



10 CFR 52.79

August 13, 2010
NRC3-10-0039

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

- References:
- 1) Fermi 3
Docket No. 52-033
 - 2) Letter from Jerry Hale (USNRC) to Jack M. Davis (Detroit Edison), "Request for Additional Information Letter No. 36 Related to the SRP Sections 2.5.2 and 2.5.4 for the Fermi 3 Combined License Application," dated June 22, 2010
 - 3) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Requests for Additional Information Letter No. 36," NRC3-10-0035 dated August 9, 2010

Subject: Detroit Edison Company Response to NRC Request for Additional Information 02.05.02-15

In Reference 2, the NRC requested additional information to support the review of certain portions of the Fermi 3 Combined License Application (COLA). Reference 3 provided responses to ten of the eleven Requests for Additional Information (RAIs) identified in Reference 2. The technical work for RAI 02.05.02-15 had been completed but design verification was not completed to support submission in Reference 3.

The response to RAI 02.05.02-15 is provided as Attachment 1 of this letter. Information contained in this response will be incorporated into a future COLA submission as described in the attachment.

If you have any questions, or need additional information, please contact me at (313) 235-3341.

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NRC

USNRC
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I state under penalty of perjury that the foregoing is true and correct. Executed on the 13th day of August 2010.

Sincerely,



Peter W. Smith, Director
Nuclear Development – Licensing and Engineering
Detroit Edison Company

Attachments: 1) Response to RAI Letter No. 36 (Question No. 02.05.02-15)

cc: Adrian Muniz, NRC Fermi 3 Project Manager
Jerry Hale, NRC Fermi 3 Project Manager
Bruce Olson, NRC Fermi 3 Environmental Project Manager
Fermi 2 Resident Inspector
NRC Region III Regional Administrator
NRC Region II Regional Administrator
Supervisor, Electric Operators, Michigan Public Service Commission
Michigan Department of Environmental Quality
Radiological Protection and Medical Waste Section

**Attachment 1
NRC3-10-0039**

**Response to RAI Letter No. 36
(eRAI Tracking No. 4766)**

RAI Question No. 02.05.02-15

NRC RAI 02.05.02-15

In response to RAI 02.05.02-8, you indicated that, based on the occurrence of two post-EPRI/SOG earthquakes of mb 5.0 and 5.2, the probability of activity for the Dames and Moore source zone DAM08 increased from 0.08 to 1 in the Fermi 3 PSHA. Therefore, please explain why the hazard contribution from the source zone DAM08 appears to be so low in comparison to other sources included in FSAR Figure 2.5.2-223. In addition, please demonstrate your ability to back calculate rock hazard curves for source zone DAM08 (shown in FSAR Figure 2.5.2-223) using the GMRS hazard curves shown in Figure 10 of your response to RAI 02.05.02-8 by factoring in corresponding amplification factors. This request is in accordance with 10 CFR 100.23.

Response

The mean seismic hazard curve for Dames & Moore Source 8 shown on FSAR Figure 2.5.2-223 was calculated with the original probability of activity of 0.08. As described in the response to RAI 02.05.02-8 in Detroit Edison letter NRC3-10-0012 (ML100540502), dated February 15, 2010, the probability of activity of this source was revised up to 1.0 for the updated seismic hazard analysis conducted for Fermi 3. Figure 1 shows the mean hazard for Dames & Moore Source 8 computed using the probability of activity of 1.0 used in the updated seismic hazard model for the Fermi 3 site. In addition, the hazard curve for the Dames & Moore source related to the Wabash Valley (Source 18, Southern Illinois/Southern Indiana) is added to make Figure 1 consistent with the FSAR text and Table 2.5.2-202. The total hazard curve is also adjusted to show the sum of the source hazard curves shown on the plot. FSAR Figure 2.5.2-223 will be replaced with Figure 1.

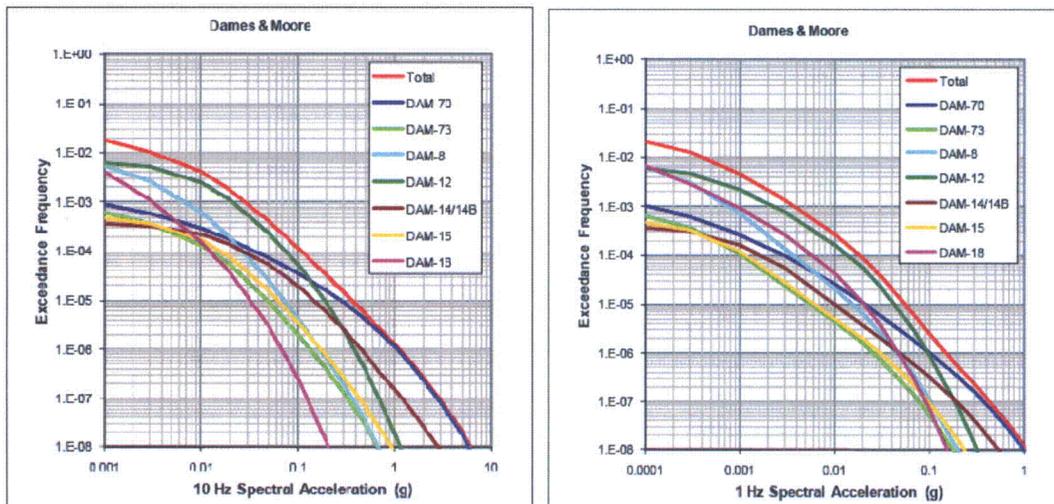


Figure 1 - Mean Hazard Curves for the Dames & Moore Team Sources Computed Using Subset of EPRI (2004, 2006) Ground Motion Models

In order to make FSAR Figures 2.5.2-222, 2.5.2-224, 2.5.2-225, 2.5.2-226, and 2.5.2-227 consistent with Tables 2.5.2-201, 2.5.2-203, 2.5.2-204, 2.5.2-205, and 2.5.2-206, respectively, and the FSAR text, mean hazard curves for the individual EPRI-SOG earth science team's seismic sources related to the Wabash Valley region are added to the respective figures. The additions are:

- Hazard curves for Bechtel sources K and BZ0 are added to FSAR Figure 2.5.2-222
- A hazard curve for Law source 7 is added to FSAR Figure 2.5.2-224
- Hazard curves for Rondout sources 2 and 4 are added to FSAR Figure 2.5.2-225
- A hazard curve for Weston Geophysics source 33 is added to FSAR Figure 2.5.2-226
- Hazard curves for Woodward-Clyde sources 43 and 44 are added to FSAR Figure 2.5.2-227

In all of these figures, the total hazard curve is adjusted to show the sum of the source hazard curves presented on each figure and listed in the corresponding table in the FSAR (Tables 2.5.2-201 through 2.5.2-206).

The seismic hazard calculations used to develop the GMRS and FIRS for the Fermi 3 site were performed using the characterization of CEUS ground motion developed by EPRI (Reference 2.5.2-259 and Reference 2.5.2-267). FSAR Figure 2.5.2-220 shows the ground motion characterization logic tree and indicates the full set of ground motion models used in the PSHA calculations. As described in the following excerpt from FSAR Section 2.5.2.4.3.1, the calculations of seismic source contributions and seismic source sensitivity analyses presented in FSAR Figures 2.5.2-222 through 2.5.2-228 were performed using a subset of the EPRI (Reference 2.5.2-259 and Reference 2.5.2-267) ground motion models:

“As discussed above in Subsection 2.5.2.2.1, the specific subset of EPRI-SOG seismic sources to include for each EST was assessed using the updated EPRI ground motion models that will be used to compute the PSHA for the Fermi 3 site (Reference 2.5.2-259, Reference 2.5.2-267). The sources examined included those within 320 km (200 mi.) of the site and those at larger distances with somewhat higher rates of seismicity, such as sources in the vicinity of the Wabash Valley seismic zone and New Madrid seismic zone. These calculations were performed for each individual team. Seismic sources were added until additional sources produced less than a one percent increase in the frequency of exceedance in the 10^{-4} to 10^{-5} range. The source contributions were tested for 10 Hz and 1 Hz ground motions. The calculations were performed using the preferred set of ground motion models for each ground motion cluster (i.e., the highest weighted path through the logic tree for each ground motion cluster). This corresponds to use of the 50th percentile cluster median model and aleatory variability models 1A and 2A. A single mb-M conversion relationship was used (Reference 2.5.2-262).”

To verify that the appropriate sources were included in FSAR Table 2.5.2-202 using the subset of ground motion models, mean seismic hazard curves were computed for all of the Dames & Moore sources using the subset and full ground motion models. The mean seismic hazard curves

obtained using either the subset or full ground motion models for the Dames & Moore Team sources show that the sources not included in FSAR Table 2.5.2-202 contribute less than one percent to the Fermi 3 site hazard. A note will be added to the captions of FSAR Figures 2.5.2-222 through 2.5.2-228 to indicate the results are for a subset of ground motion models.

Figure 2 contains the results of seismic hazard calculations presented to address the request for demonstrating the ability to back calculate rock hazard curves for Dames & Moore Source 8 from the results presented in the response to RAI 02.05.02-8. The dashed green curves show the hazard results without CAV for Dames & Moore Source 8 and the solid light green curves show the hazard computed with CAV that were presented on Figure 10 in the response to RAI 02.05.02-8 (Note: the curves shown in the response to RAI 02.05.02-8 are plotted at a different scale in Figure 2 for both the X- and Y-axis). The Dames & Moore Source 8 hazard results, with CAV (solid light green curve) and without CAV (dashed green curve), presented on both Figure 10 in response to RAI 02.05.02-8 and Figure 2 of this response are for the GMRS elevation and were computed using the full ground motion model. The black curve shows the hard rock hazard results for Dames & Moore Source 8 computed using the full ground motion model used in the Fermi 3 PSHA calculation. The red curve shows the hard rock hazard results (black curve) multiplied by the mean GMRS amplification functions developed in FSAR Section 2.5.2.5 and shown on FSAR Figure 2.5.2-270. Amplification of the hard rock hazard is an approximation of the process used to compute the amplified hazard results without CAV. As indicated on Figure 2, the red curve very closely matches the dashed green curve, indicating that the results presented in the response to RAI 02.05.02-8 are consistent with the hard rock hazard calculations conducted for the Fermi 3 site.

The light blue curve presented on Figure 2 is the mean hard rock hazard curve for Dames & Moore Source 8 computed using the subset of ground motion models that were used to conduct the sensitivity analyses presented in FSAR Section 2.5.2.4.3.1. The light blue curve is the same curve shown for Dames & Moore Source 8 on Figure 1. The mean hazard curves without CAV for Dames & Moore Source 8 presented in the response to RAI 02.05.02-8 (Figure 10), and reproduced on Figure 2 of this response, cannot be derived directly from the curves shown on Figure 1 without accounting for the difference between the hazard computed using the full set of ground motion models and the hazard computed using the subset of ground motion models. This difference in hazard caused by using either the subset or full set of the ground motion models is not important to the sensitivity analyses or the analyses used to select the set of seismic sources, for the following reasons:

- The sensitivity and seismic source analyses performed with the subset of ground motion models focus on relative effects instead of the absolute hazard values, i.e., does the introduction of an additional source result in a relative increase in the hazard large enough to include it in the model.
- The final calculations of seismic hazard for the Fermi 3 site used the full set of ground motion models, which provide the absolute level of hazard.

The seismic source analysis discussed above results in the same set of seismic sources being selected for the Dames & Moore team using the full set of ground motion models or the subset of ground motion models.

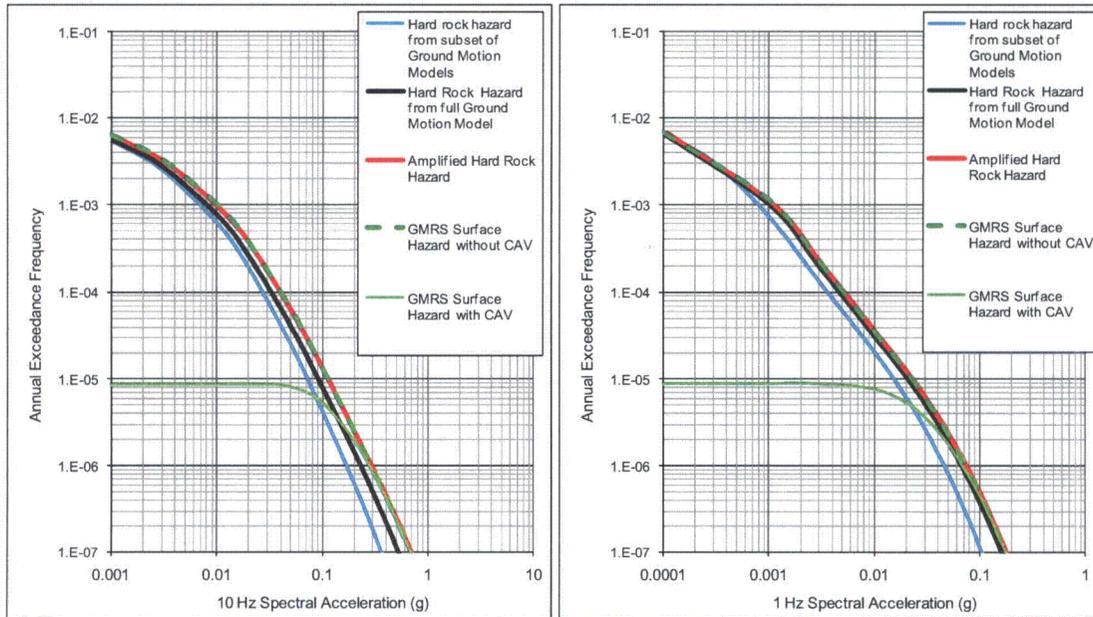


Figure 2 - Comparison of hard rock PSHA results for Dames & Moore Source 8 using the reduced set of ground motion models and using the full set of ground motion models. Also shown are comparisons between the amplified hard rock hazard results and the GMRS surface hazard computed with and without CAV reported in the response to RAI 02.05.02-8.

FSAR Figures 2.5.2-222 through 2.5.2-228 are also revised in response to RAI 02.05.02-12 in Detroit Edison letter NRC3-10-0035 (ML102210351), dated August 6, 2010, to provide clearer grid lines and axes labeling.

Proposed COLA Revision

Proposed revisions to FSAR Figures 2.5.2-222 through 2.5.2-228 are shown on the attached markup.

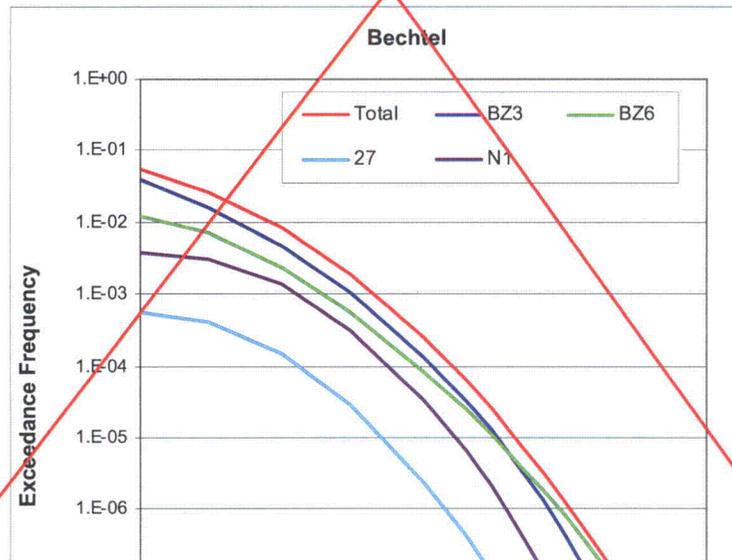
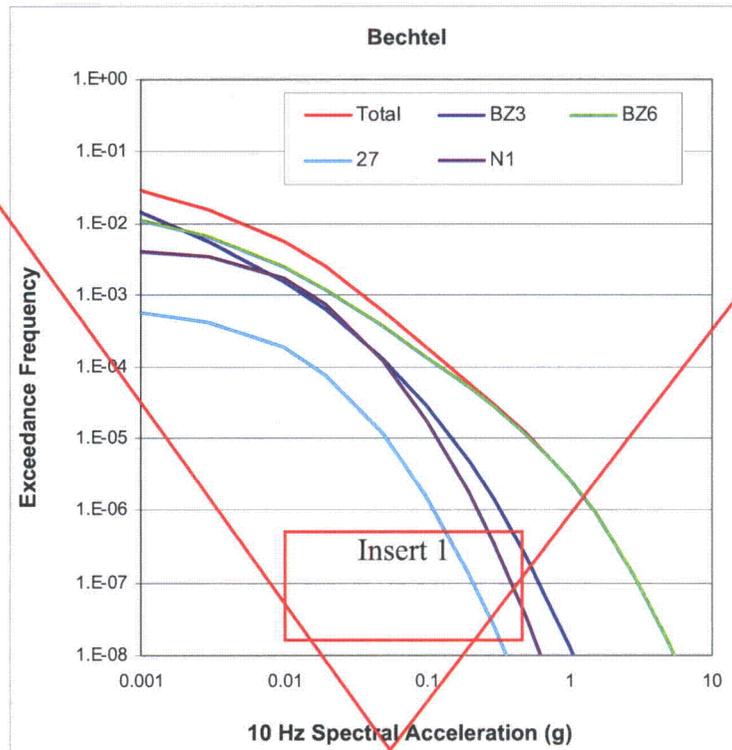
Markup of Detroit Edison COLA
(following 14 pages)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next submittal of the Fermi 3 COLA Revision 3. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

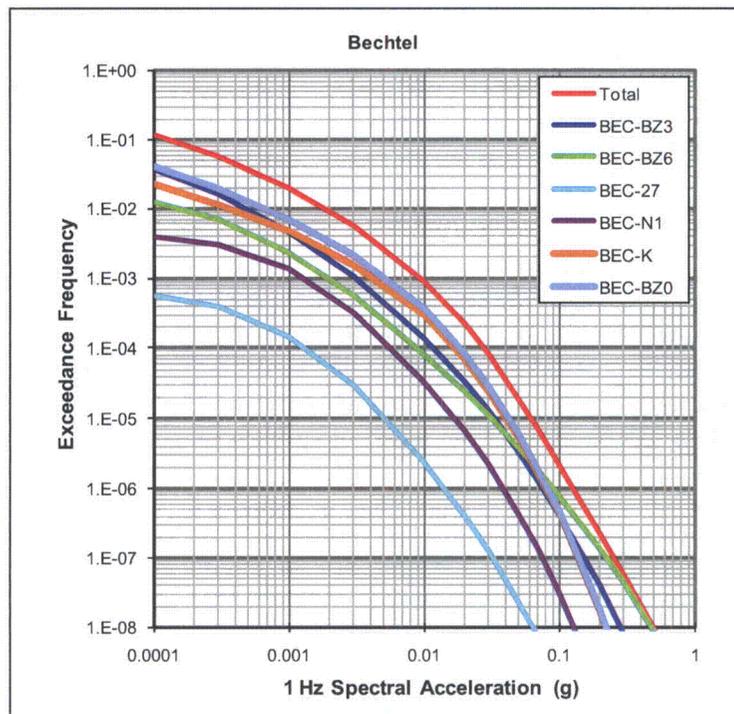
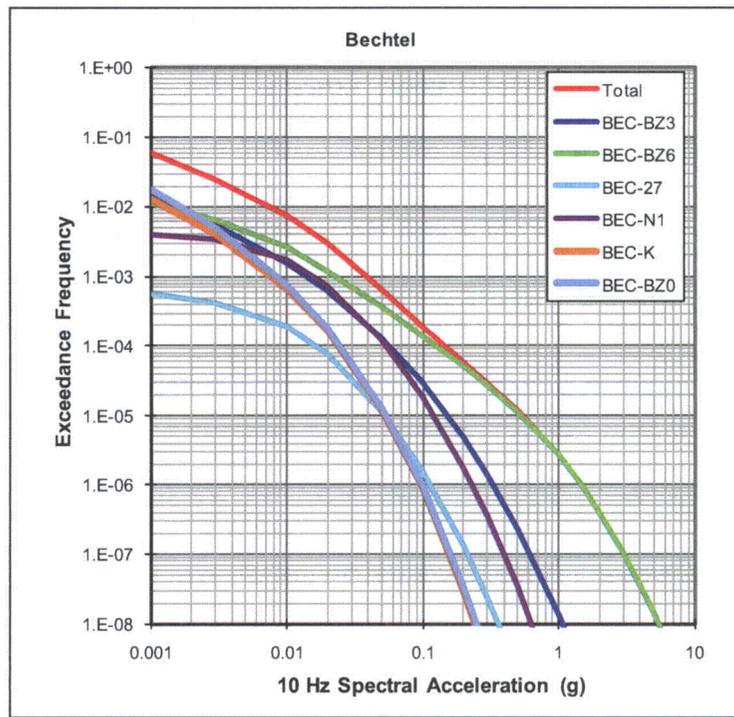
~~Figure 2.5.2-222~~

~~Mean Hazard Curves for the Bechtel Team Sources~~

[EF3 COL
2.0-27-A]

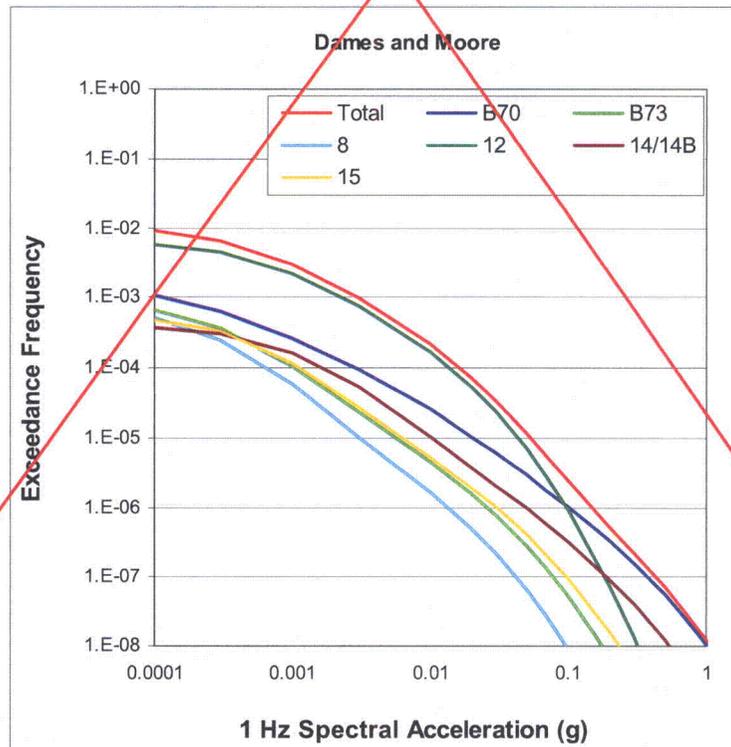
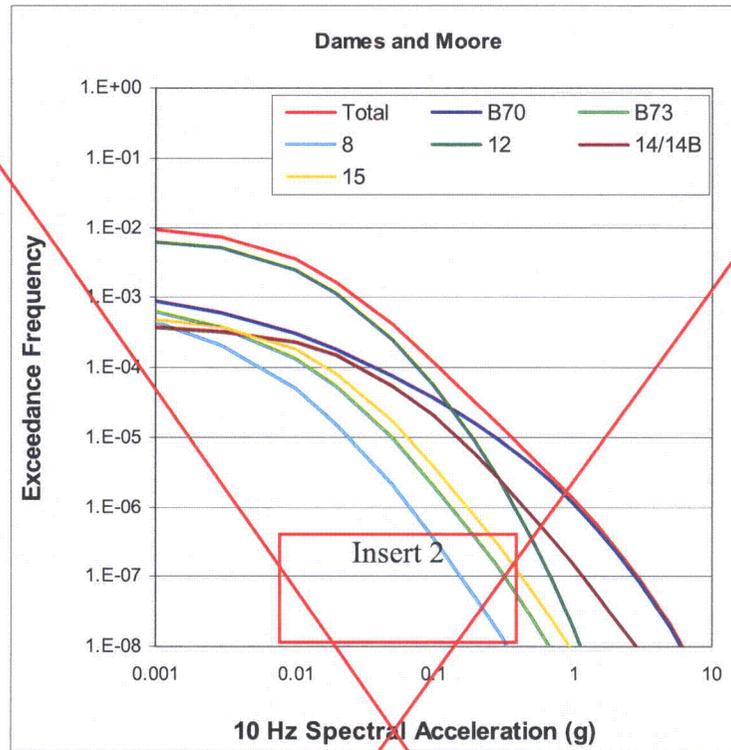


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~~Figure 2.5.2-223~~

~~Mean Hazard Curves for the Dames & Moore Team Sources~~ [EF3
COL 2.0-27-A]



Insert 2

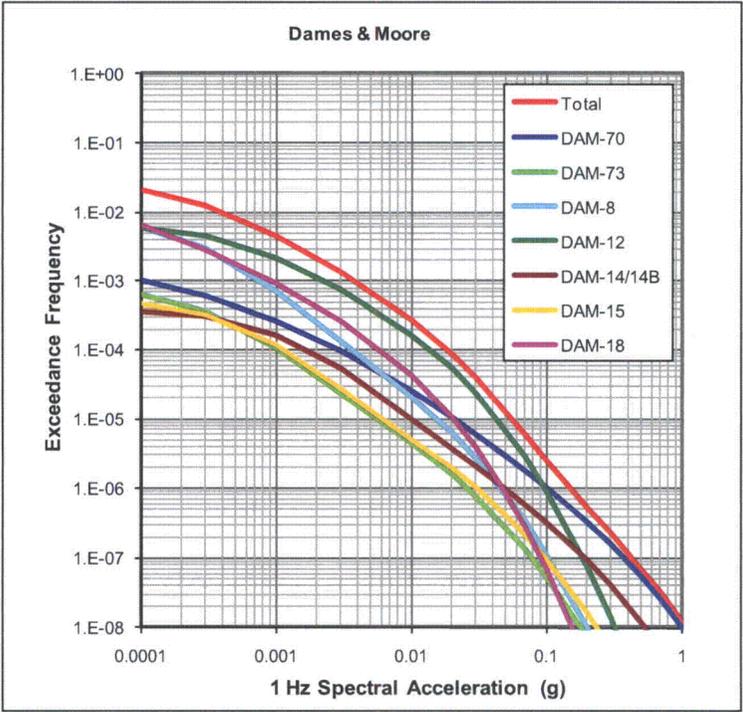
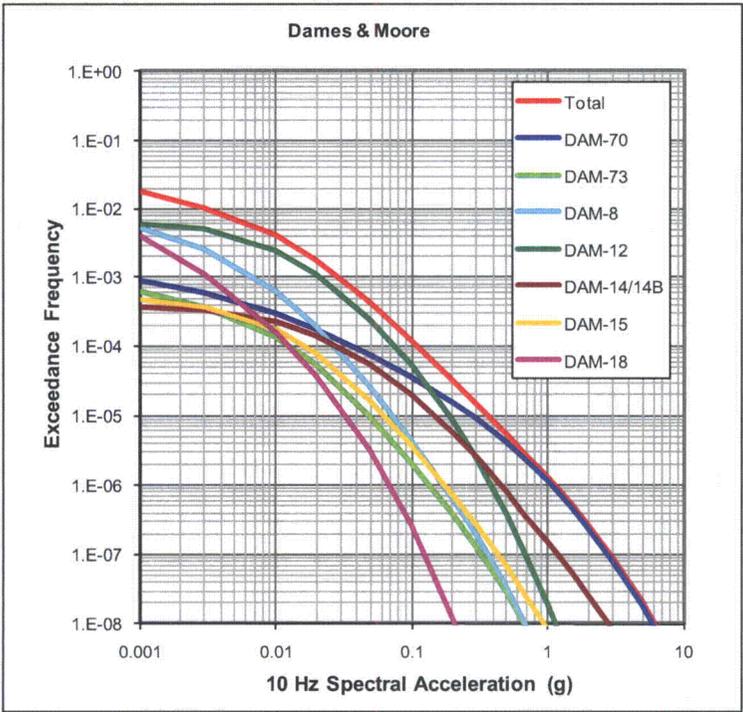
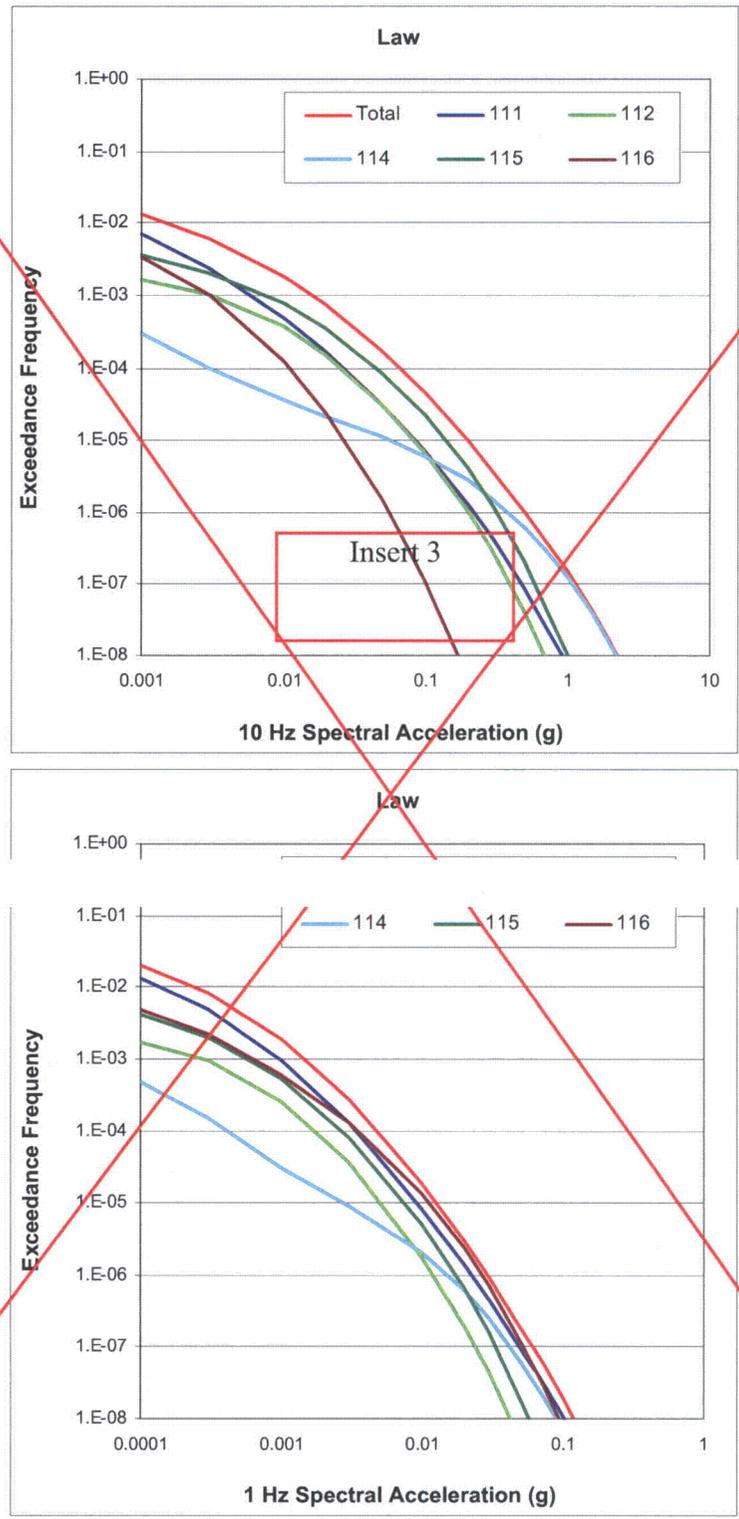




Figure 2.5.2-224 ~~Mean Hazard Curves for the Law Engineering Team Sources~~ [EF3
COL 2.0-27-A]



Insert 3

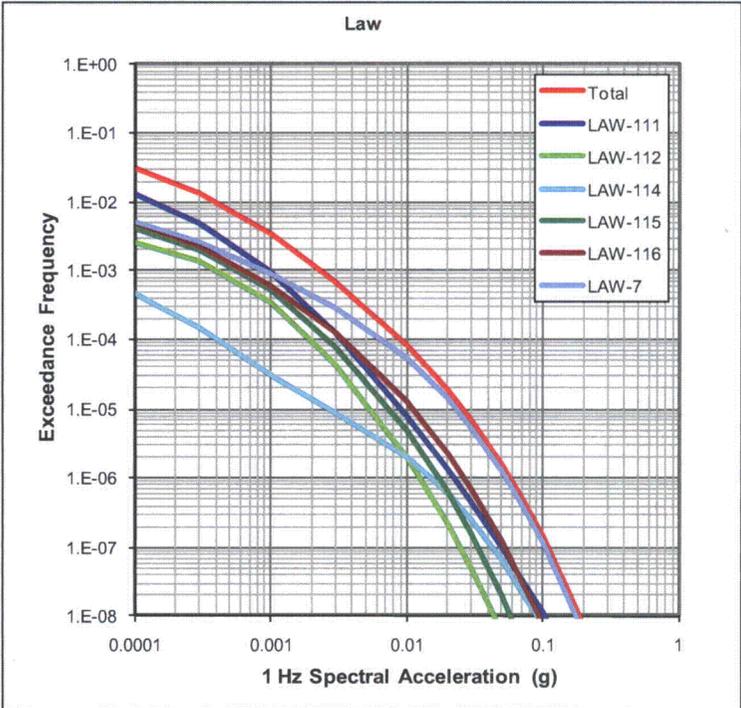
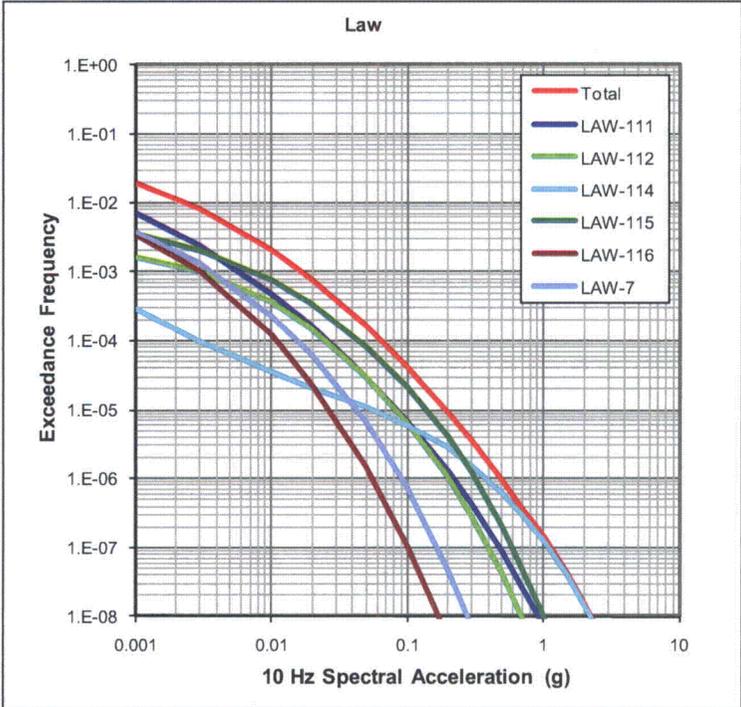
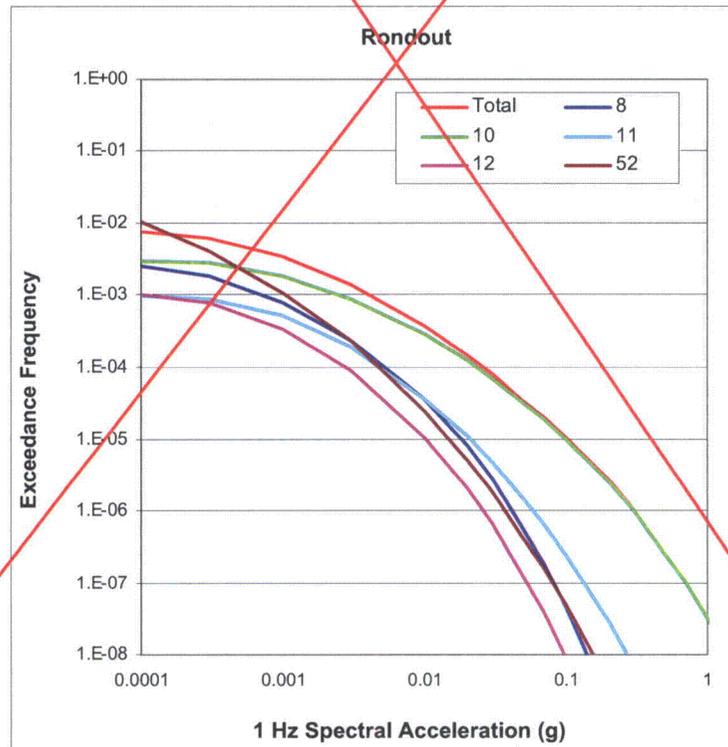
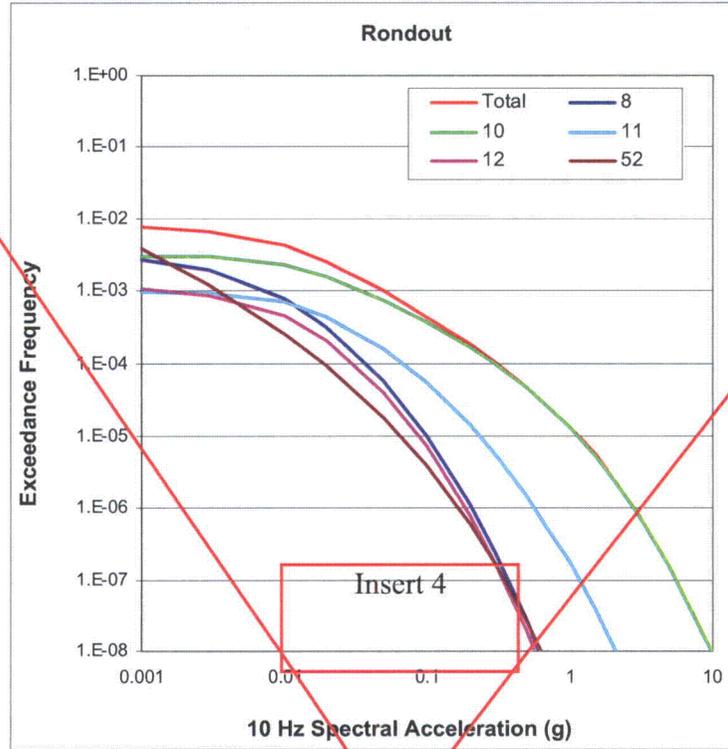


Figure 2.5.2-225 Mean Hazard Curves for the Rondout Associates Team Sources Computed using Subset of EPRI (2004, 2006) Ground Motion Models

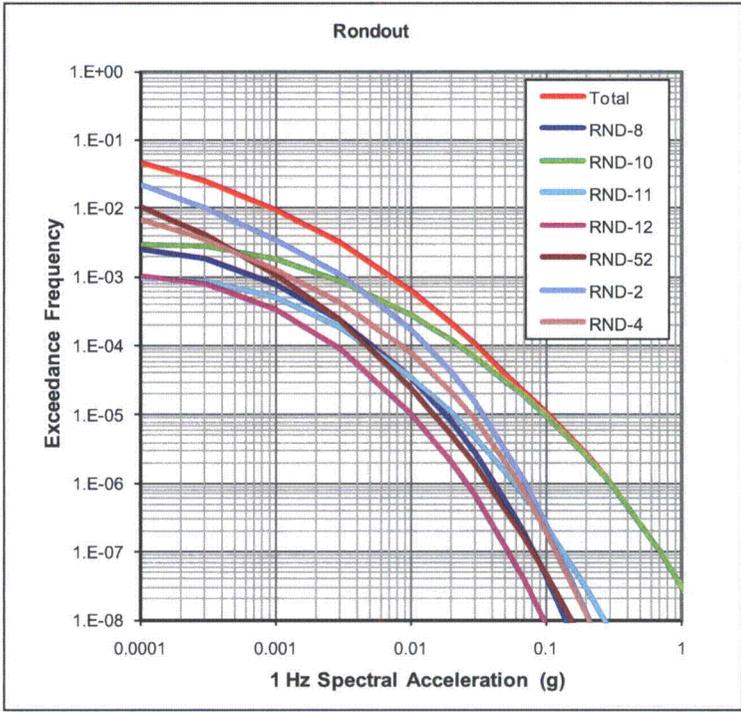
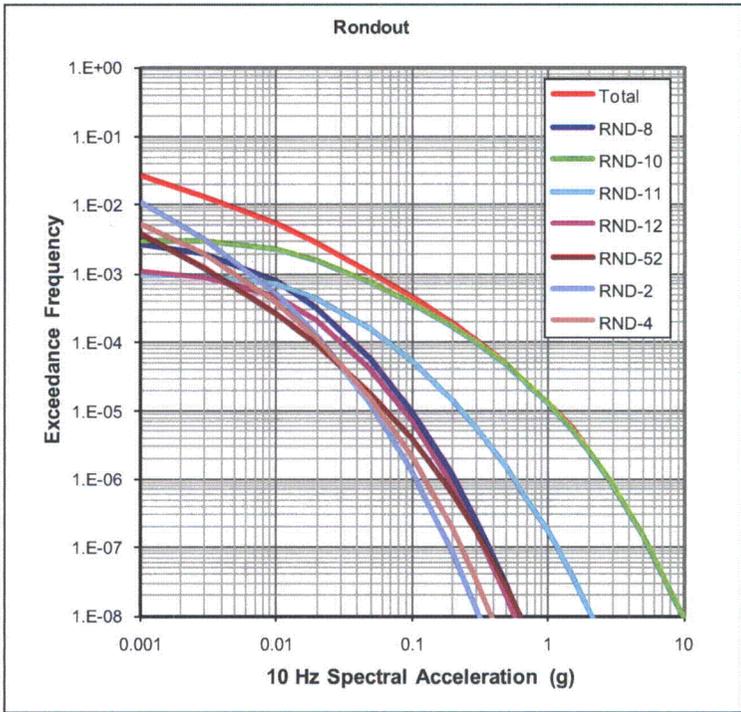
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~~Mean Hazard Curves for the Rondout Associates Team Sources~~

[EF3 COL 2.0-27-A]



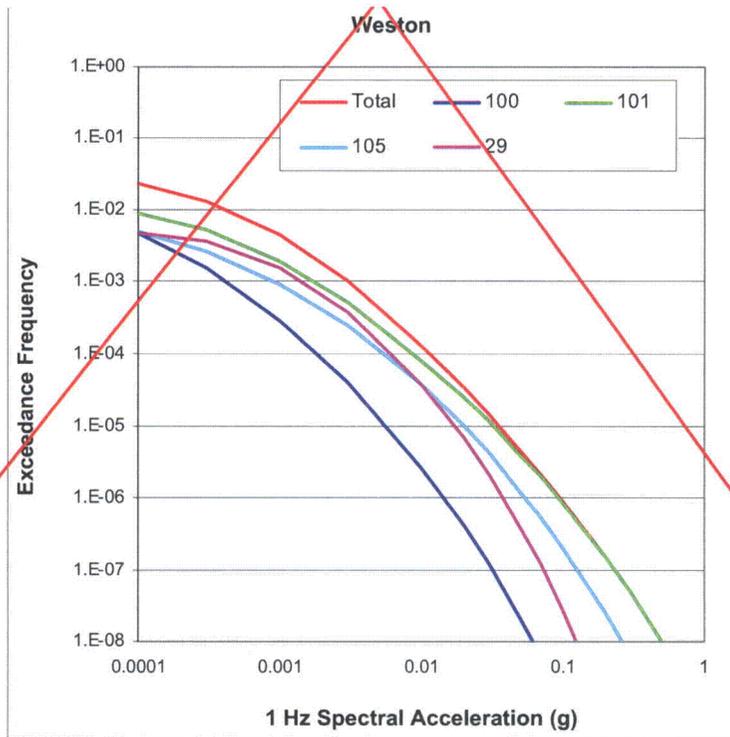
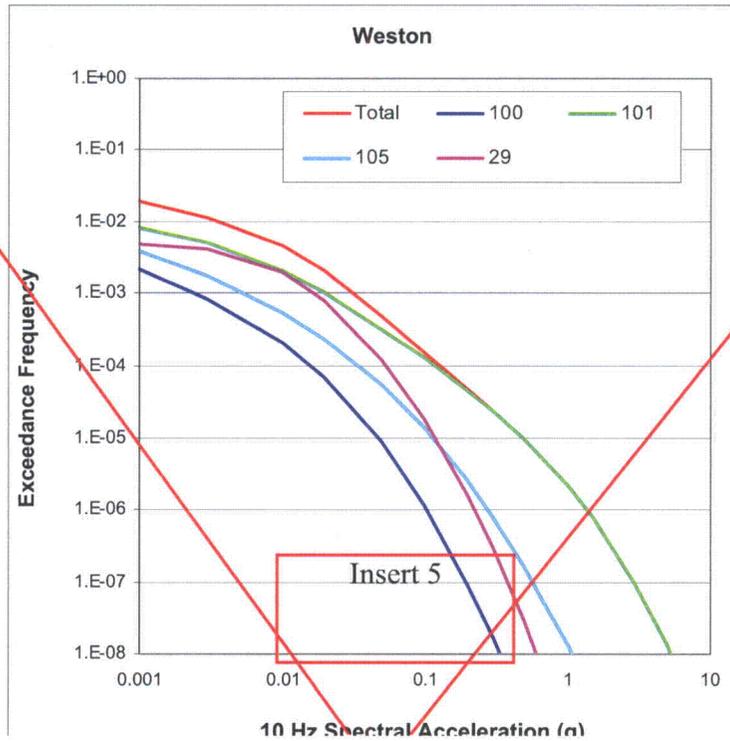
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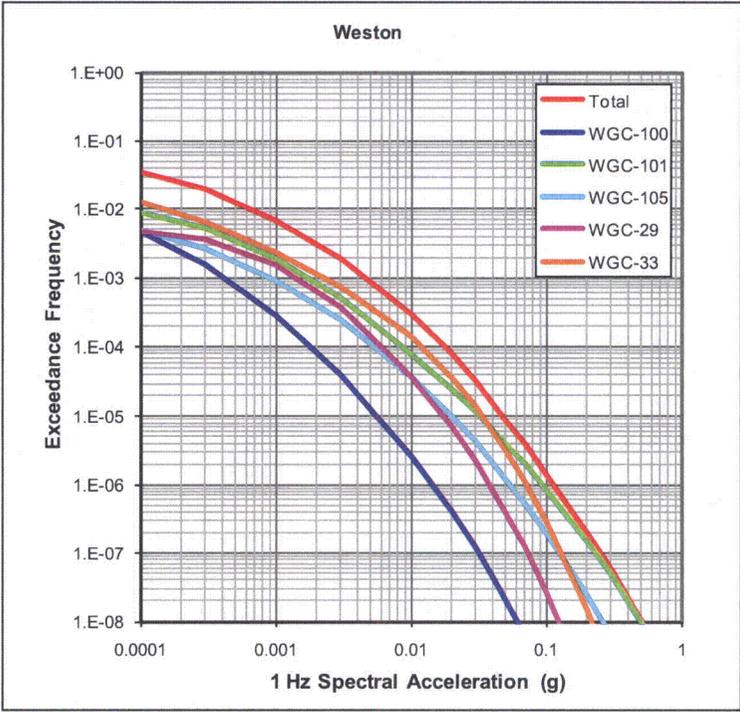
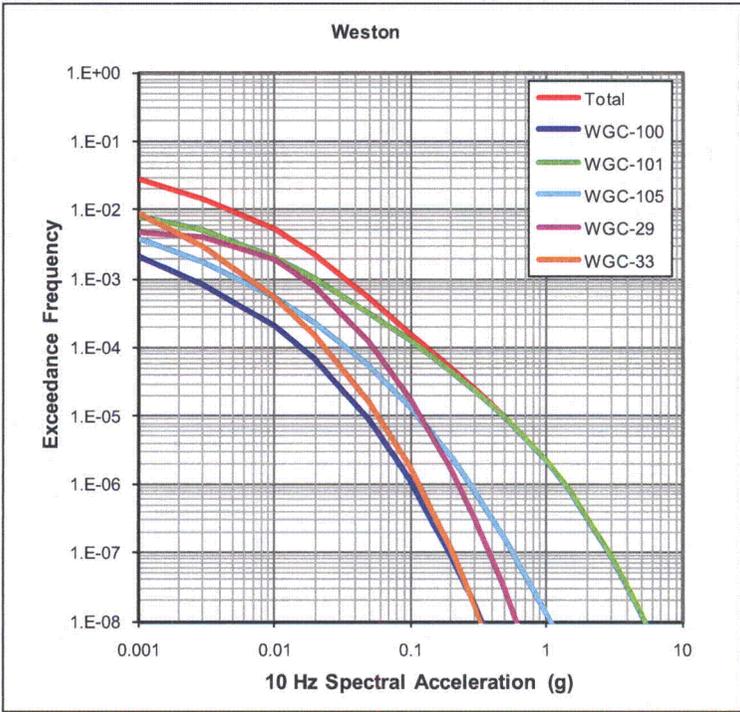
~~Figure 2.5.2-226~~

~~Mean Hazard Curves for the Weston Geophysical Team Sources~~

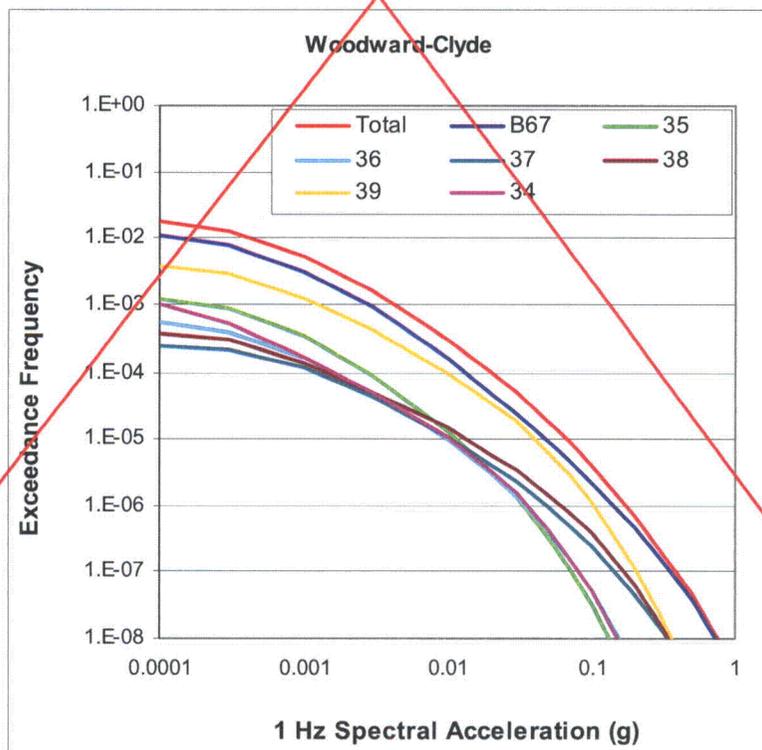
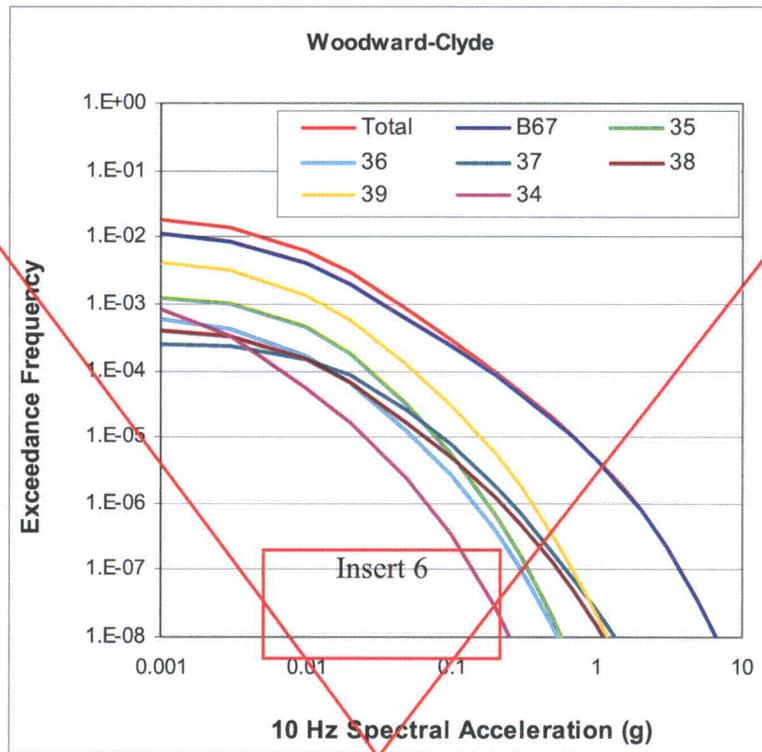
[EF3 COL 2.0-27-A]



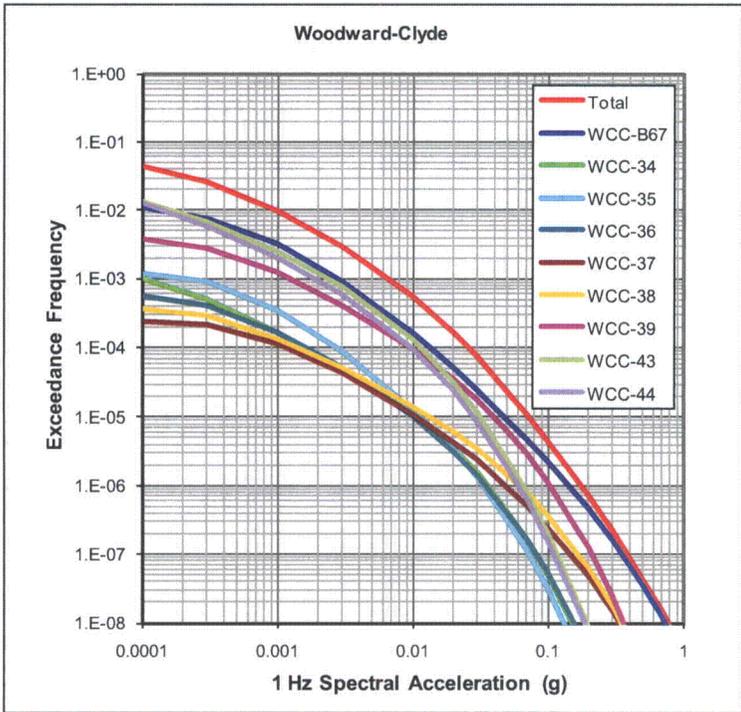
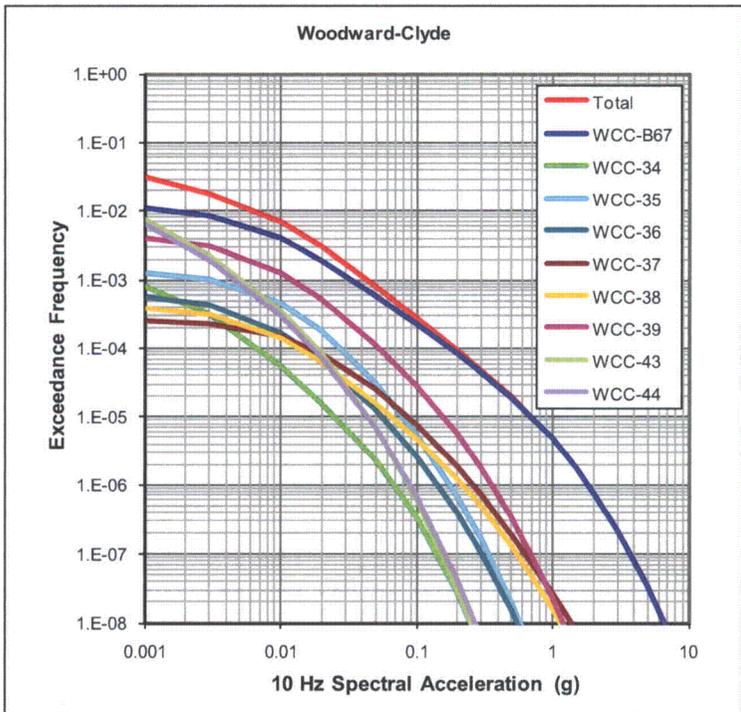
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~~Figure 2.5.2-227 Mean Hazard Curves for the Woodward-Clyde Consultants Team Sources [EF3 COL 2.0-27-A]~~

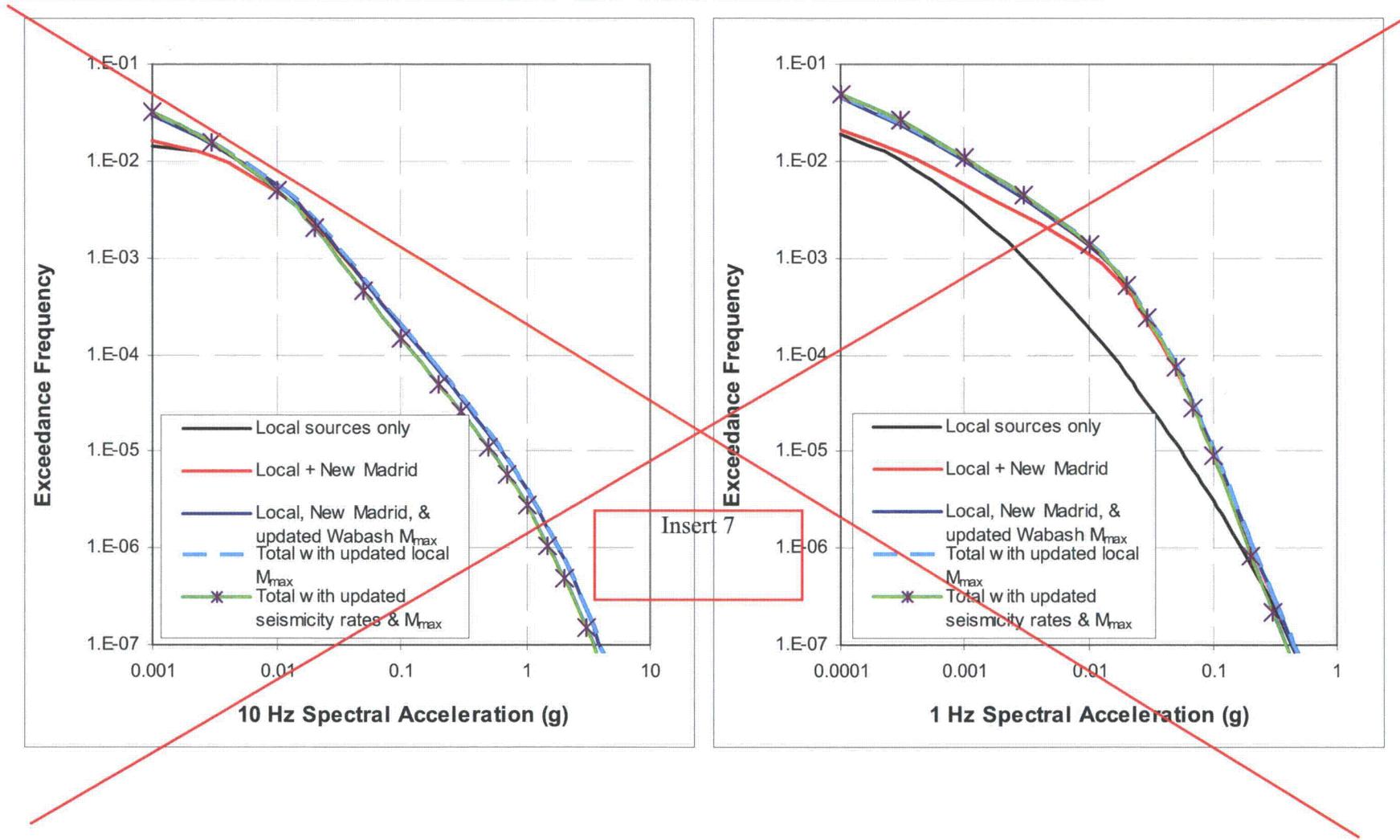


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~~Figure 2.5.2-228 Effect of Update of EPRI-SOG and Additional Sources on the Seismic Hazard for the Fermi 3 Site [EF3 COL 2.0-27-A]~~

Figure 2.5.2-228 Effect of Update of EPRI-SOG and Additional Sources on the Seismic Hazard for the Fermi 3 Site. Hazard computed using Subset of EPRI (2004, 2006) Ground Motion Models



Insert 7

