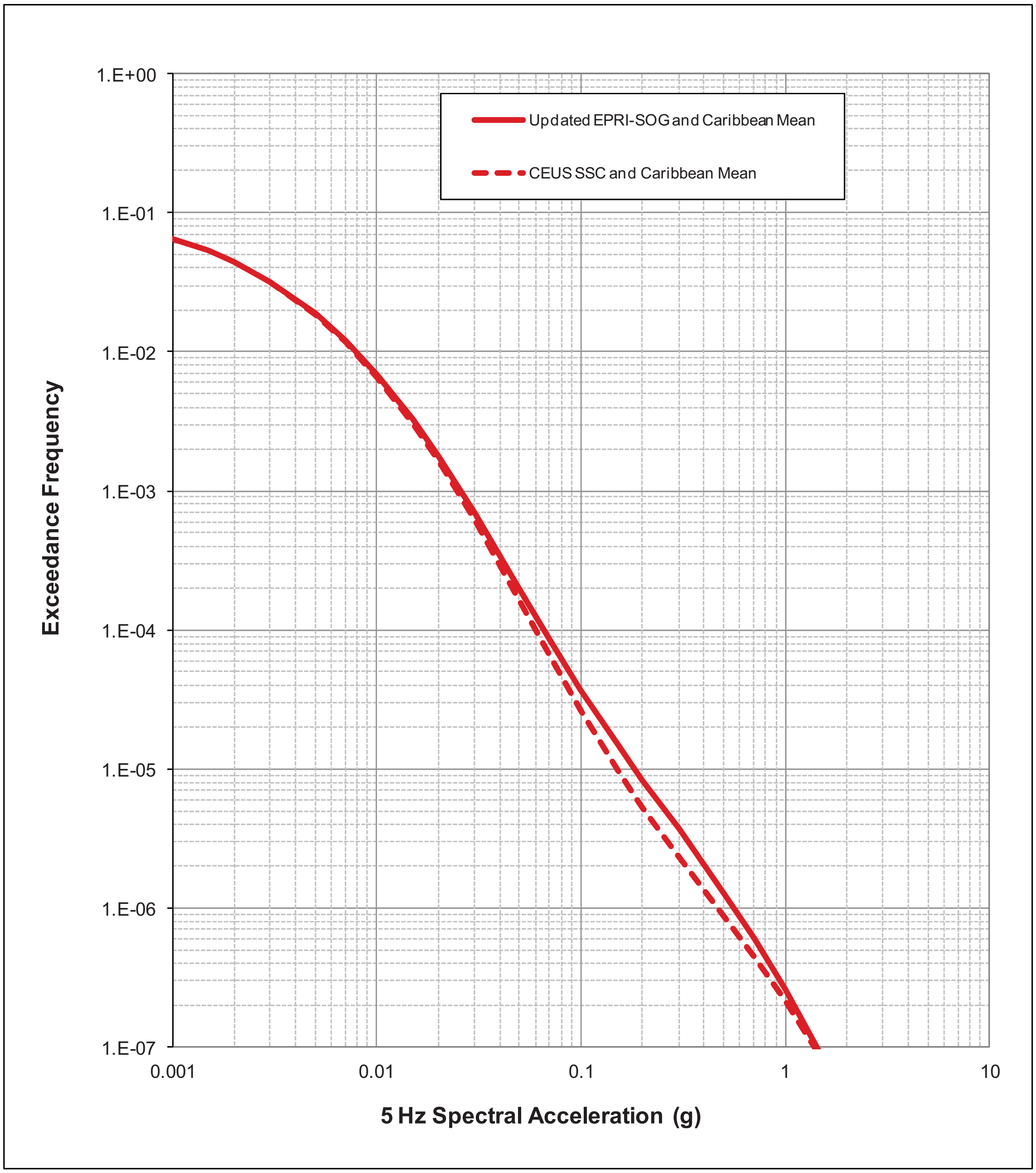
Generic CEUS Hard Rock Hazard Results for 1 Hz spectral acceleration for the Turkey Point Units 6 & 7 site comparing results for the updated EPRI-SOG model with those obtained using in this analysis the CEUS SSC model in combination with the hazard from the Caribbean sources.

Figure 6: CEUS Hard Rock Hazard Results for 2.5 Hz Spectral Acceleration



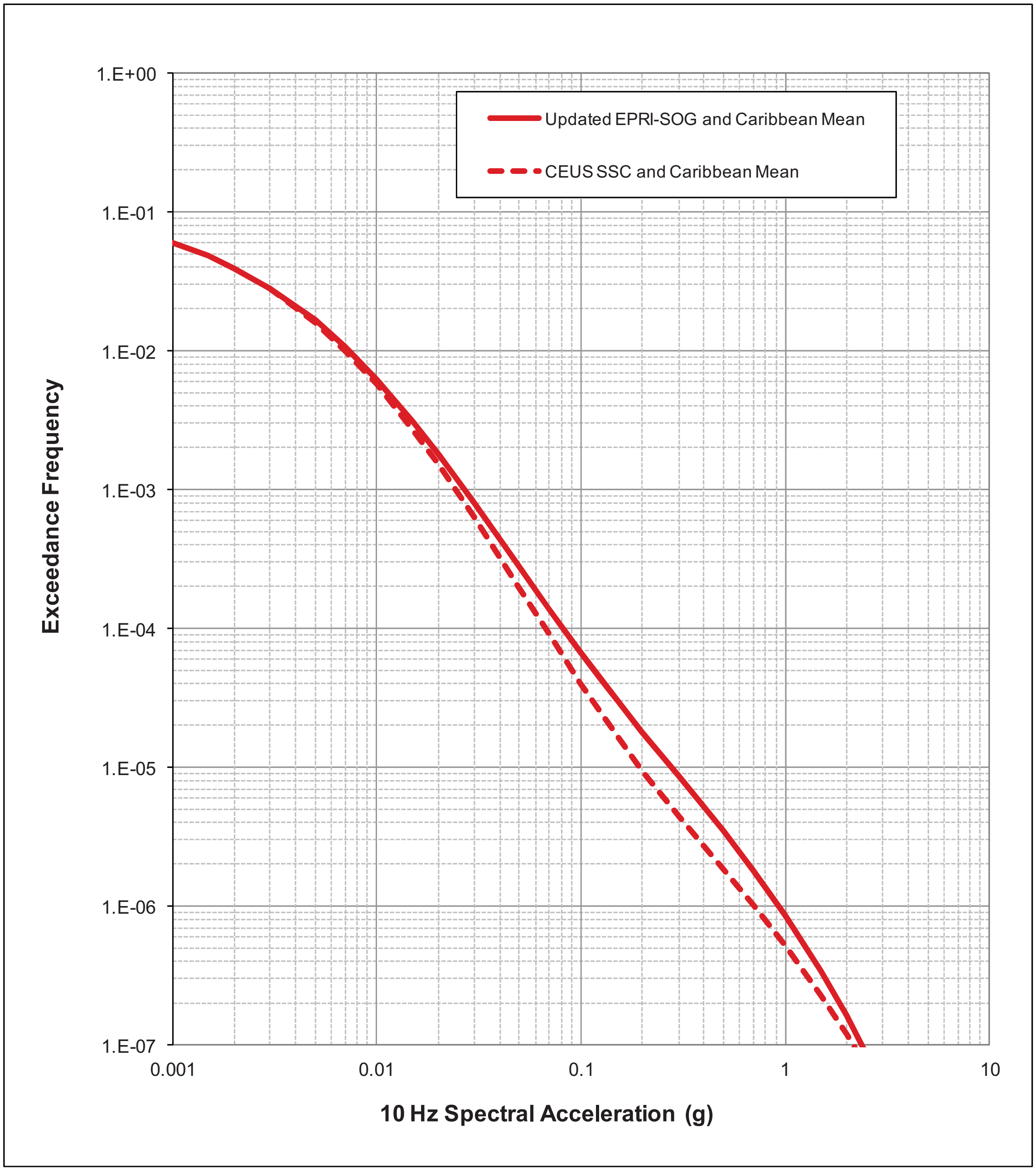
Generic CEUS Hard Rock Hazard Results for 2.5 Hz spectral acceleration for the Turkey Point Units 6 & 7 site comparing results for the updated EPRI-SOG model with those obtained in this analysis using the CEUS SSC model in combination with the hazard from the Caribbean sources.

Figure 7: CEUS Hard Rock Hazard Results for 5 Hz Spectral Acceleration



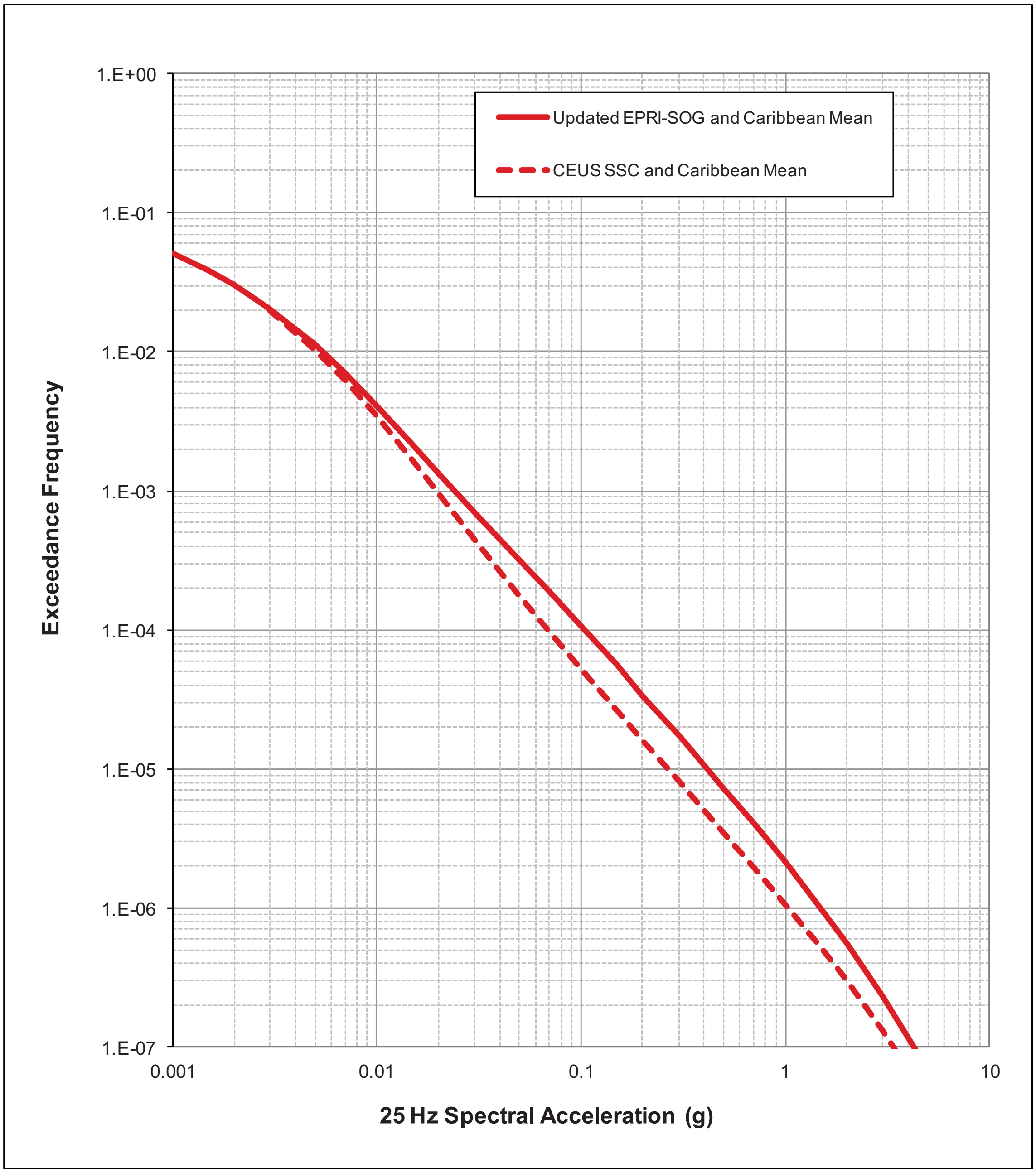
Generic CEUS Hard Rock Hazard Results for 5 Hz spectral acceleration for the Turkey Point Units 6 & 7 site comparing results for the updated EPRI-SOG model with those obtained in this analysis using the CEUS SSC model in combination with the hazard from the Caribbean sources.

Figure 8: CEUS Hard Rock Hazard Results for 10 Hz Spectral Acceleration



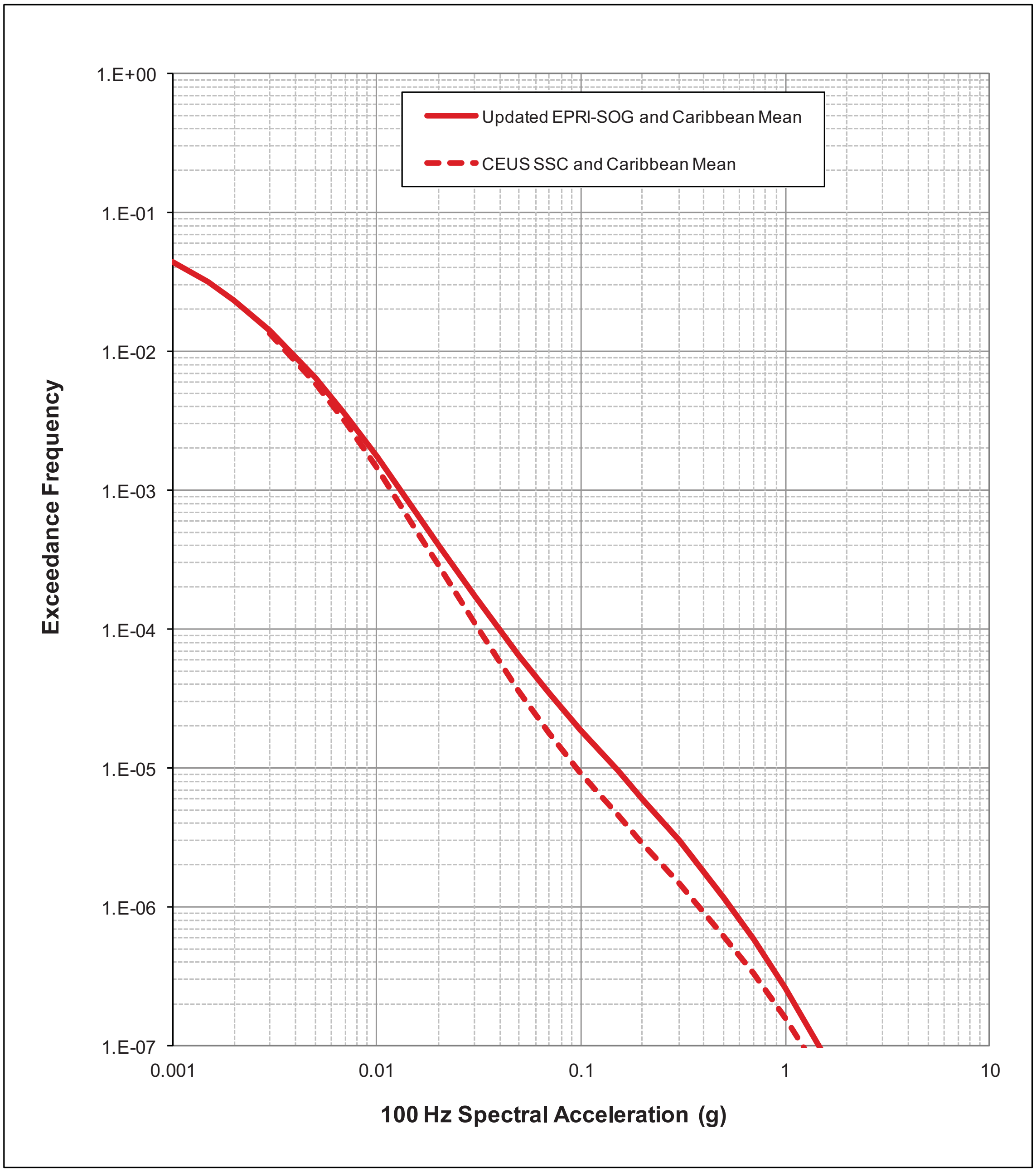
Generic CEUS Hard Rock Hazard Results for 10 Hz spectral acceleration for the Turkey Point Units 6 & 7 site comparing results for the updated EPRI-SOG model with those obtained in this analysis using the CEUS SSC model in combination with the hazard from the Caribbean sources.

Figure 9: CEUS Hard Rock Hazard Results for 25 Hz Spectral Acceleration



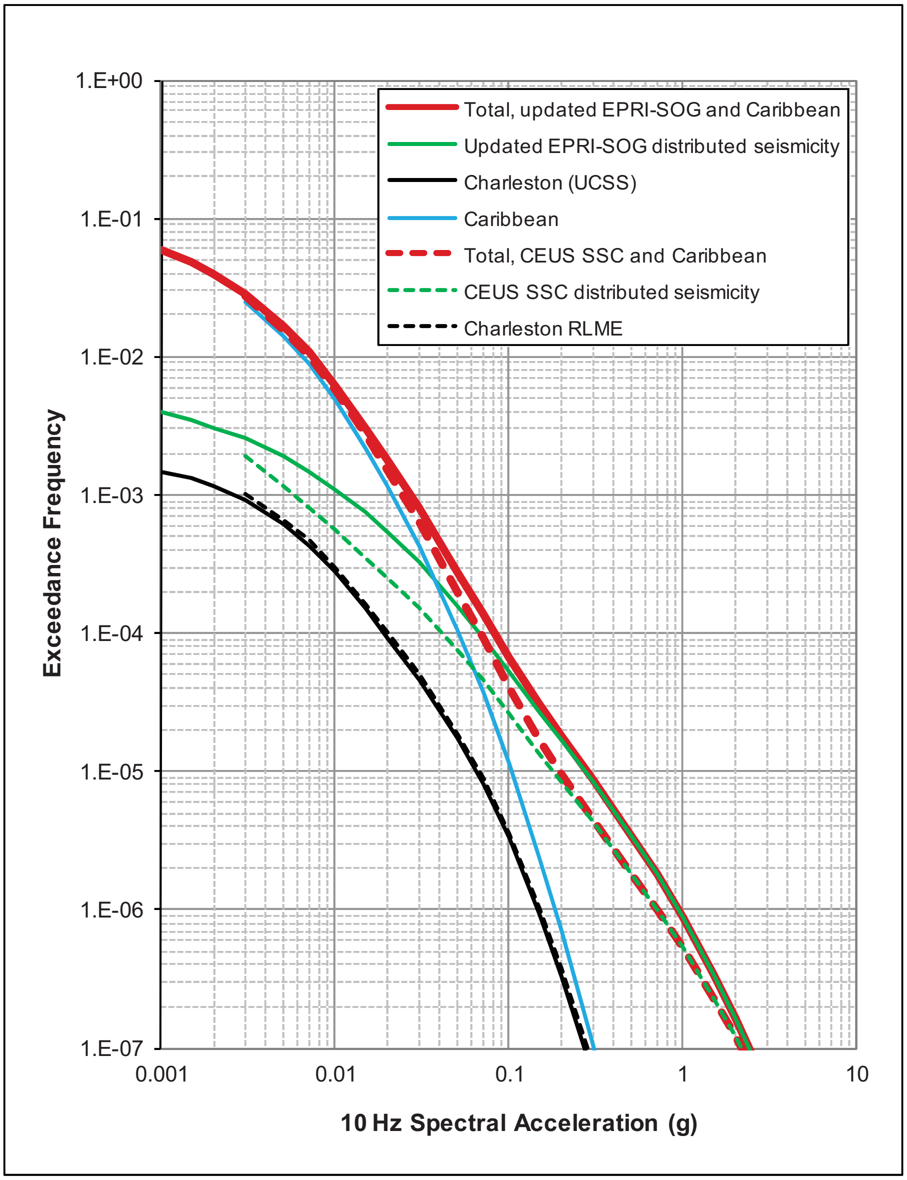
Generic CEUS Hard Rock Hazard Results for 25 Hz spectral acceleration for the Turkey Point Units 6 & 7 site comparing results for the updated EPRI-SOG model with those obtained in this analysis using the CEUS SSC model in combination with the hazard from the Caribbean sources.

Figure 10: CEUS Hard Rock Hazard Results for 100 Hz Spectral Acceleration



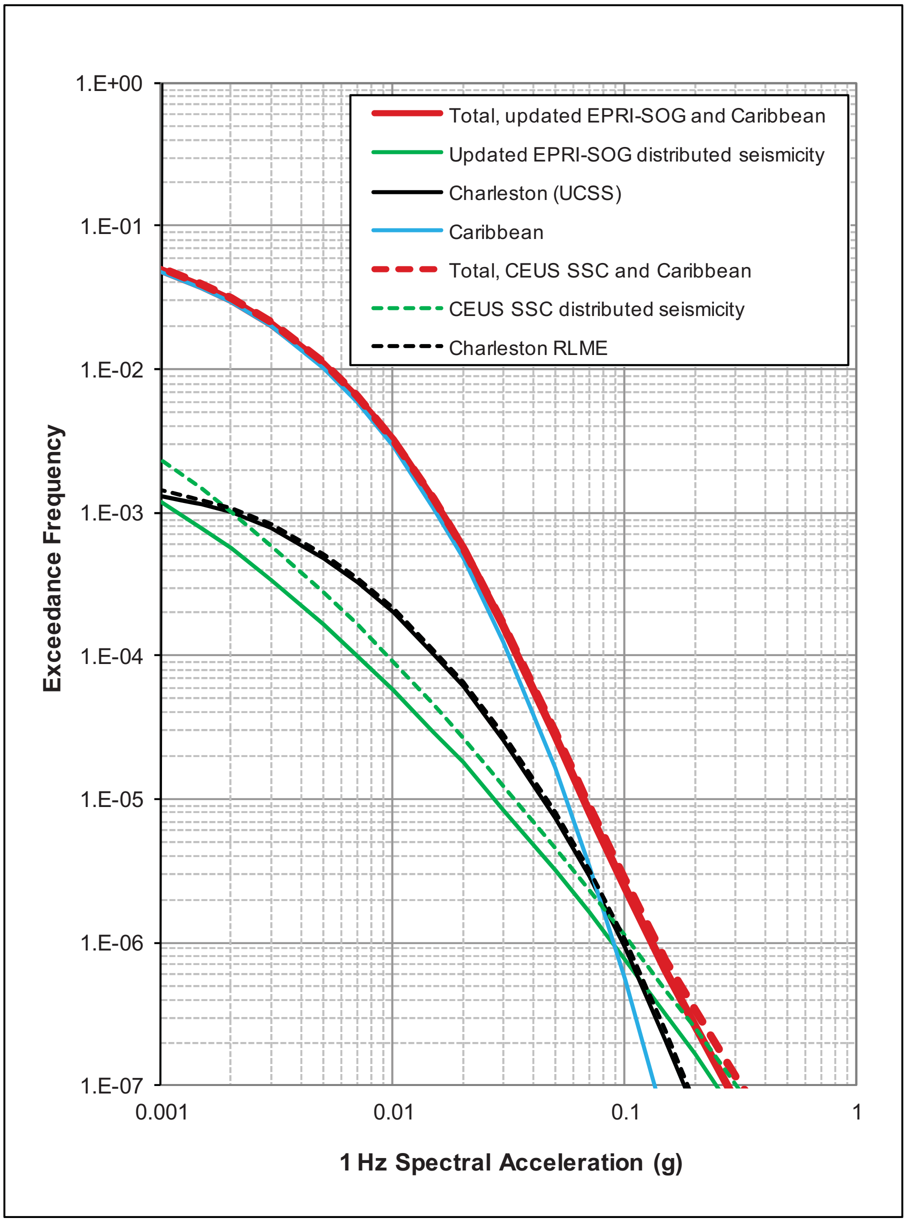
Generic CEUS Hard Rock Hazard Results for 100 Hz spectral acceleration for the Turkey Point Units 6 & 7 site comparing results for the updated EPRI-SOG model with those obtained in this analysis using the CEUS SSC model in combination with the hazard from the Caribbean sources.

Figure 11: Contributions of Various Source Types to Hard Rock Hazard for 10 Hz



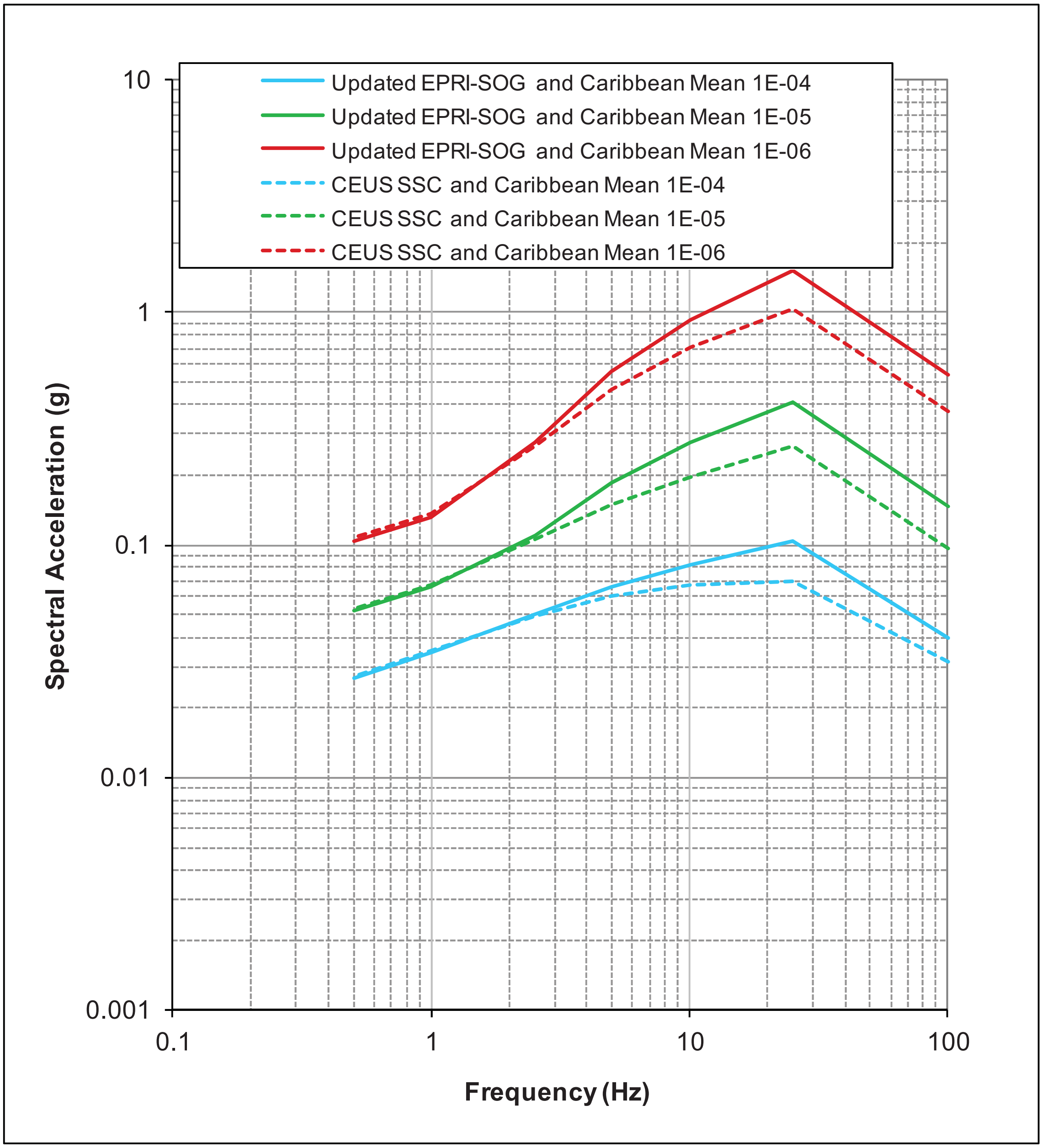
Contributions of various source types to total hazard. Solid curves show hazard based on updated EPRI-SOG. Dashed curves show hazard based on CEUS SSC model.

Figure 12: Contributions of Various Source Types to Hard Rock Hazard for 1 Hz



Contributions of various source types to total hazard. Solid curves show hazard based on updated EPRI-SOG model. Dashed curves show hazard based on CEUS SSC model.

Figure 13: Comparison of Hard Rock UHRS



Comparison between the hard rock UHRS based on the updated EPRI-SOG model plus Caribbean Sources, and the UHRS computed using the CEUS SSC model plus Caribbean sources.

This response is PLANT SPECIFIC.

References:

1. Electric Power Research Institute (EPRI), U.S. Department of Energy (U.S. DOE), and U.S. Nuclear Regulatory Commission (U.S. NRC), 2012, Technical Report: Central and Eastern United States Seismic Source Characterization for Nuclear Facilities, published as NUREG 2115 by the U.S. Nuclear Regulatory Commission.
2. U.S. Nuclear Regulatory Commission, 2012, Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami, dated February 17, 2012, SECY-12-0025, 14 pp.
3. Progress Energy, 2012, Letter NPD-NRC-2012-029 to the U.S. Nuclear Regulatory Commission, Levy Nuclear Plant, Units 1 and 2 Docket Nos. 52-029 and 52-030 Supplement 2 To Response To NRC RAI Letter 108 – Implementation of Fukushima Near-Term Task Force Recommendations, dated August 1, 2012 (ADAMS accession number ML12258A469).

ASSOCIATED COLA REVISIONS:

The following new Subsection 2.5.2.4.7 will be added to the COLA.

2.5.2.4.7 Hazard Sensitivity Analyses Using the CEUS SSC Model

This subsection describes sensitivity analyses performed using the CEUS SSC seismic source model presented in NUREG-2115 (Reference 353) and presents comparisons of the CEUS hard rock hazards and UHRS computed using the CEUS SSC model with the results presented in Subsection 2.5.2.4.6.

2.5.2.4.7.1 Summary of CEUS SSC Model Sources.

This section summarizes the CEUS SSC model. Details are provided in NUREG-2115 (Reference 353). The model for seismic sources in the CEUS consists of two types of seismic sources. The first type is seismic source zones used to model future distributed seismicity throughout the CEUS. As shown on Figures 2.5.2-280 and 2.5.2-281, two approaches are used to define the distributed seismicity sources. The seismotectonic approach (Figure 2.5.2-280) subdivides the CEUS into different source zones on the basis of differences in geology and tectonic history. The M_{max} Zones approach (Figure 2.5.2-280) subdivides the CEUS into regions that are expected to have different values of the maximum magnitude that can occur. The second type of seismic source is used to model

the recurrence of repeated large magnitude earthquakes (RLMEs) that have been identified from the historical and paleoseismic record. The RLME sources are additional sources of large magnitude earthquakes added to the hazard computed from the distributed seismicity sources – either the M_{max} source zones or the Seismotectonic source zones. The location of the RLME sources is shown on Figure 2.5.2-282. The nearest RLME source to the Turkey Point Units 6 & 7 site is the Charleston RLME source.

2.5.2.4.7.2 Description of CEUS SSC Model Sensitivity Analysis.

Comparison of the areal extent of the CEUS SSC model shown on Figures 2.5.2-280 and 2.5.2-281 with the region encompassed by the updated EPRI-SOG seismic sources shown on Figures 2.5.2-204 through 2.5.2-209 indicates that the two source models cover the same region. In addition, Charleston RLME source in the CEUS SSC model, shown on Figure 2.5.2-282 occupies the same general location as the UCSS shown on Figure 2.5.2-212. Thus, the CEUS SSC model can be considered as a replacement for the updated EPRI-SOG model, including the UCSS source and the supplemental sources between Florida and Cuba in their entirety. As a consequence, an assessment of the effect of the CEUS SSC model on the total hazard for the site can be evaluated by subtracting from the total mean hazard presented in Subsection 2.5.2.4.6 and Table 2.5.2-223 the contributions of the updated EPRI-SOG sources and then adding the hazard contributed by the CEUS SSC model sources. Comparing the resulting values against the total hazard listed in Table 2.5.2-223 shows the sensitivity of the site rock hazard to use of the CEUS SSC model sources in place of the updated EPRI-SOG sources.

The CEUS SSC model was used to compute hard rock hazard at the Turkey Point site. The hazard was computed using the contributions from those portions of all of the CEUS SSC seismic source zones within 620 miles (1,000 km) of the site. In addition, the hazard from the Charleston RLME source (Figure 2.5.2-282) was included. Consistent with the calculations presented in Subsection 2.5.2.4, the hazard calculations for the seismic source zones and the Charleston RLME used the mid-continent versions of the EPRI (Reference 242) ground motion models. Similar to the analyses presented in Subsection 2.5.2.4, the contribution from the New Madrid RLME (Figure 2.5.2-282) was found to be negligible, and this source was not included in the hazard calculations. Also, as documented in Chapter 8 of NUREG-2115 (Reference 353), the other RLME sources in the vicinity of the New Madrid RLME were found to have negligible contribution to the hazard at the Chattanooga demonstration site, and thus would not contribute to the hazard at Turkey Point, which is much further way from these sources. Therefore, only the Charleston RLME source was included in the sensitivity calculations.

Calculations were performed for PGA and spectral accelerations at structural frequencies of 25, 10, 5, 2.5, 1, and 0.5 Hz using the CEUS SSC model sources. These results were used to develop total mean hazard for the site by adding the hazard from the Caribbean sources described in Subsection 2.5.2.4.6.

2.5.2.4.7.3 CEUS SSC Model Sensitivity Analysis Results.

Figures 2.5.2-283 and 2.5.2-284 compare the hazard results obtained using the CEUS SSC model with those presented in Subsection 2.5.2.4.6 using the updated EPRI-SOG model for 10 Hz and 1 Hz spectral accelerations, respectively. The solid curves show the total mean hazard for the combined updated EPRI-SOG plus Caribbean sources and the mean hazard from the three major source types: the EPRI-SOG distributed seismicity sources, the Charleston (UCSS) source, and the Caribbean sources. The dashed curves show the total hazard for the combined CEUS SSC plus Caribbean sources and the mean hazard from the CEUS SSC distributed seismicity sources and the Charleston RLME source (the hazard from the Caribbean sources is the same for the two analyses).

The results for 10 Hz (Figure 2.5.2-283) indicate that the total hazard computed using the CEUS SSC sources is lower than that computed using the updated EPRI-SOG sources in the important annual exceedance frequency range of 1E-04 to 1E-06. As shown on the figure, the hazard computed using the Charleston RLME source is essentially the same as that computed using the Charleston UCSS source. Thus, the difference in the hazard is due to differences in the characterization of the distributed seismicity sources in the CEUS. As the hazard in both models is computed using the same ground motion models, difference in hazard is due to a difference in the predicted frequency of earthquakes in the site region with the CEUS SSC model predicting a lower rate of earthquakes than the updated EPRI-SOG model.

The results for 1 Hz (Figure 2.5.2-284) indicate that the total hazard computed using the CEUS SSC sources is slightly higher than that computed using the updated EPRI-SOG sources in the important annual exceedance frequency range of 1E-04 to 1E-06. The increase in computed hazard is about 3 percent at 1E-04 and about 11 percent at 1E-06. Again, as shown on the figure, the hazard computed using the Charleston RLME source is essentially the same as that computed using the Charleston UCSS source and the difference in the hazard is due to differences in the characterization of the distributed seismicity sources in the CEUS. The larger hazard at low structural frequencies from the CEUS SSC distributed seismicity sources is attributed to the larger on average maximum magnitudes for these sources in the CEUS SSC model as compared to the values for the distributed seismicity sources in the updated EPRI-SOG model. The differences in hazard for 1 Hz spectral accelerations shown on Figure 2.5.2-284 are less than the suggested tolerances for hazard accuracy presented in Chapter 9 of NUREG-2115 (Reference 353).

The total mean hazard obtained by combining the hazard from the CEUS SSC model with that from the Caribbean sources was used to compute hard rock UHRS. Figure 2.5.2-285 compares these UHRS to those computed using the updated EPRI-SOG source model presented in Table 2.5.2-209. For structural frequencies of 2 Hz and higher, the UHRS based on the CEUS SSC sources are lower than those based on the updated EPRI-SOG source model. At lower structural frequencies, the UHRS based on the CEUS SSC source model are about 1 percent higher at 1E-04 mean annual exceedance frequency, about 2 to

2.5 percent higher at 1E-05 mean annual exceedance frequency, and 3 to 5 percent higher at 1E-06 mean annual exceedance frequency. These small differences at low structural frequencies are considered to be negligible because they are similar in magnitude to differences in computed ground motions that are obtained from implementation of the CEUS SSC model by two different software packages, as documented in hazard calculation for the seven NUREG-2115 (Reference 353) demonstration sites documented in Table 2.5.2-232 of Attachment C to the Progress Energy supplemental response for Levy Nuclear Units 1 and 2 to the RAI concerning the Fukushima Near-Term Task Force recommendations contained in SECY-12-0025 (Reference 354).

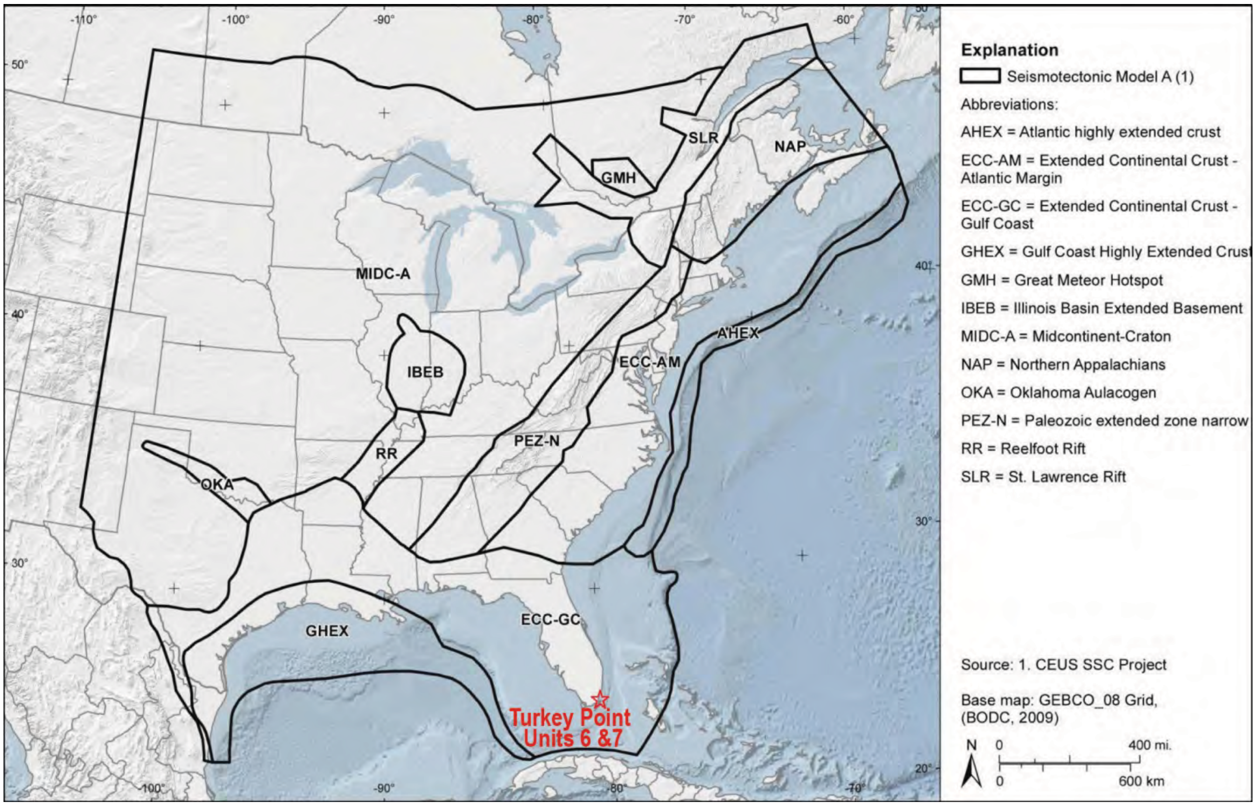
Thus, the conclusion of the sensitivity calculations is that ground motions for the site computed using the CEUS SSC seismic source model presented in NUREG-2115 (Reference 353) are similar to or enveloped by ground motions computed using the updated EPRI-SOG seismic source model presented in Subsection 2.5.2.4.6.

The following references will be added to Subsection 2.5.2.7 References.

353. Electric Power Research Institute (EPRI), U.S. Department of Energy (U.S. DOE), and U.S. Nuclear Regulatory Commission (U.S. NRC), 2012, Technical Report: Central and Eastern United States Seismic Source Characterization for Nuclear Facilities, published as NUREG- 2115 by the U.S. Nuclear Regulatory Commission.

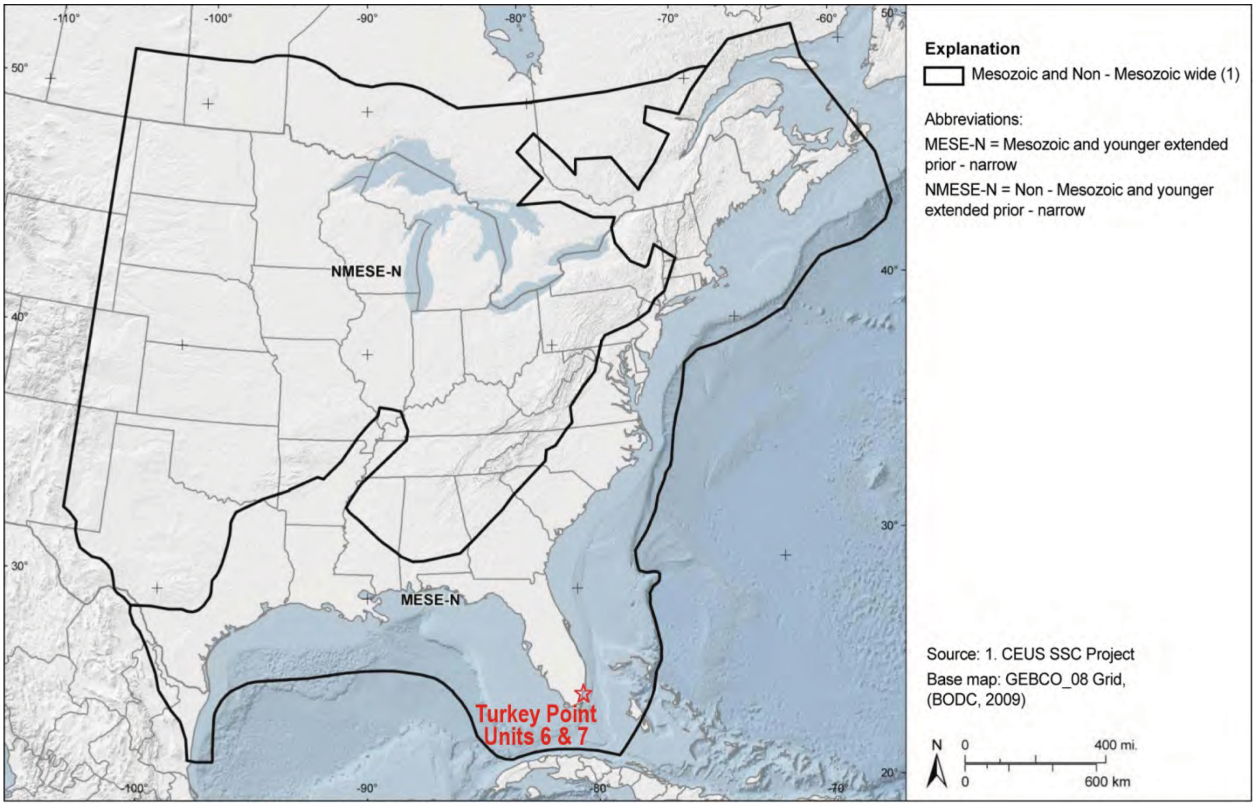
354. Progress Energy, 2012, Letter NPD-NRC-2012-029 to the U.S. Nuclear Regulatory Commission, Levy Nuclear Plant, Units 1 and 2 Docket Nos. 52-029 and 52-030 Supplement 2 To Response To NRC RAI Letter 108 – Implementation of Fukushima Near-Term Task Force Recommendations, dated August 1, 2012 (ADAMS accession number ML12258A469).

Figure 2.5.2-280 Seismotectonic Source Zones in the CEUS SSC Model



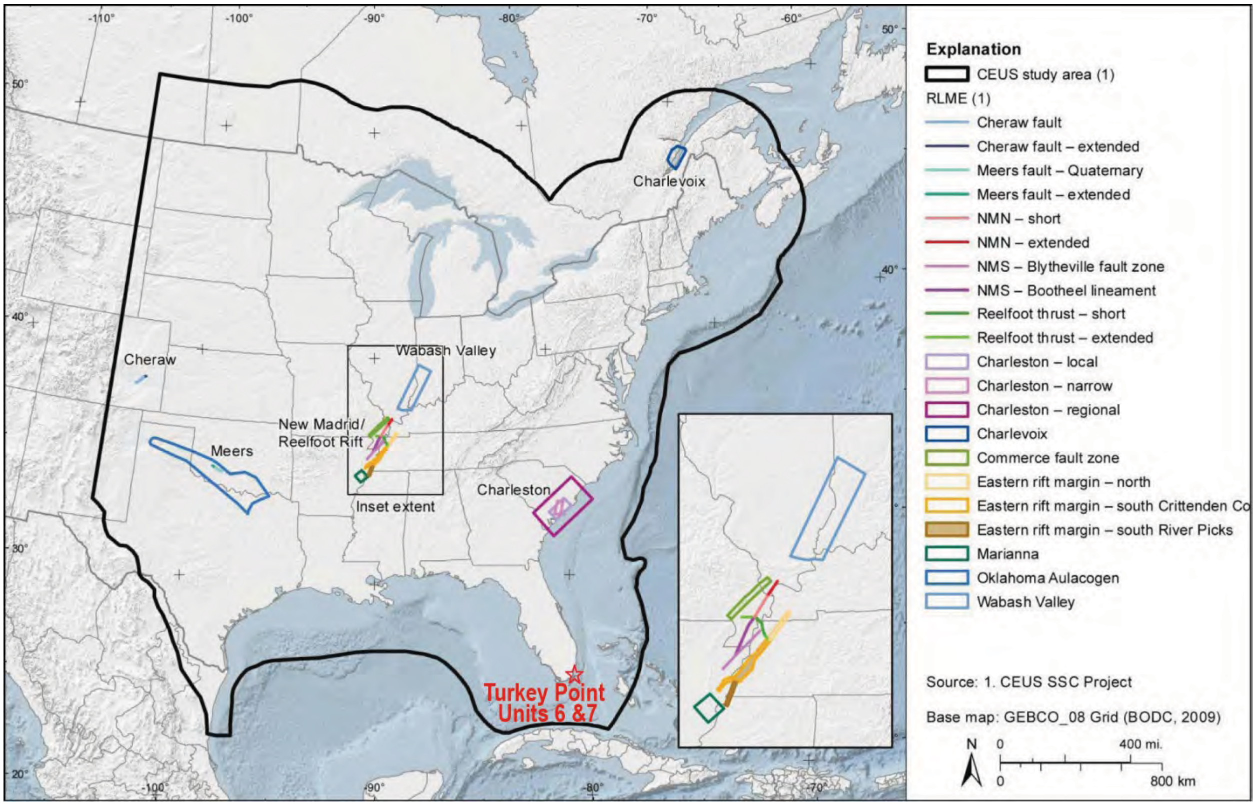
Seismotectonic source zones for the “narrow” interpretation of PEZ and the Rough Creek Graben not included as part of the Reelfoot Rift (RR) source (Figure 4.2.4-2 of NUREG-2115). Approximate location of the Turkey Point Units 6 & 7 site is shown by the red star.

Figure 2.5.2-281 Mmax Source Zones in the CEUS SSC Model



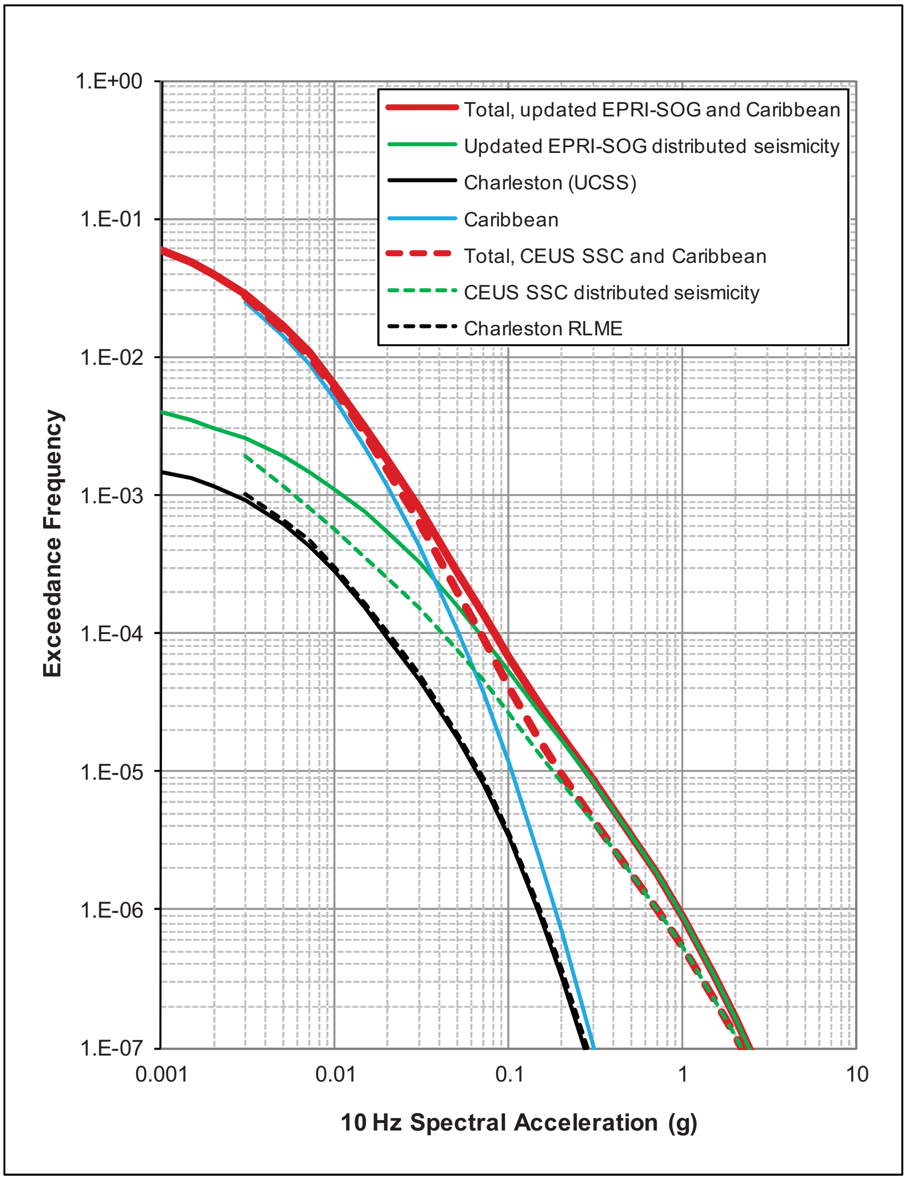
Mmax source zones from the CEUS SSC model for the “narrow” interpretation (Figure 4.2.3-2 of NUREG-2115). Approximate location of the Turkey Point Units 6 & 7 site is shown by the red star.

Figure 2.5.2-282 RLME Sources in the CEUS SSC Model



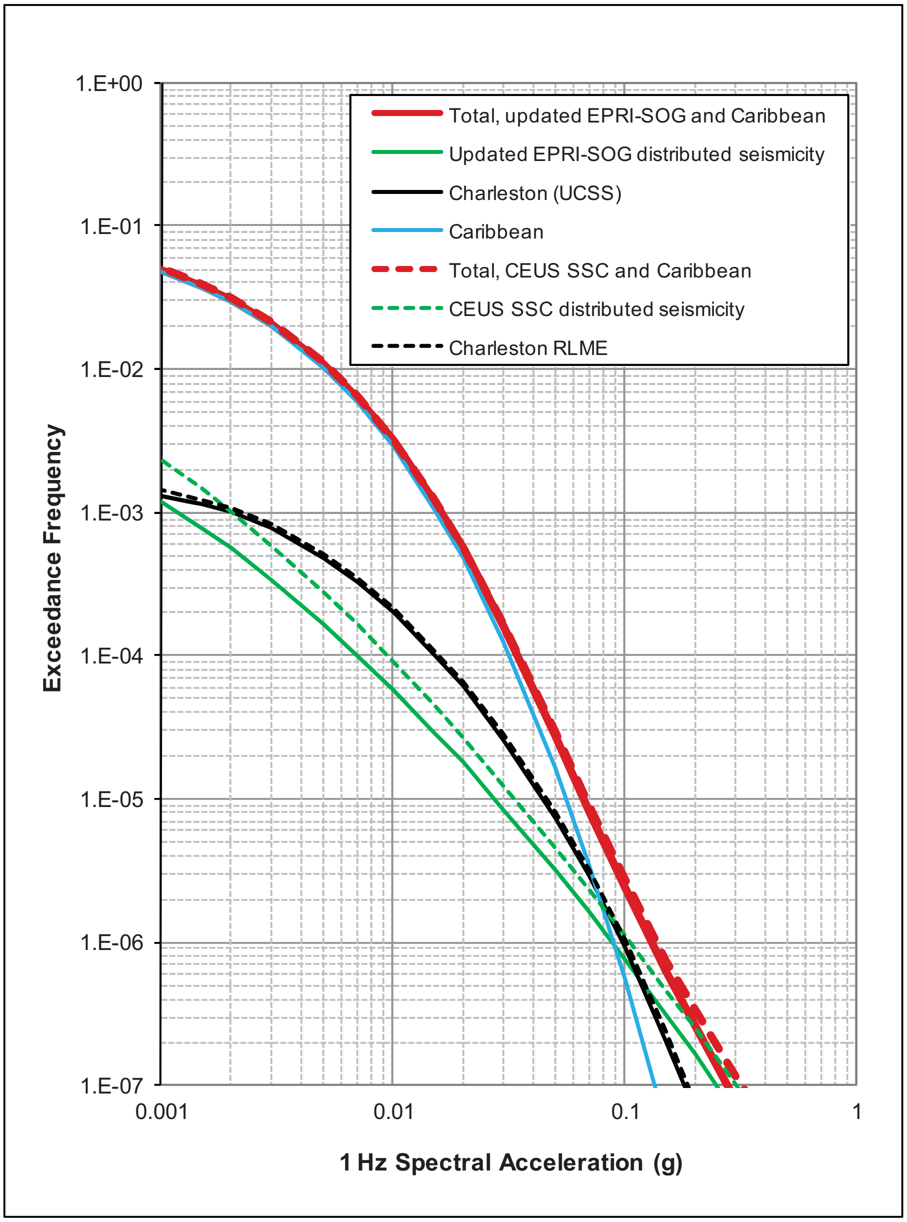
Location of RLME sources in the CEUS SSC model (Figure 4.2.2-2 of NUREG-2115). Approximate location of the Turkey Point Units 6 & 7 site is shown by the red star.

Figure 2.5.2-283 Contributions of Various Source Types to Hard Rock Hazard for 10 Hz



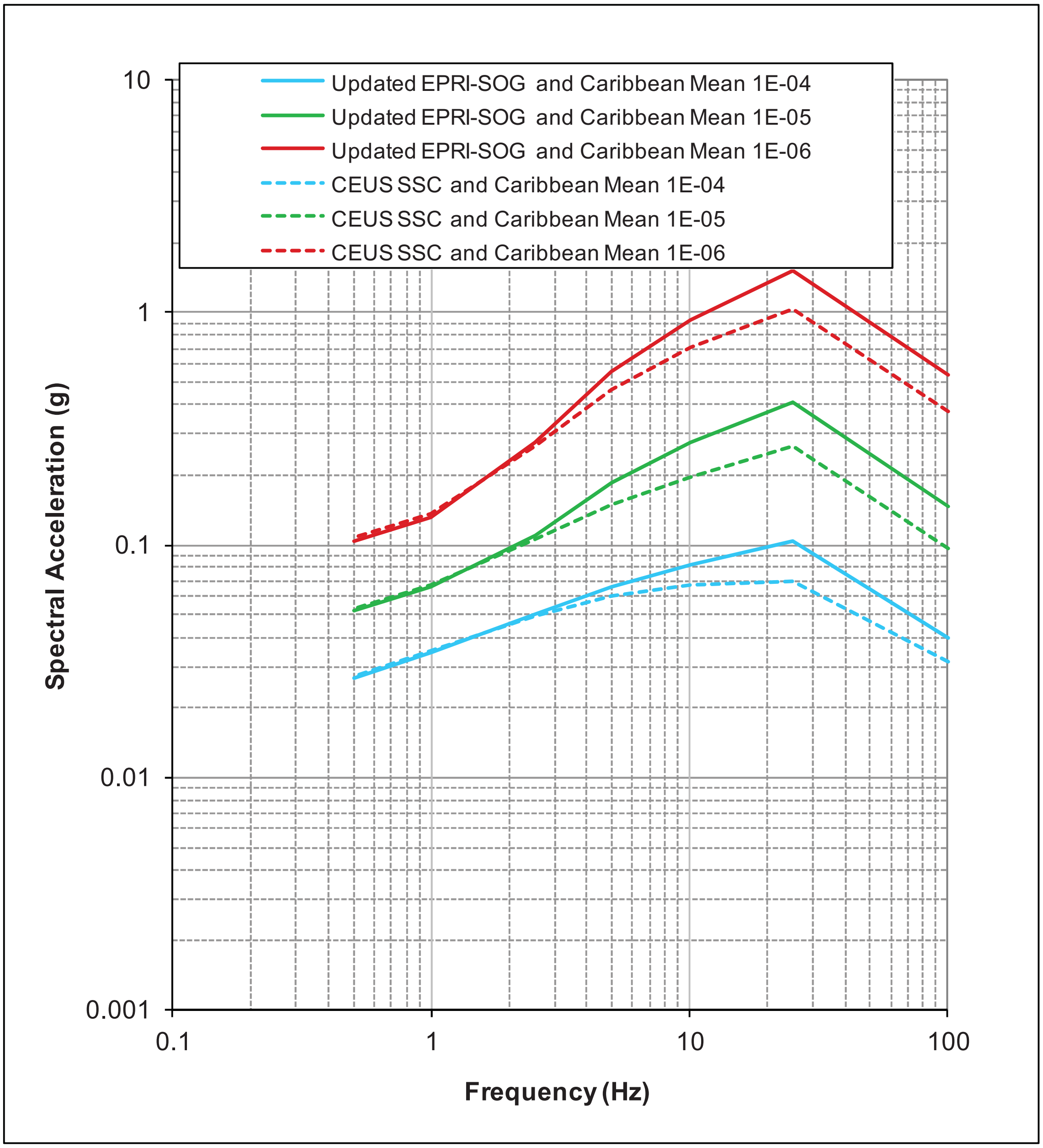
Contributions of various source types to total hazard. Solid curves show hazard based on updated EPRI-SOG. Dashed curves show hazard based on CEUS SSC model.

Figure 2.5.2-284 Contributions of Various Source Types to Hard Rock Hazard for 1 Hz



Contributions of various source types to total hazard. Solid curves show hazard based on updated EPRI-SOG model. Dashed curves show hazard based on CEUS SSC model.

Figure 2.5.2-285 Comparison of Hard Rock UHRS



Comparison between the hard rock UHRS based on the updated EPRI-SOG model plus Caribbean Sources, and the UHRS computed using the CEUS SSC model plus Caribbean sources.

ASSOCIATED ENCLOSURES:

None