BSC	**Model Administrative Change Notice** *Complete only applicable items.*	QA: QA Page 1 of 3

1. Document Number:	MDL-MGR-GS-000007	**2. Revision:**	00	**3. ACN:**	02
4. Title:	Supplemental Earthquake Ground Motion Input for a Geologic Repository at Yucca Mountain, NV				
5. No. of Pages Attached	137	**Note:** This ACN includes attached electronic media, 1 CD as described in Block 8. The parent document (MDL-MGR-GS-000007 Rev 00) includes 6 DVDs and 1 CD that are electronic media attachments to Appendix D, but the original Model Signature Page/Change History omits any description of these media.			

6. Approvals:		
Preparer:	Ivan. G. Wong [signature] Print name and sign	3/26/08 Date
Checker:	Richard Quittmeyer [signature] Print name and sign	3/26/2008 Date
QER:	Jerry Heaney [signature] Print name and sign	3/27/08 Date
Independent Technical Reviewer:	Robert Green [signature] Print name and sign	3/26/08 Date
Responsible Manager:	James S. Whitcraft [signature] Print name and sign	3/27/08 Date

7. Affected Pages	**8. Description of Change:**
6-22	In the first paragraph of Section 6.3.1, in the 4th (next-to-last) sentence, added the word "motions" to the end of the sentence. In the text following Equations 6-4 and 6-5, changed the fonts of variables from normal to italics or vice-versa to match the italicized or normal fonts used in the equations.
6-177	Added the following note to Figure 6.4.2-38: "For South Case C, only the portion of the profile based on down-hole and suspension data is plotted. For this profile from 500 ft to the top of the Calico Hills Formation (1300 ft) the shear-wave velocity is 6000 ft/s, from 1300 ft to the top of the Prow Pass Tuff (1700 ft) the shear-wave velocity is 5600 ft/s, and below 1700 ft the shear-wave velocity is 6000 ft/s (see Figures 6.4.2-54 through 6.4.2-56)."
6-196 – 6-198; 6-202	In each of Figures 6.4.2-57, 6.4.2-58, 6.4.2-59, and 6.4.2-63, removed the text above the legend and the stray "p…" in the legend.
6-236 – 6-238	Made the right-axis scale consistent with the left-axis scale in the upper graphs in each of Figures 6.4.4-1 – 6.4.4-3.

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4. Title: Supplemental Earthquake Ground Motion Input for a Geologic Repository at Yucca Mountain, NV

7. Affected Pages (cont'd)	**8. Description of Change (cont'd):**
6-255 – 6-260; 6-263; 6-286; 6-287; 6-289; 6-290; 6-292; 6-293; 6-295; 6-296; 6-298; 6-299; 6-301 – 6-305; 6-307; 6-308; 6-313 – 6-318; 6-369; 6-370; 6-372; 6-373; 6-376; 6-379; 6-382; 6-385; 6-388; 6-391; 6-394; 6-397; 6-400; 6-403; 6-406; 6-409; 6-412; 6-415; 6-418; 6-421; 6-424; 6-427; 6-430; 6-433; 6-436; 6-439; 6-442; 6-445; 6-448; 6-451; 6-454; 6-457; 6-463; 6-469; 6-472; 6-475; 6-478; 6-481; 6-484; 6-487; 6-490; 6-493; 6-496; 6-499; 6-502; 6-505; 6-508; 6-599; 6-600; 6-602 – 6-612; 6-614; 6-649; 6-652; 6-655; 6-658; 6-661; 6-664; 6-667; 6-670; 6-673; A-49 – A-51; A-57 – A-65	Made the right-axis scale consistent with the left-axis scale in each of Figures 6.5.1-1 – 6.5.1-6; 6.5.1-9; 6.5.2-8, -9, -11, -12, -14, -15, -17, -18, -20, -21, -23, -24, -25, -26, -27, -29, -30, -35, -36, -37, -38, -39, -40, -91 (Horizontal 1 and 2), -92 (Horizontal 1 and Vertical), -94 (Horizontal 1), -95, -98, -101, -104 (Velocity and Displacement), -107, -110 (Acceleration and Velocity), -113 (Displacement), -116, -119, -122, -125 (Acceleration and Displacement), -128 (Acceleration and Displacement), -131, -134, -137, -140, -143 (Acceleration), -146 (Velocity), -149 (Acceleration), -152 (Acceleration), -155, -158 (Acceleration), -161 (Acceleration), -164 (Acceleration and Displacement), -167, -170 (Acceleration and Displacement), -173, -176, -179 (Acceleration), -185 (Acceleration and Displacement), -191 (Velocity), -194 (Acceleration and Velocity), -197 (Displacement), -200 (Acceleration and Velocity), -203 (Acceleration and Displacement), -206 (Acceleration), -209 (Acceleration and Displacement), -212, -215 (Acceleration and Displacement), -218 (Acceleration), -221 (Acceleration and Displacement), -224 (Acceleration), -227 (Acceleration), and -230 (Acceleration and Displacement); 6.5.3-4 and -5; 6.5.3-7 – 6.5.3-17a; 6.5.3-18, -53, -56 (Velocity and Displacement), -59 (Acceleration), -62 (Acceleration), -65 (Acceleration), -68 (Acceleration and Velocity), -71 (Acceleration), -74 (Acceleration), and -77; A8(a), -(b), and -(c); A10(a), -(b) and -(c); A11(a), -(b), and -(c); and A12(a), -(b), and -(c).
6-285; 6-288; 6-291; 6-297; 6-300; 6-306; 6-598; 6-601	Made the right-axis scale consistent with the left-axis scale and made the top-axis scale consistent with the bottom-axis scale in each of Figures 6.5.2-7, -10, -13, -19, -22, and -28; 6.5.3-3; and 6.5.3-6.
6-294	Made the right-axis scale consistent with the left-axis scale, made the top-axis scale consistent with the bottom-axis scale, and aligned end-points of the left axis with the left end-points of the top and bottom axes in Figure 6.5.2-16.
6-309	Made the right-axis scale consistent with the left-axis scale, made the top-axis scale consistent with the bottom-axis scale, and extended the plot of the Mean Horizontal Hazard Curve to include additional high-probability, low-spectral-acceleration data in Figure 6.5.2-31.
6-310; 6-311	Made the right-axis scale consistent with the left-axis scale and extended the plot of the Mean Horizontal Hazard Curve to include additional high-probability, low-spectral-acceleration data in Figures 6.5.2-32 and 6.5.2-33.
A-53	Removed spacing within the word "report" at the end of the caption for Figure A9(b).
A-55	Removed yellow highlighting of "BSC 2004 [DIRS 170027" in the note and of "2004 [DIRS 170027" in the caption for Figure A9(d).

Model
Administrative Change Notice

Complete only applicable items.

1. Document Number:	MDL-MGR-GS-000007	2. Revision:	00	3. ACN:	02
4. Title:	Supplemental Earthquake Ground Motion Input for a Geologic Repository at Yucca Mountain, NV				

7. Affected Pages (cont'd)	8. Description of Change (cont'd):
C-3	Rephrased the statement regarding report figures to state that Table C-1 is included in attached electronic media.
D-24	Revised first sentence to state the number of DVDs (six) attached, made editorial corrections to the second sentence, and added the following sentence to the first paragraph: "A separate CD contains lists of all of the files on each of the DVDs."
N/A, electronic media attachment	Incorporated the attached CD, "Supplemental Earthquake Ground Motion Input for a Geologic Repository at Yucca Mountain, NV, Appendix C Attachment, MDL-MGR-GS-000007 Rev 00 ACN 02." This attachment contains data that were inadvertently omitted from the original (Revision 00) record submittal. These data constitute the original Rev 00 Appendix C electronic media attachment, and are graphically represented in figures in Section 6.4.2 of the model report. This attachment also contains new data related to Figure 6.4.2-94 (revised from Rev 00), which is included in ACN 01 of this model report.

6.3 POINT-SOURCE STOCHASTIC GROUND MOTION MODEL

The following is a description of the stochastic point-source ground motion model used in these analyses. This description has been extracted from Silva et al. (1996 [DIRS 110474]).

6.3.1 Model Description

The stochastic ground motion model as implemented in this study had its inception with the early observation by Hanks (1979 [DIRS 182045]) that RMS (root mean square) accelerations at close distances could be interpreted as band-limited, finite duration white noise with a source spectrum consistent with the omega-square model of Aki (1967 [DIRS 182349]), Brune (1970 [DIRS 103315], 1971 [DIRS 131516]). This early point-source model was later extended to estimate peak accelerations by applying random vibration theory (RVT) to relate peak time domain values to RMS accelerations (Hanks and McGuire 1981 [DIRS 163510]). Hanks and McGuire (1981 [DIRS 163510]) further validated the model with existing strong motion data (moment magnitude [**M**] ≥ 4) over the distance range of about 10 to 100 km. Their results showed that the simple point-source model, using a Fourier amplitude spectrum which is constant between the earthquake source corner frequency (Brune 1970 [DIRS 103315], 1971 [DIRS 131516]) and a high-frequency cutoff due to propagation path/site damping, predicted peak acceleration values to within 50% or less of recorded ground motions. This is a remarkably close agreement since typical empirical relations have a standard deviation on peak acceleration of about 0.5 (natural log).

The two corner frequencies (source and path/site) give rise to the band-limited characterization of the model with the strong motion or faulting duration defined as the inverse of the magnitude-dependent source corner frequency. The only free parameters in the Hanks and McGuire (1981 [DIRS 163510]) model are the two corner frequencies and distance (1/R geometrical attenuation). Due to the assumed constant Fourier acceleration spectrum, the model can easily be integrated for the a_{RMS}:

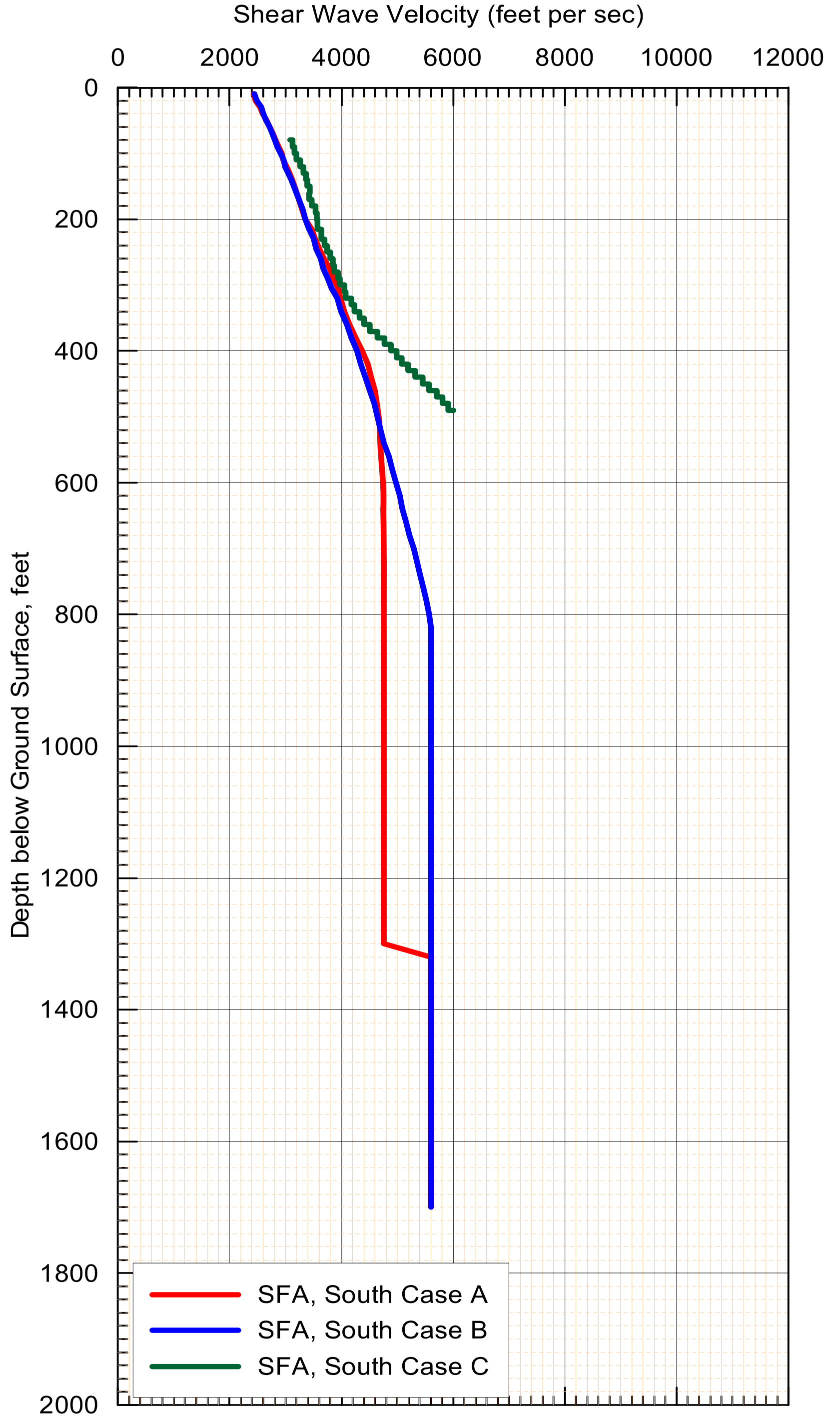
$$a_{RMS} = 0.85 \frac{(2\pi)^2}{106} \frac{\Delta\sigma}{\rho R} \sqrt{\frac{f_{max}}{f_O}} \quad \text{(Eq. 6-4)}$$

where $\Delta\sigma$ is stress drop, ρ is density, R is hypocentral distance, f_0 is the source corner frequency, and f_{max} is a maximum frequency.

Assuming the acceleration time history is white Gaussian noise, the RVT estimate of peak acceleration is given by

$$a_{max} = a_{RMS} \sqrt{2\,ln\left(\frac{2 f_{max}}{f_O}\right)} \quad \text{(Eq. 6-5)}$$

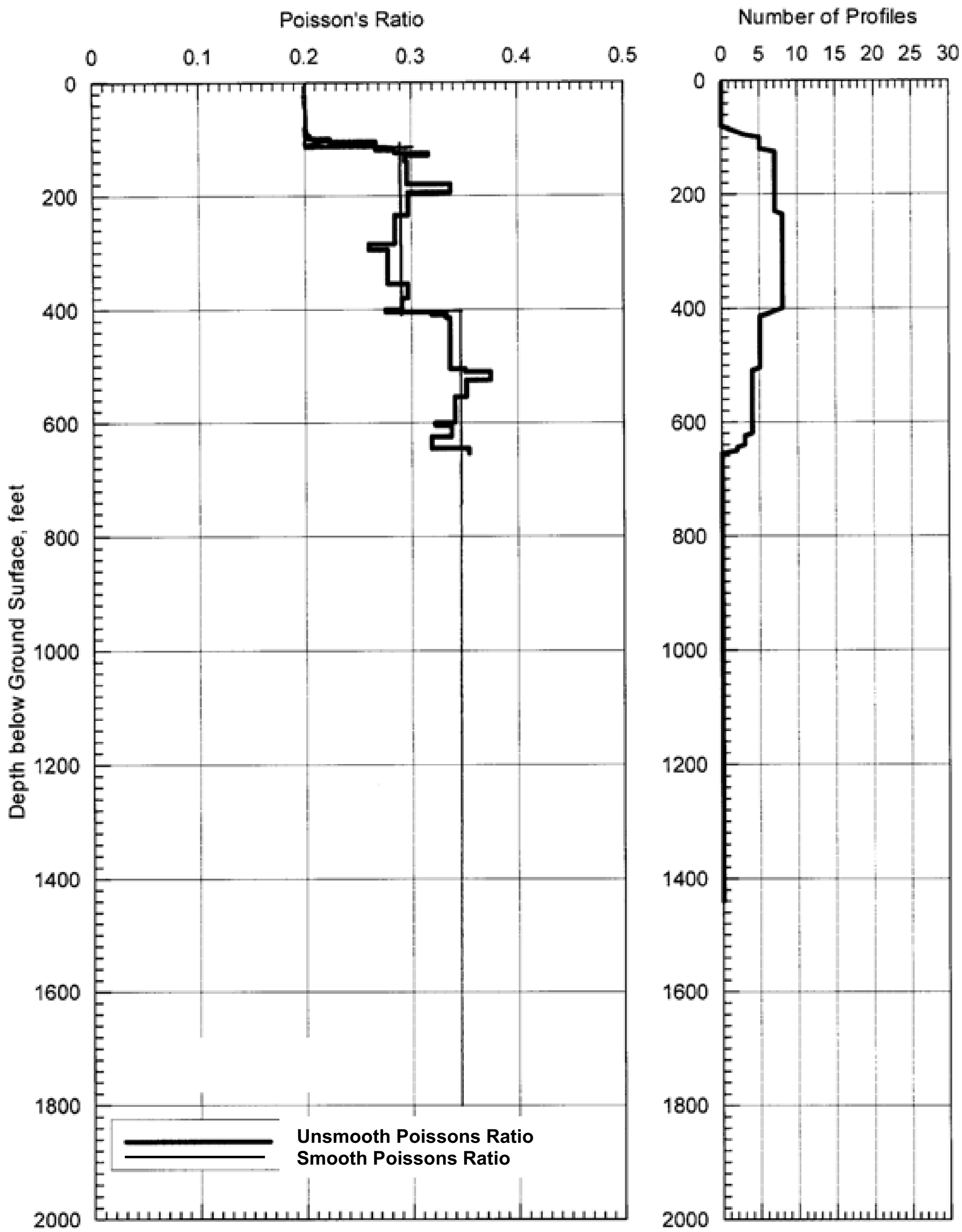
The source corner frequency (f_0) is determined by the magnitude using Brune scaling and is the low frequency limit, while the high frequency limit, f_{max}, is taken as the highest frequency passed through the recording instrument. The stress drop $\Delta\sigma$ is constant and for this first model, a value of 100 bars provided the best fit to the RMS and peak value data.



Source: Appendix C, Table C-1

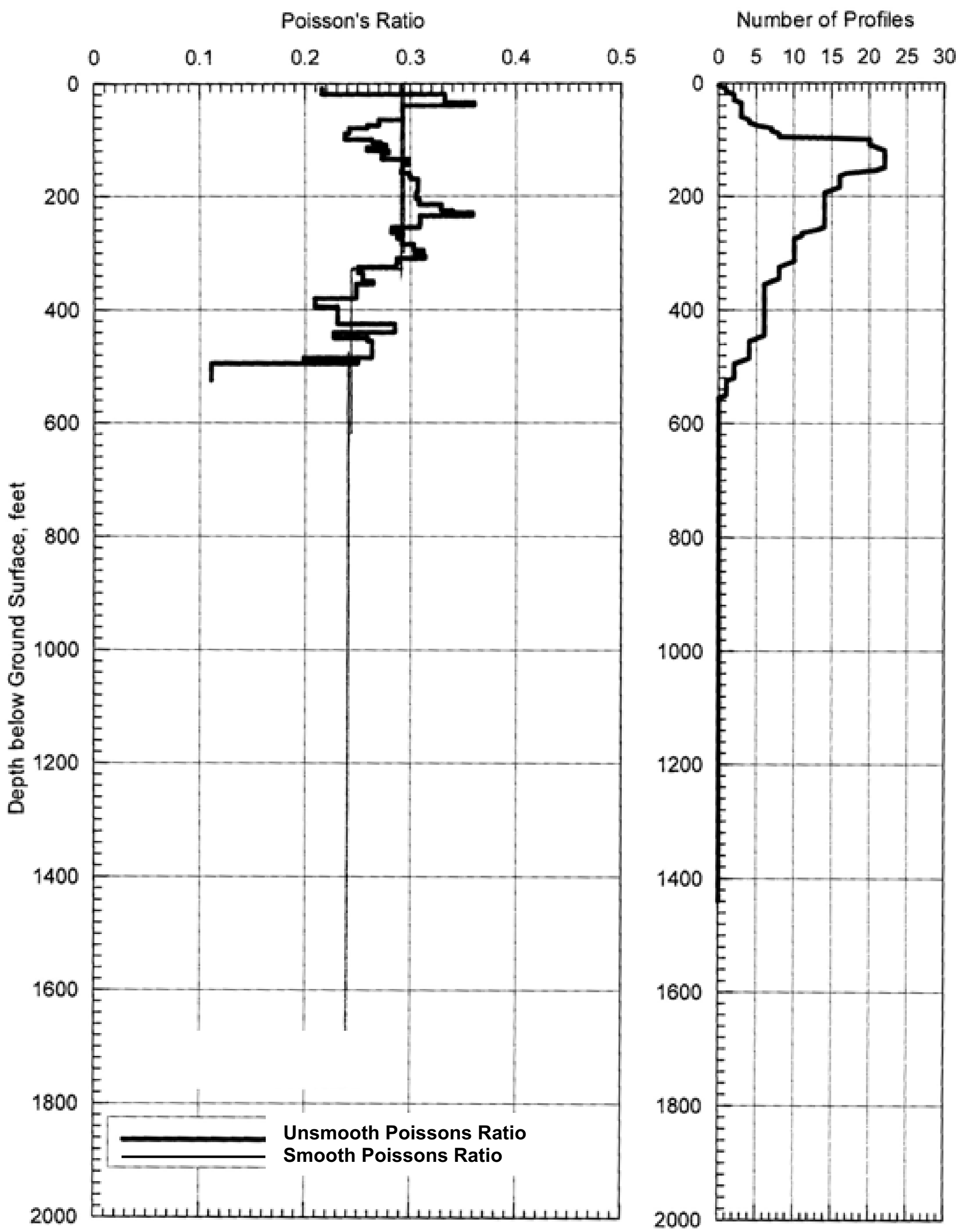
Note: For South Case C, only the portion of the profile based on downhole and suspension data is plotted. For this profile from 500 ft to the top of the Calico Hills Formation (1300 ft) the shear-wave velocity is 6000 ft/s, from 1300 ft to the top of the Prow Pass Tuff (1700 ft) the shear-wave velocity is 5600 ft/s, and below 1700 ft the shear-wave velocity is 6000 ft/s (see Figures 6.4.2-54 through 6.4.2-56).

Figure 6.4.2-38. South Case A, B, and C for the SFA



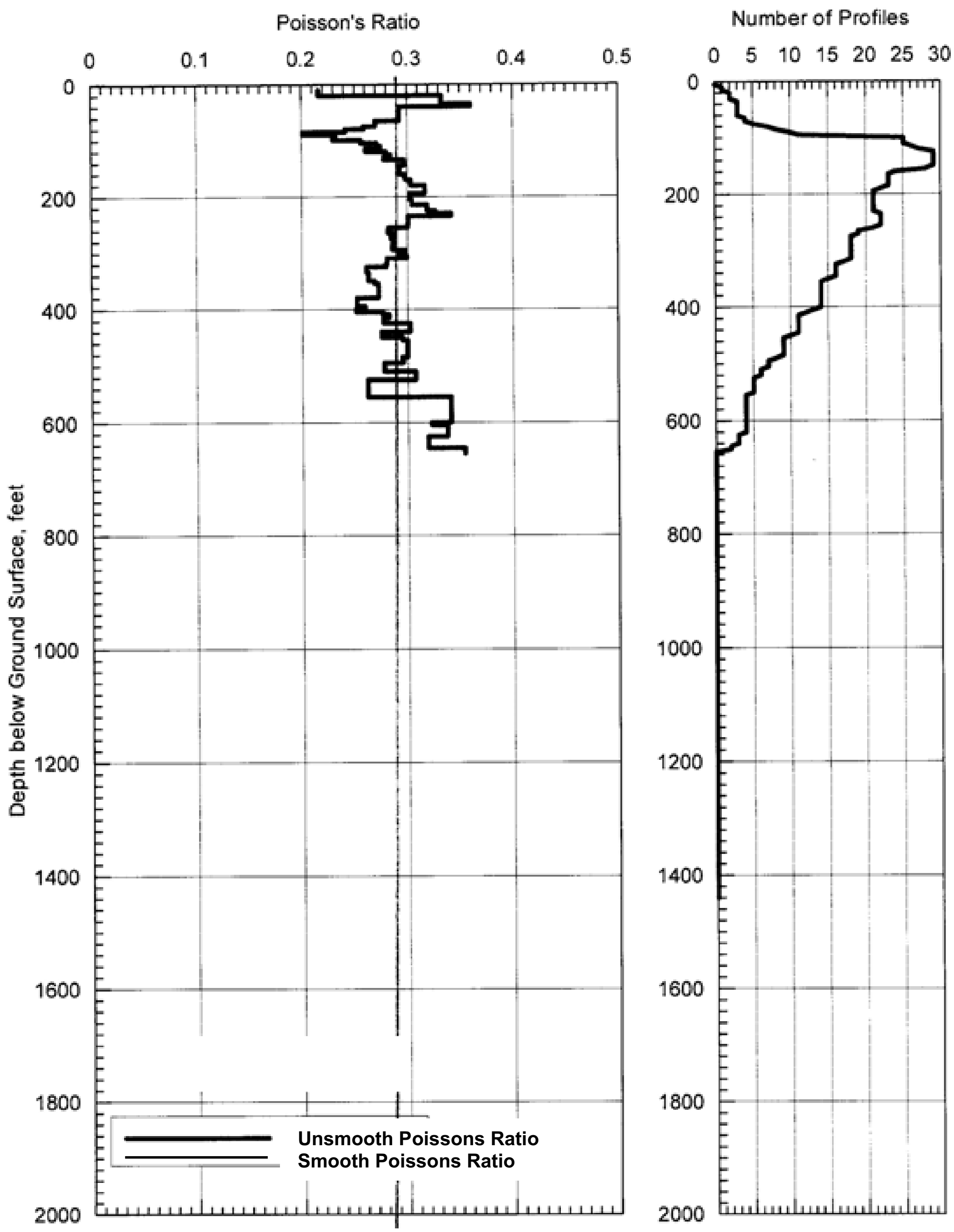
Source: Appendix C, Table C-1

Figure 6.4.2-57. Poisson's Ratio for Tuff of the Timber Mountain and Paintbrush Groups at the SFA From Average V_S and V_P Profiles for Northeast of Exile Hill Fault Splay



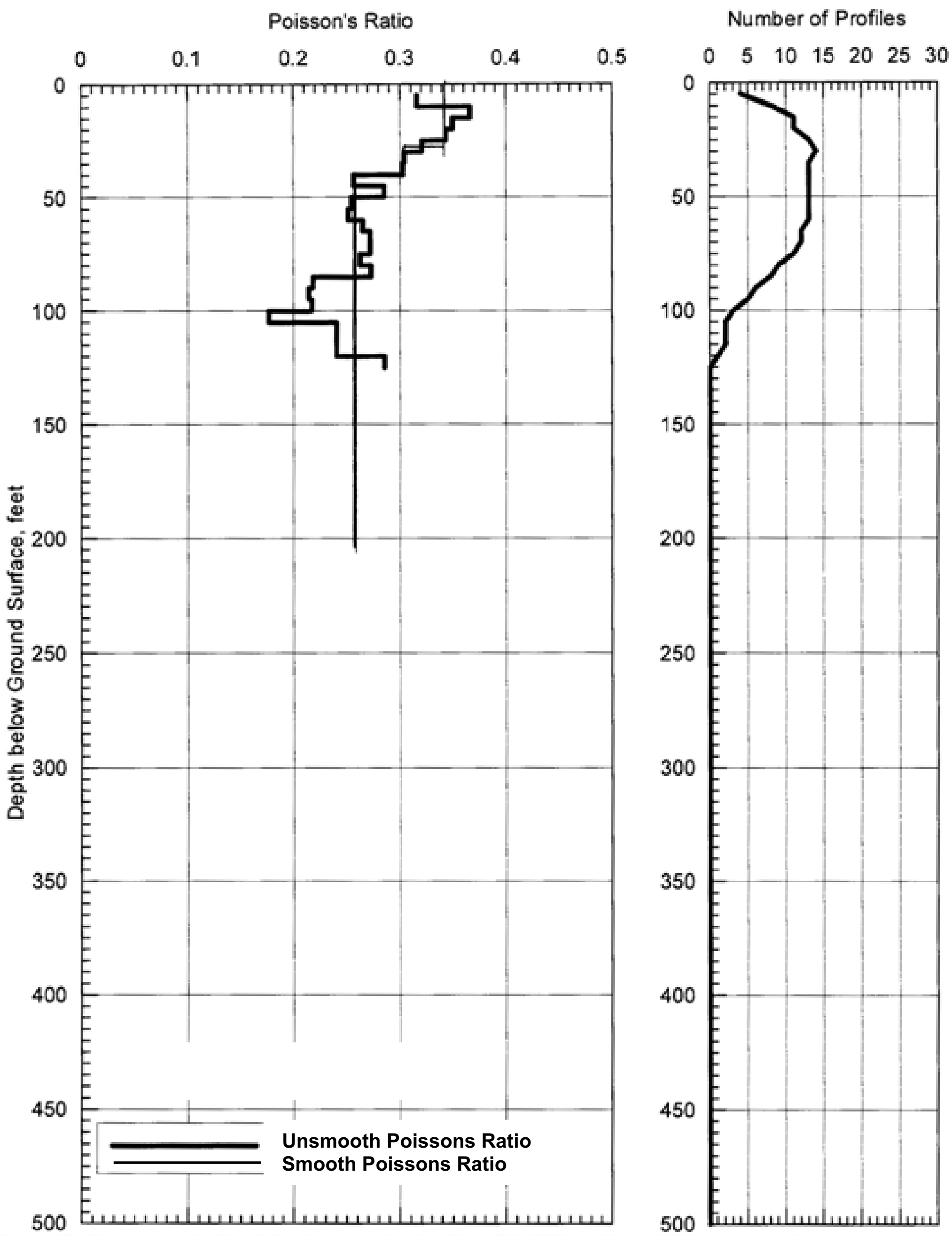
Source: Appendix C, Table C-1

Figure 6.4.2-58. Poisson's Ratio for Tuff of the Timber Mountain and Paintbrush Groups at the SFA From Mean V_S and V_P Profiles for South and Southwest of Exile Hill Fault Splay



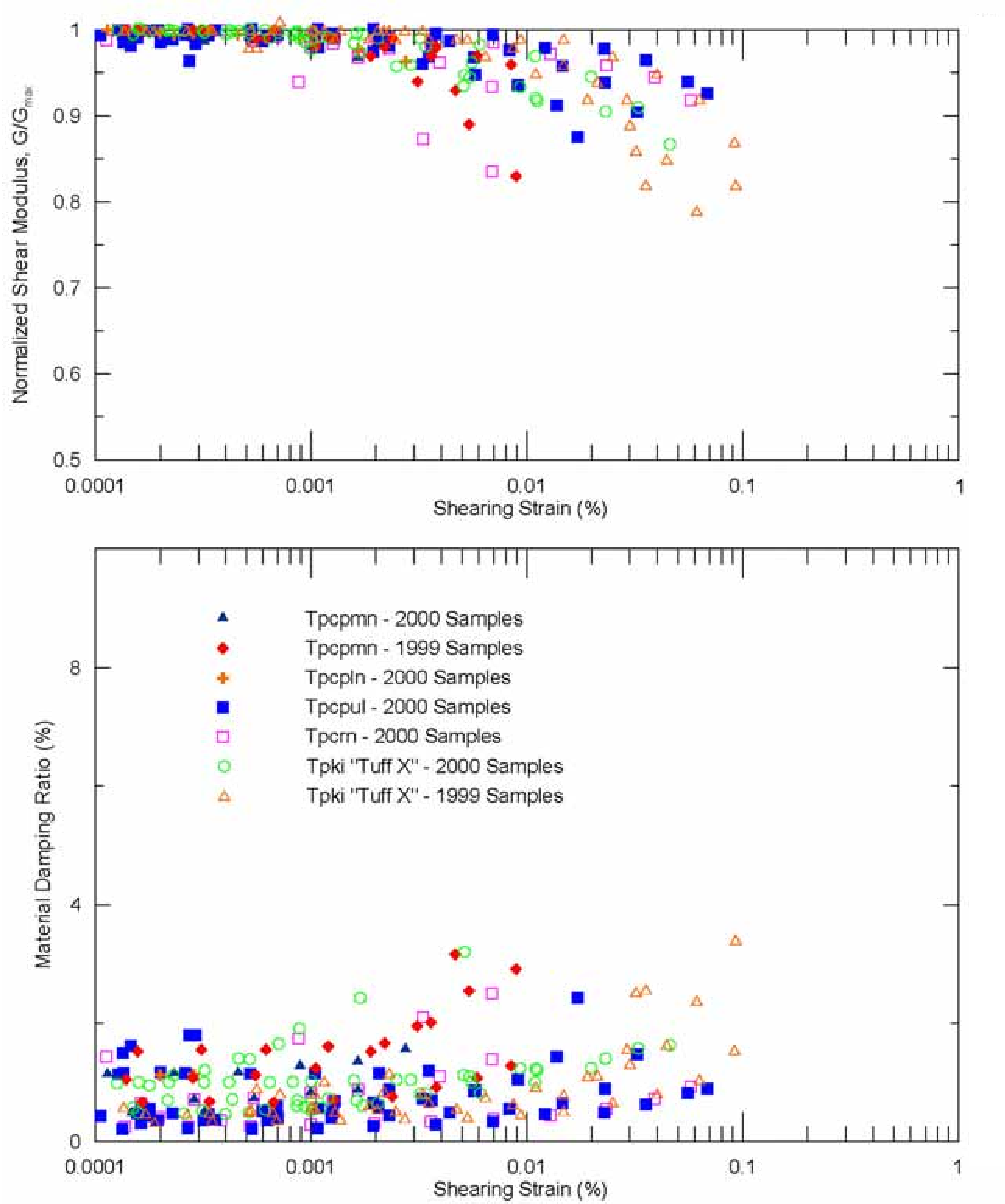
Source: Appendix C, Table C-1

Figure 6.4.2-59. Poisson's Ratio for Tuff of the Timber Mountain and Paintbrush Groups at the SFA From Mean V_S and V_P Profiles for All Boreholes on Either Side of Exile Hill Fault Splay



Source: Appendix C, Table C-1

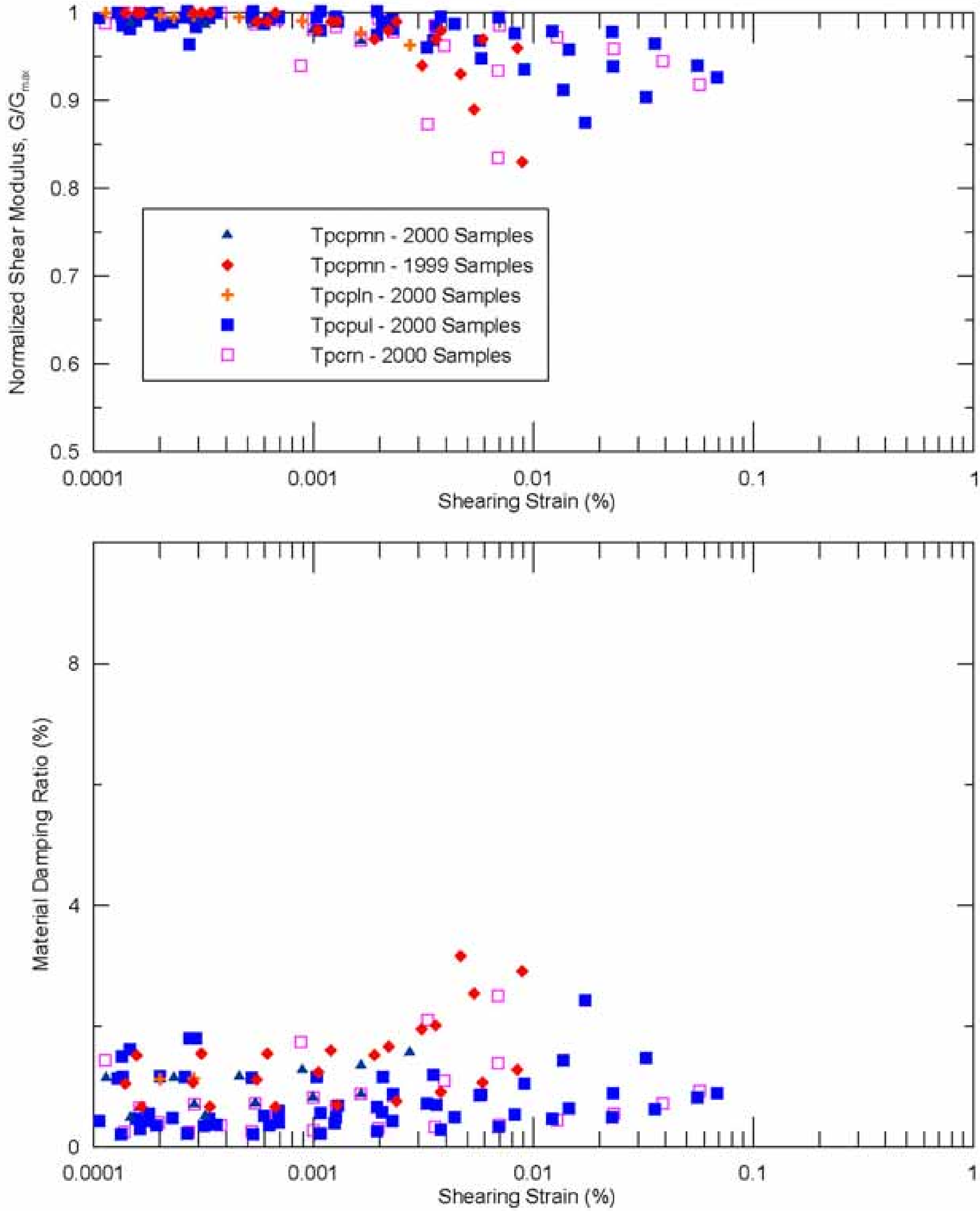
Figure 6.4.2-63. Poisson's Ratio for Alluvium at the SFA From Mean V_S and V_P Profiles for all Boreholes on Either Side of Exile Hill Fault Splay



DTN: MO0203DHRSSWHB.001 [DIRS 158082], MO9905LABDYNRS.000 [DIRS 103792]

Note: Only data obtained from SFA borehole samples are shown. Data from ESF samples are not plotted.

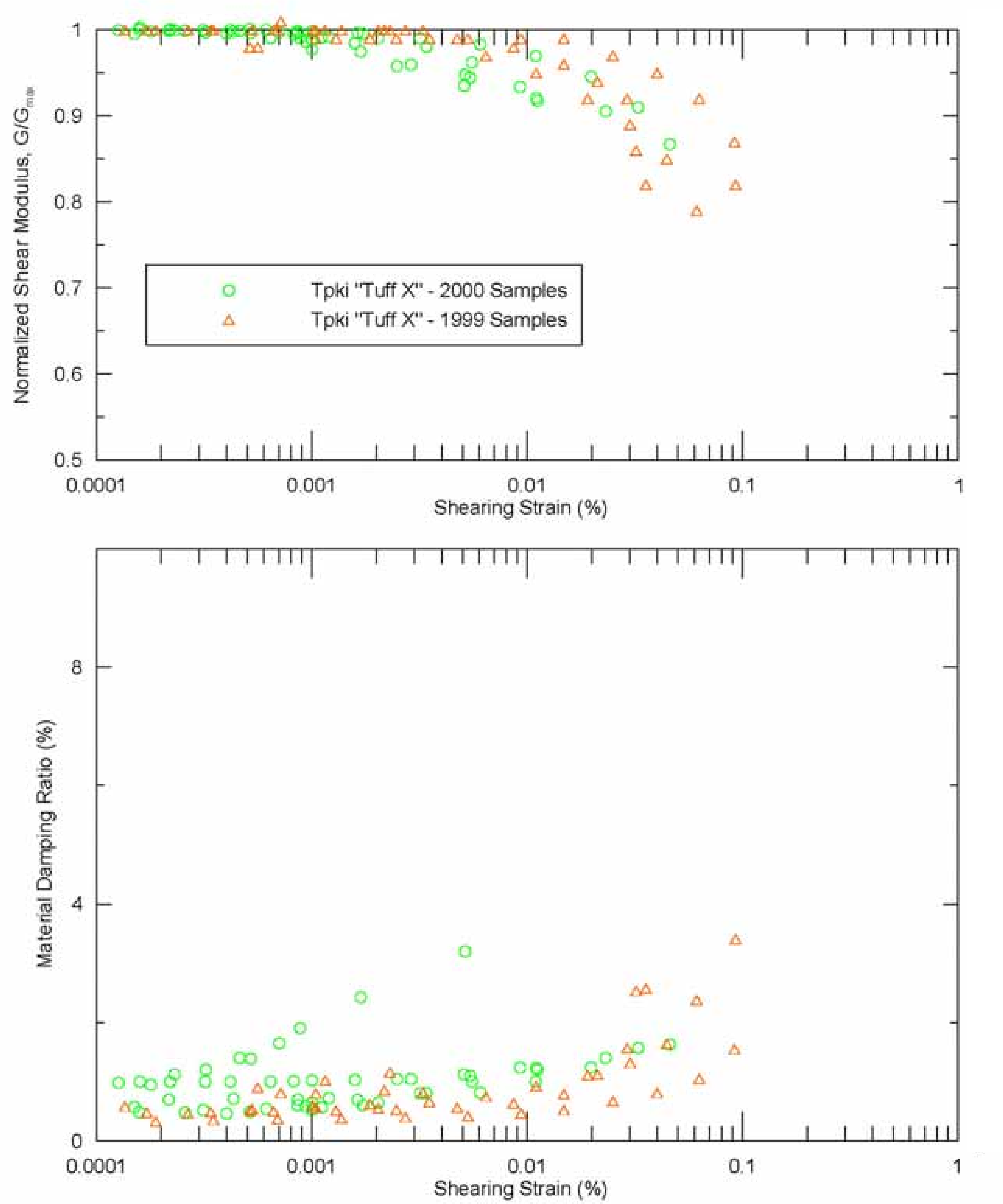
Figure 6.4.4-1. Laboratory Test Results on Tuff Specimens Grouped by Stratigraphic Unit



DTN: MO0203DHRSSWHB.001 [DIRS 158082], MO9905LABDYNRS.000 [DIRS 103792]

Note: Only data obtained from SFA borehole samples are shown. Data from ESF samples are not plotted.

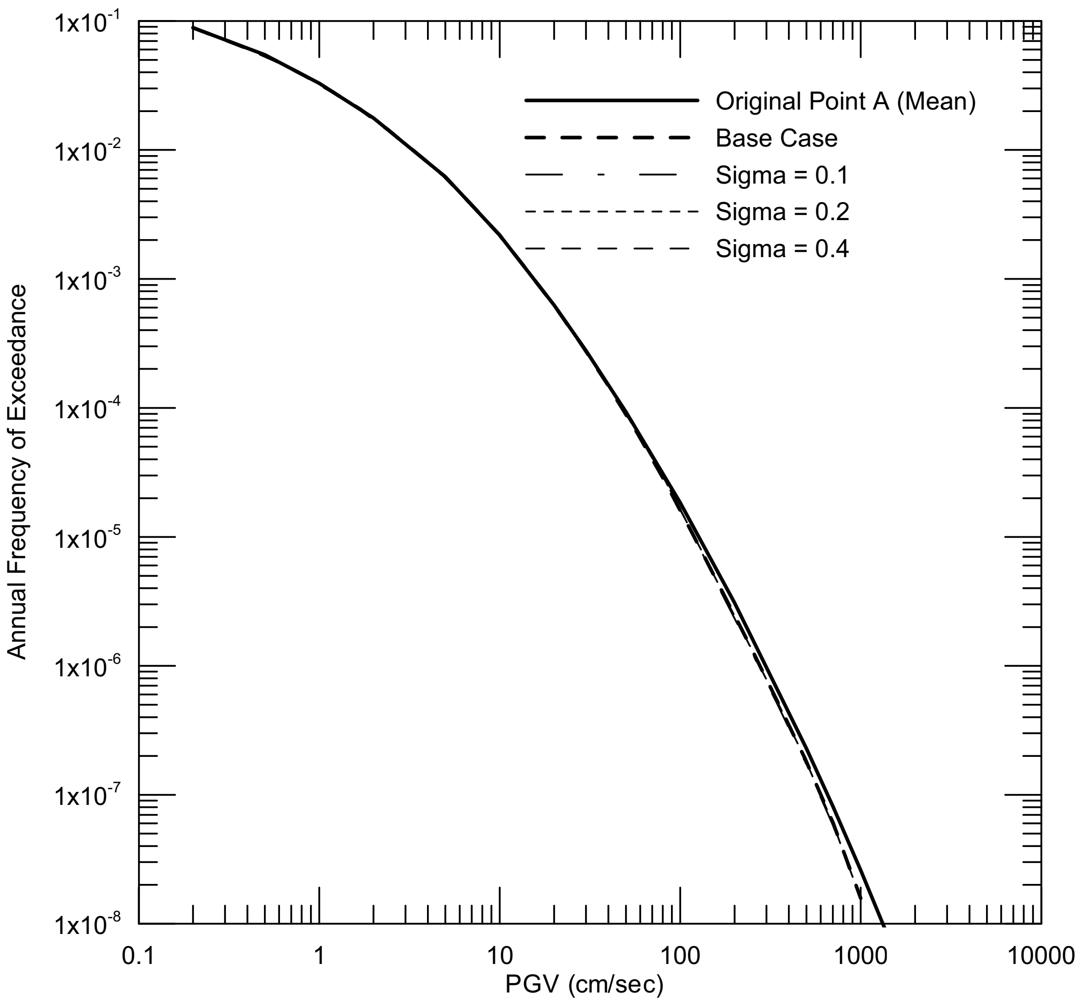
Figure 6.4.4-2. Laboratory Test Results on Welded Tuff Specimens



DTN: MO0203DHRSSWHB.001 [DIRS 158082], MO9905LABDYNRS.000 [DIRS 103792]

Note: Only data obtained from SFA borehole samples are shown. Data from ESF samples are not plotted.

Figure 6.4.4-3. Laboratory Test Results on Nonwelded Tuff Specimens

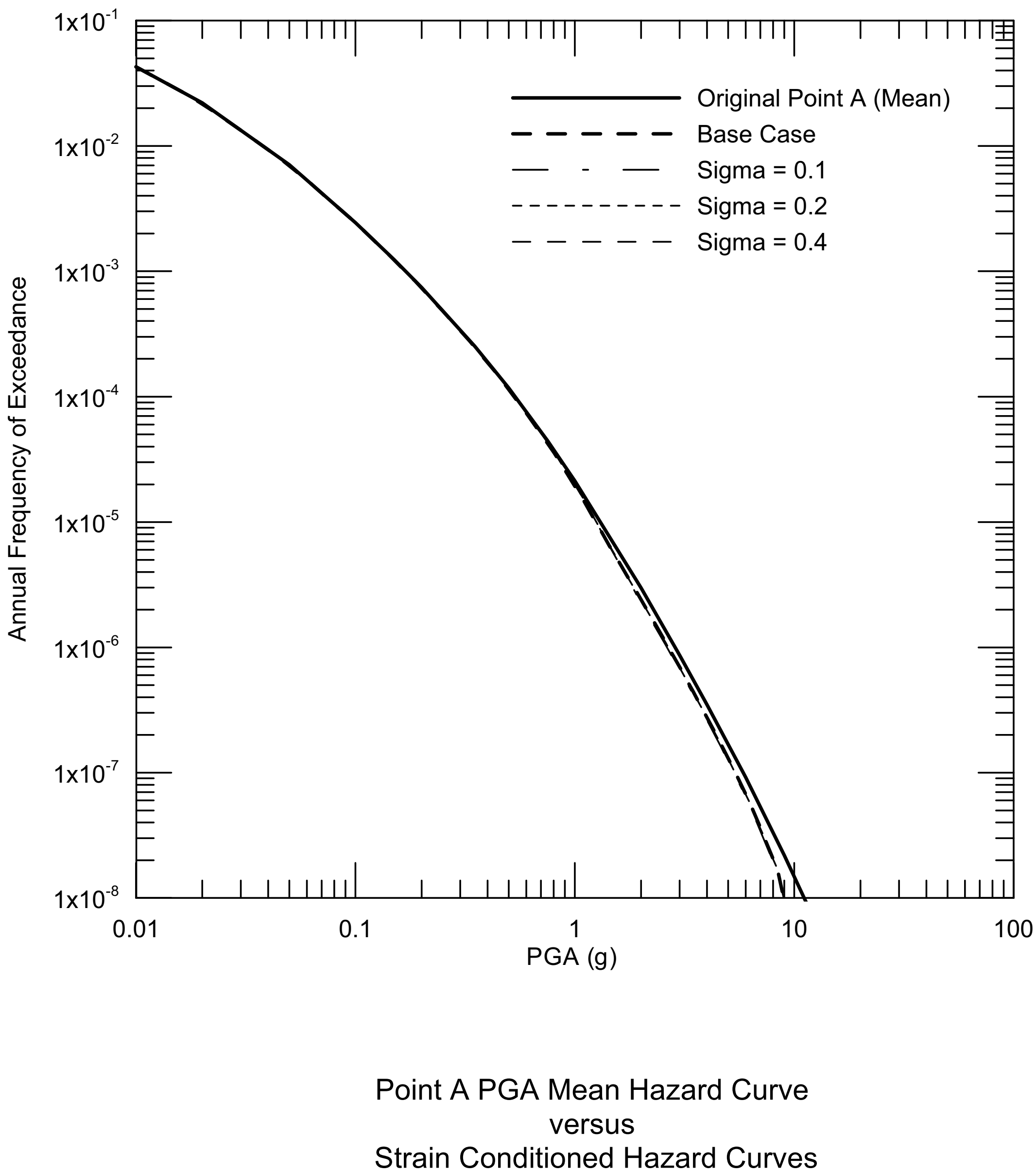


Point A PGV Mean Hazard Curve
versus
Strain Conditioned Hazard Curves

Source: Appendix D, Table D-1

NOTE: Shear strain sigma for the base-case is determined from site-response modeling. Point A is the PSHA reference rock outcrop used as the control point for site-response modeling.

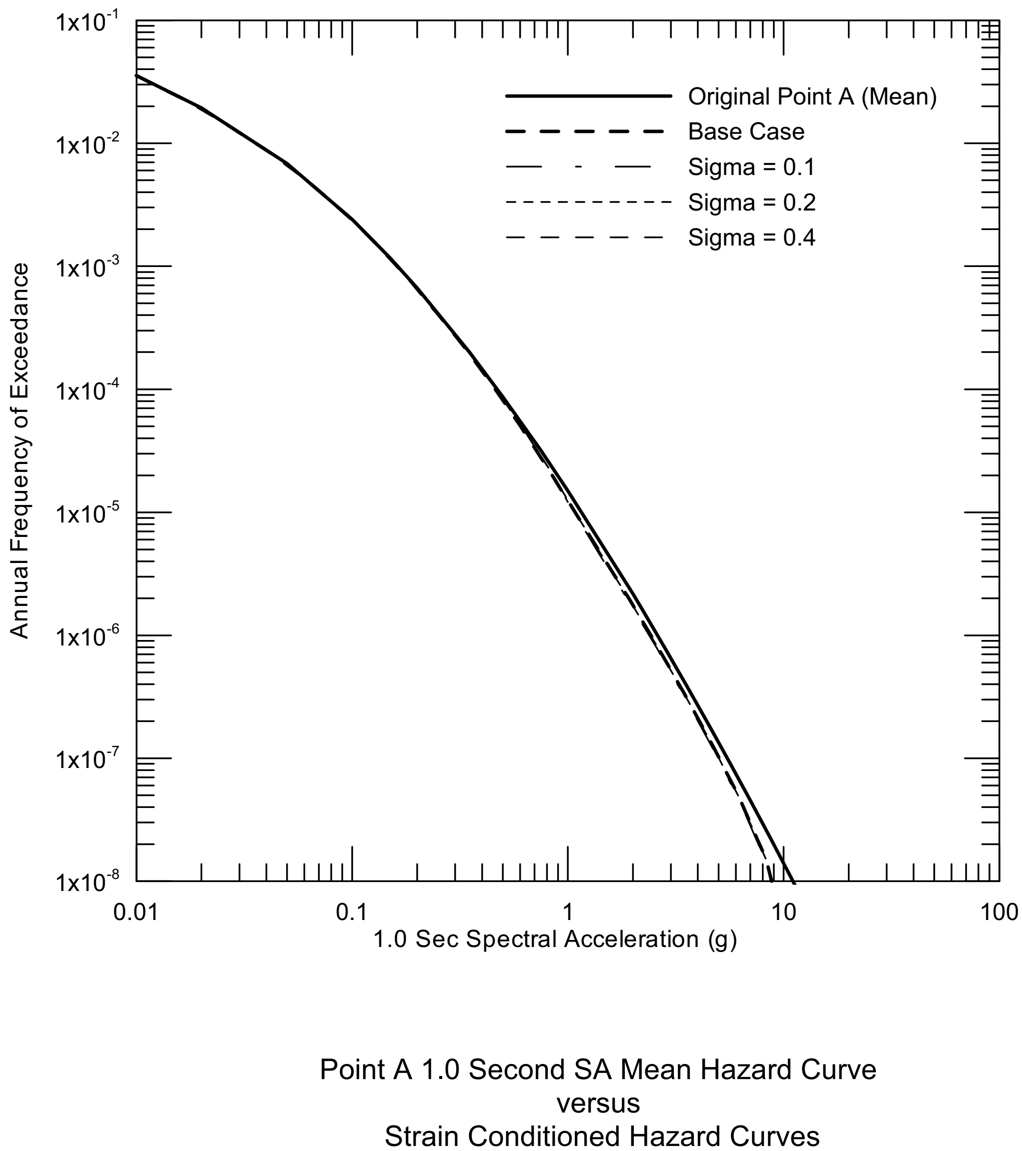
Figure 6.5.1-1. Shear-Strain-Threshold-Conditioned and Unconditioned Reference Rock Outcrop PGV Mean Hazard Curves for a Range of Shear Strain Sigmas



Source: Appendix D, Table D-1

NOTE: Shear strain sigma for the base-case is determined from site-response modeling. Point A is the PSHA reference rock outcrop used as the control point for site-response modeling.

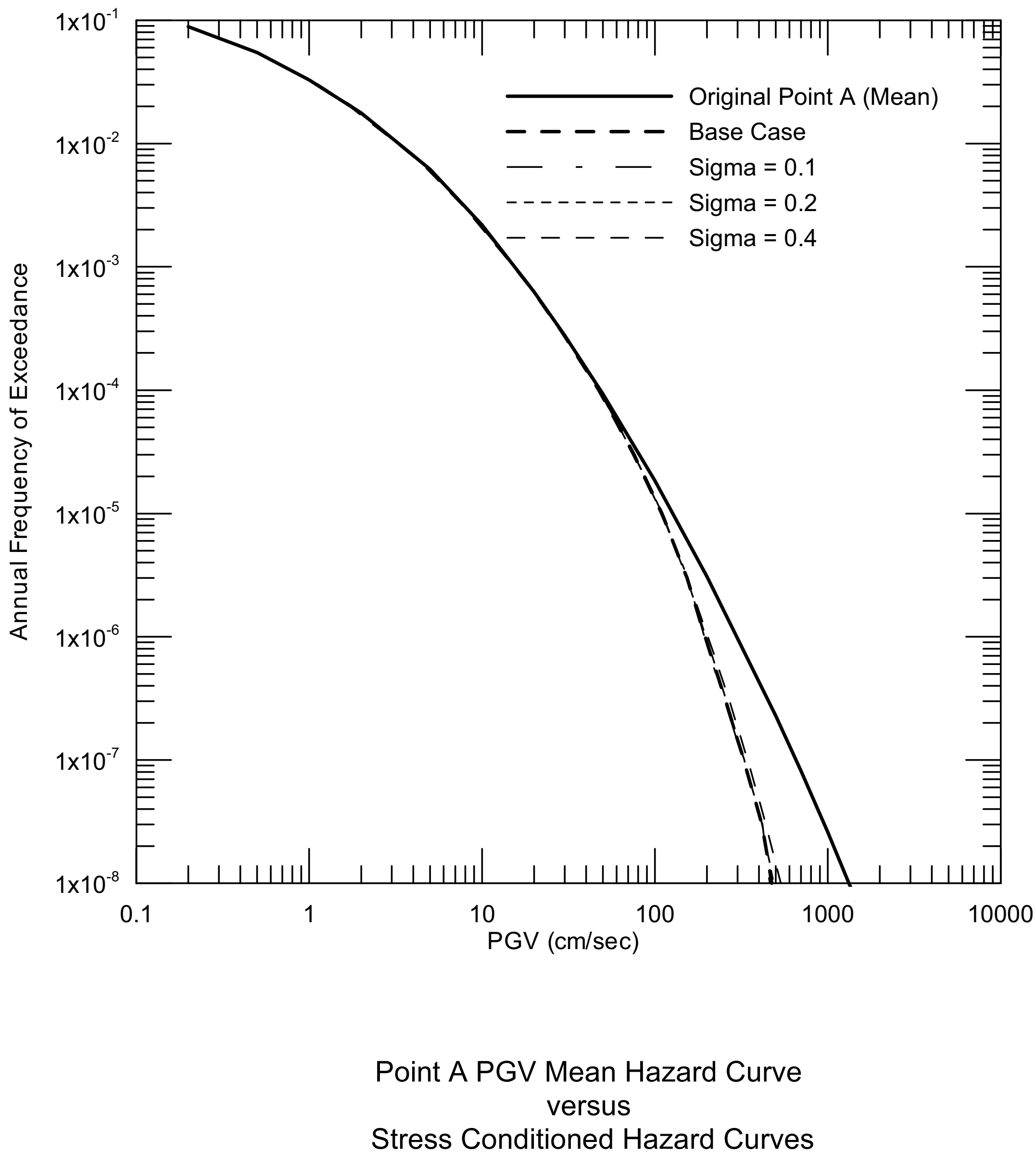
Figure 6.5.1-2. Shear-Strain-Threshold-Conditioned and Unconditioned Reference Rock Outcrop PGA Mean Hazard Curves for a Range of Shear Strain Sigmas



Source: Appendix D, Table D-1

NOTE: Shear strain sigma for the base-case is determined from site-response modeling. Point A is the PSHA reference rock outcrop used as the control point for site-response modeling.

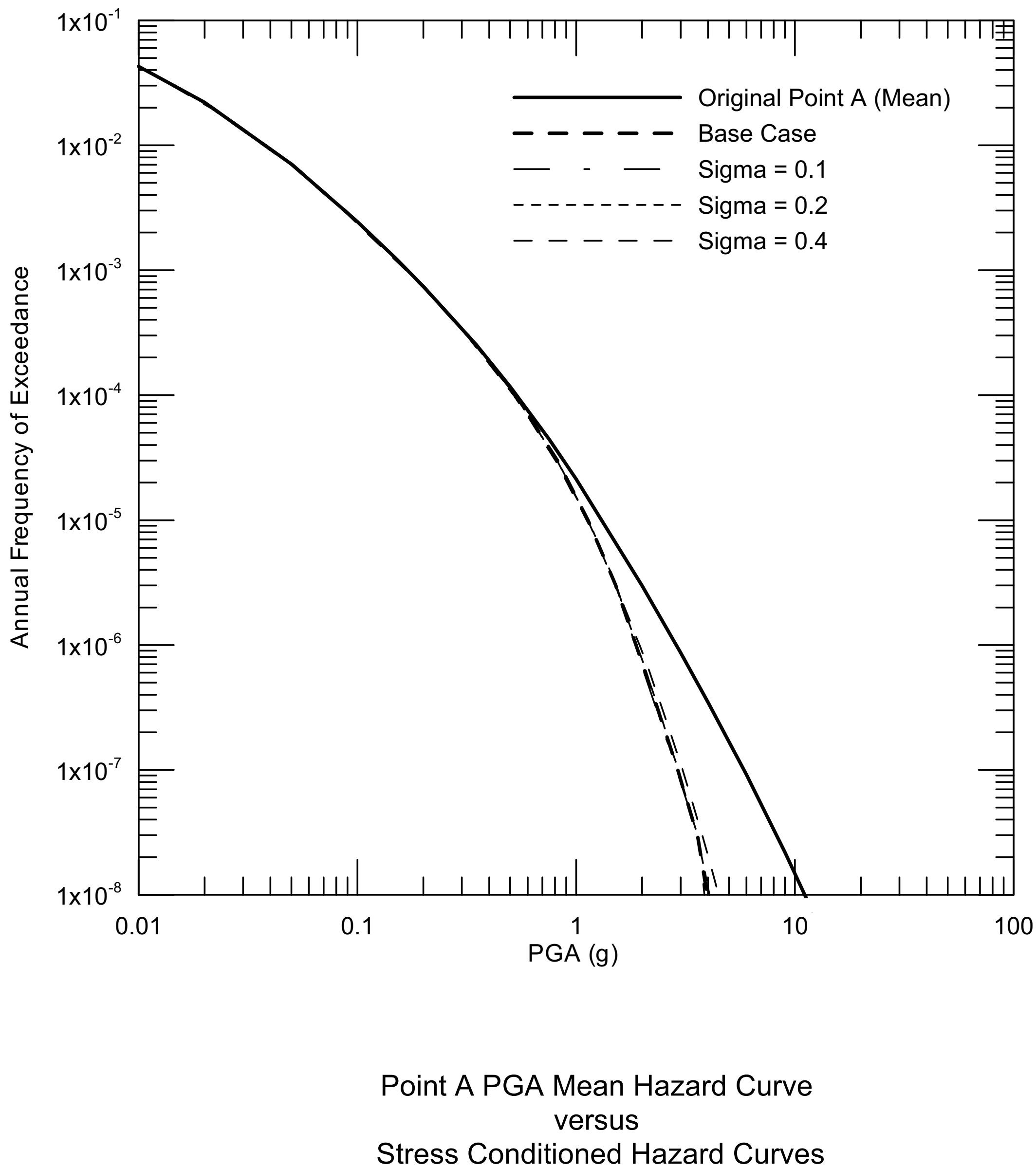
Figure 6.5.1-3. Shear-Strain-Threshold-Conditioned and Unconditioned Reference Rock Outcrop 1.0 Sec Spectral Acceleration Mean Hazard Curves for a Range of Shear Strain Sigmas



Source: Appendix D, Table D-1

NOTE: Base-case ground motion sigma is 0.15. Point A is the PSHA reference rock outcrop used as the control point for site-response modeling.

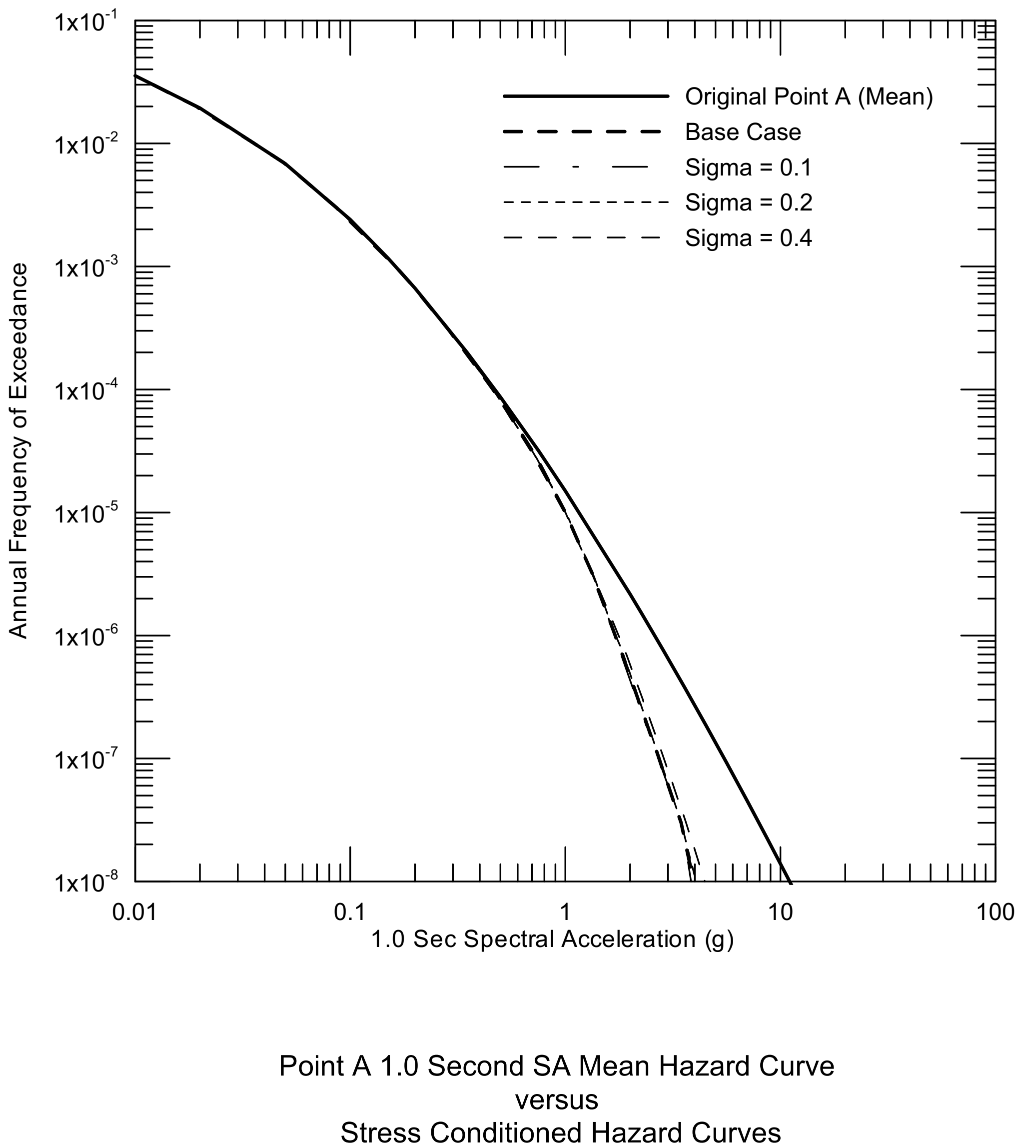
Figure 6.5.1-4. Extreme-Stress Drop-Conditioned and Unconditioned PGV Mean Hazard Curves for a Range of Ground Motion Sigmas



Source: Appendix D, Table D-1

NOTE: Base-case ground motion sigma is 0.15. Point A is the PSHA reference rock outcrop used as the control point for site-response modeling.

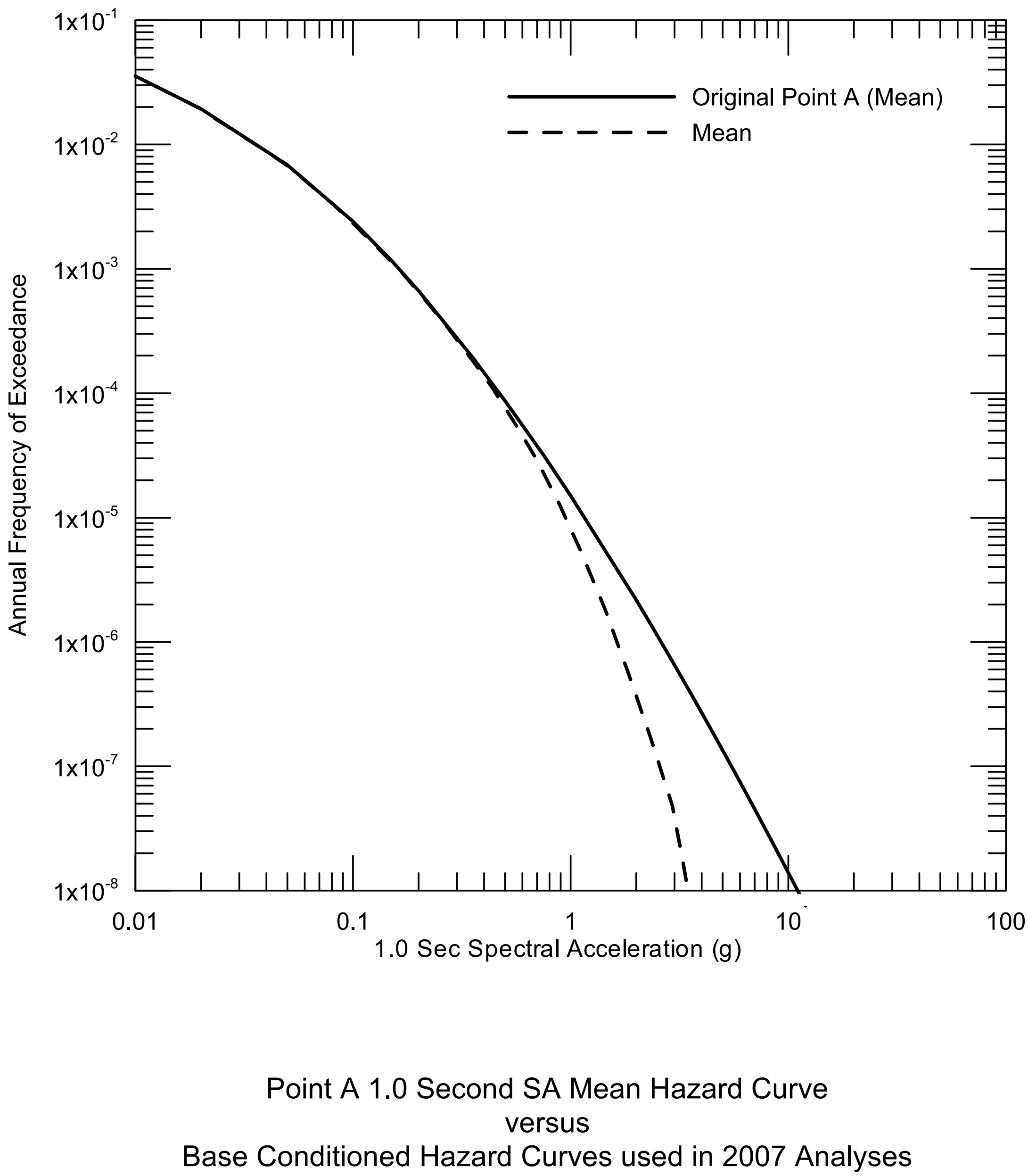
Figure 6.5.1-5. Extreme–Stress-Drop-Conditioned and Unconditioned PGA Mean Hazard Curves for a Range of Ground Motion Sigmas



Source: Appendix D, Table D-1

NOTE: Base-case ground motion sigma is 0.15. Point A is the PSHA reference rock outcrop used as the control point for site-response modeling.

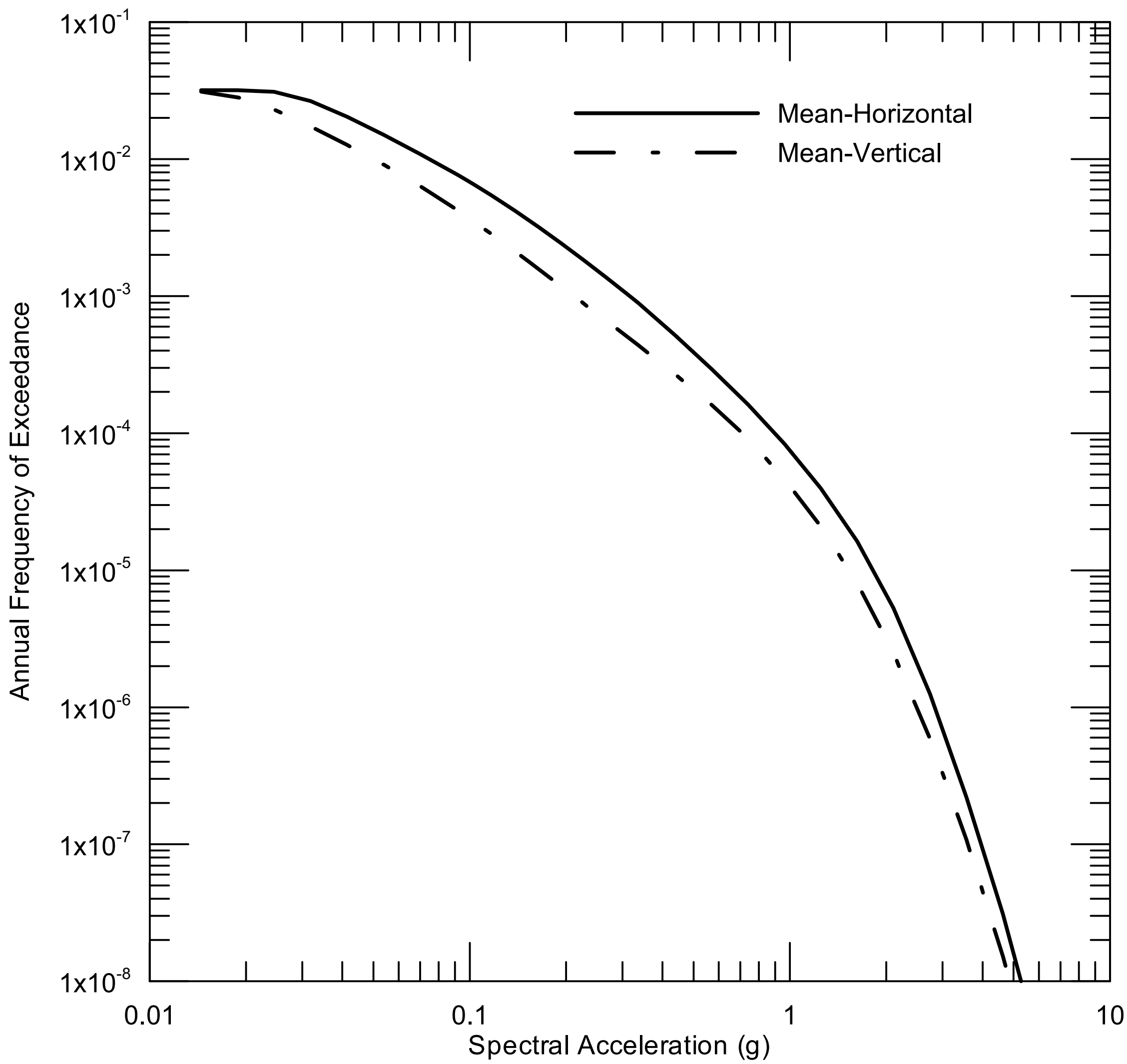
Figure 6.5.1-6. Extreme–Stress-Drop-Conditioned and Unconditioned 1.0 Hz Spectral Acceleration Mean Hazard Curves for a Range of Ground Motion Sigmas



Source: Appendix D, Table D-1

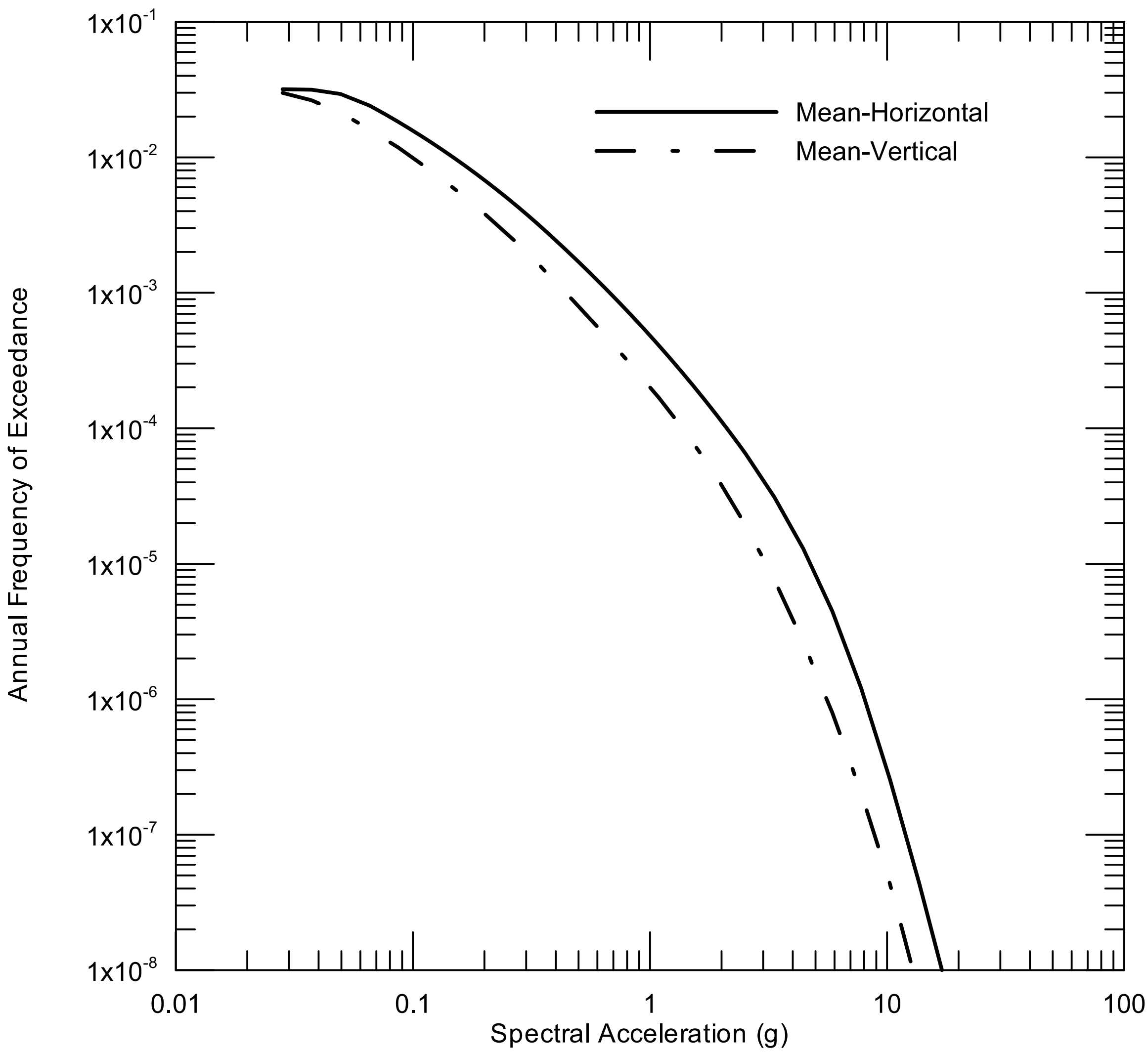
Note: Point A is the PSHA reference rock outcrop used as the control point for site-response modeling.

Figure 6.5.1-9. Conditioned and Unconditioned Reference Rock Outcrop Mean Horizontal 1.0 Sec Spectral Acceleration Hazard Curves



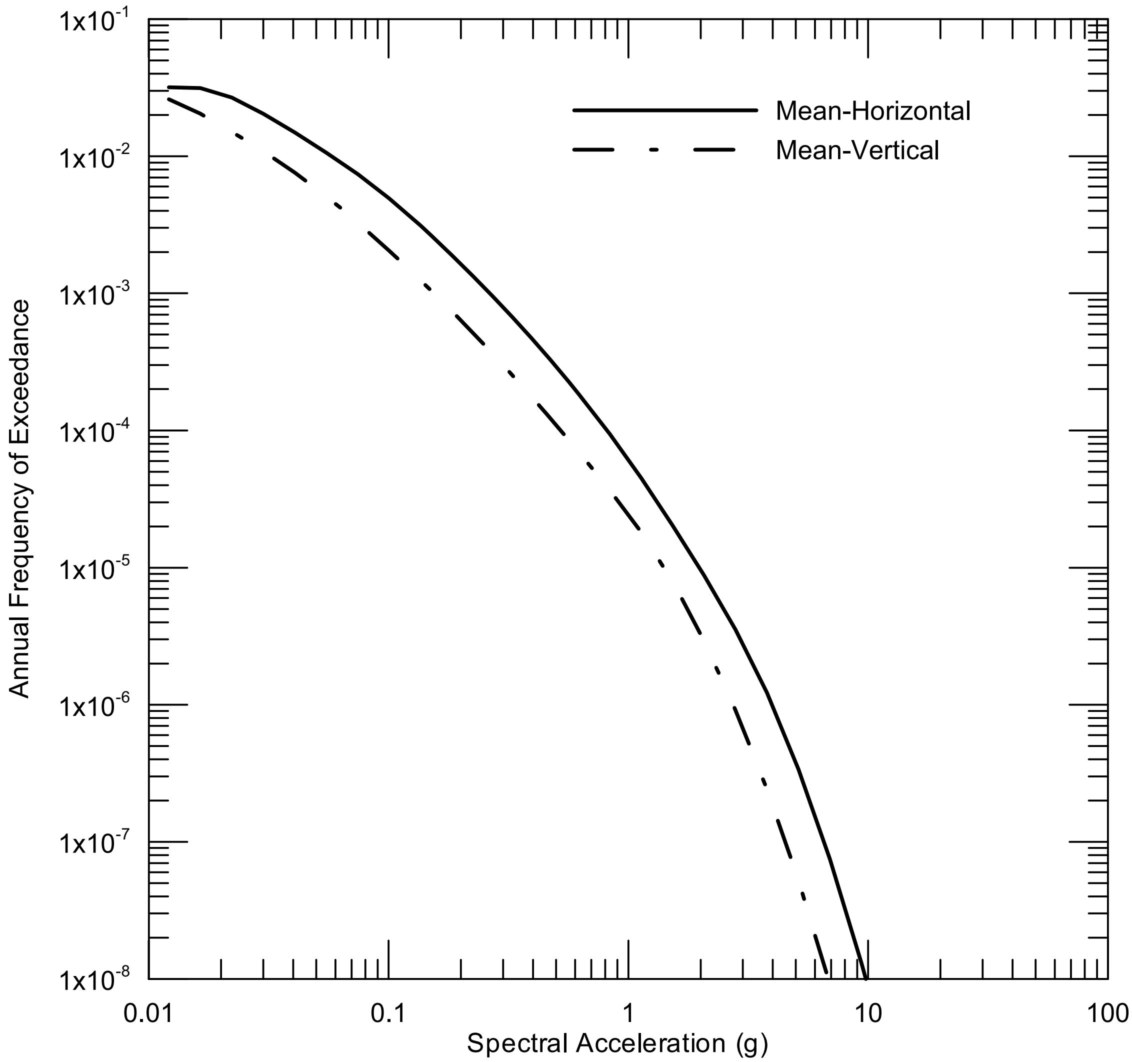
Source: Appendix D, Table D-1

Figure 6.5.2-7. Mean Horizontal and Vertical Seismic Hazard Curves for 30 ft of Alluvium over Tuff, Northeast of the Fault, for PGA at SFA



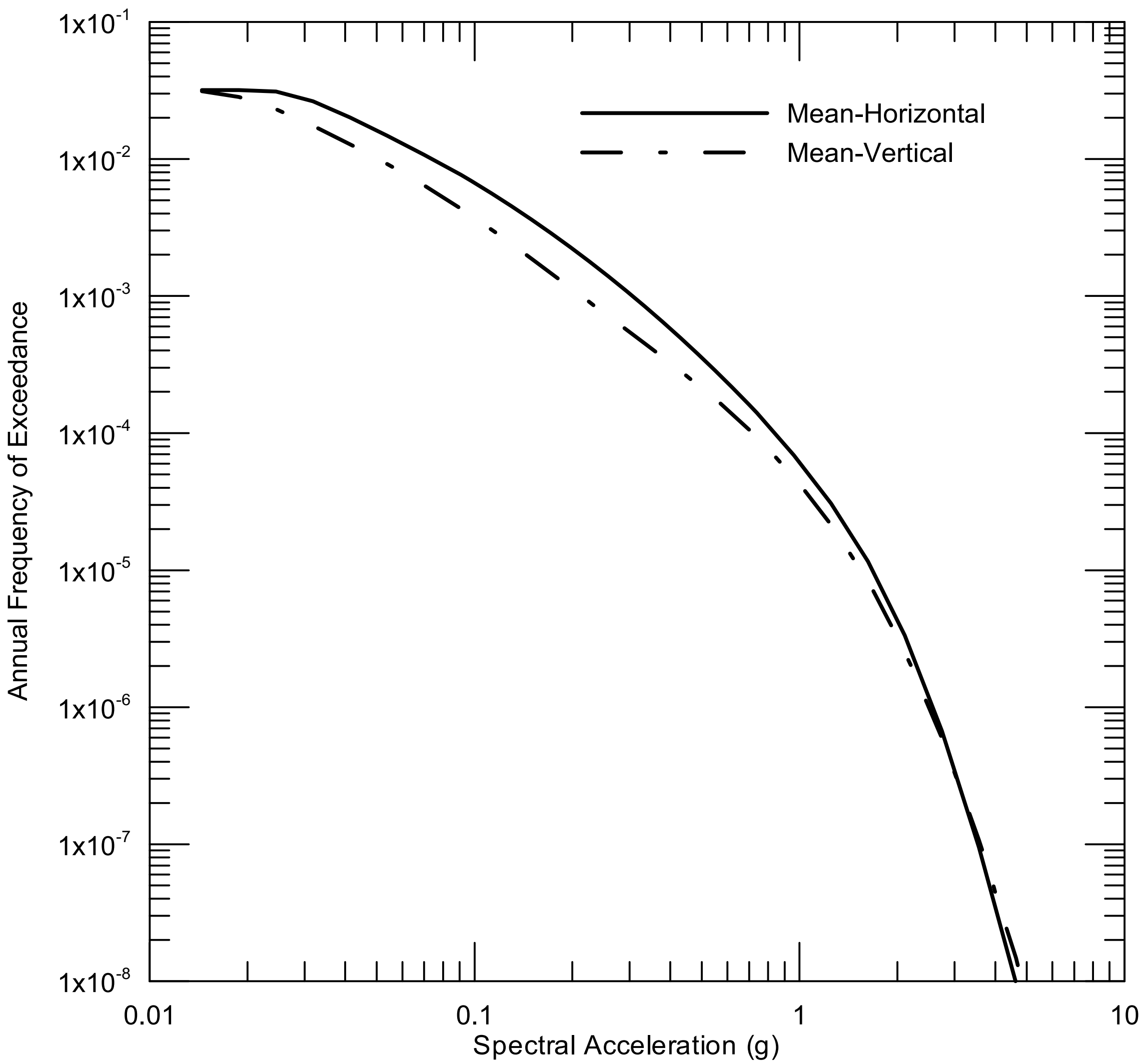
Source: Appendix D, Table D-1

Figure 6.5.2-8. Mean Horizontal and Vertical Seismic Hazard Curves for 30 ft of Alluvium over Tuff, Northeast of the Fault, for 0.2 Sec SA at SFA



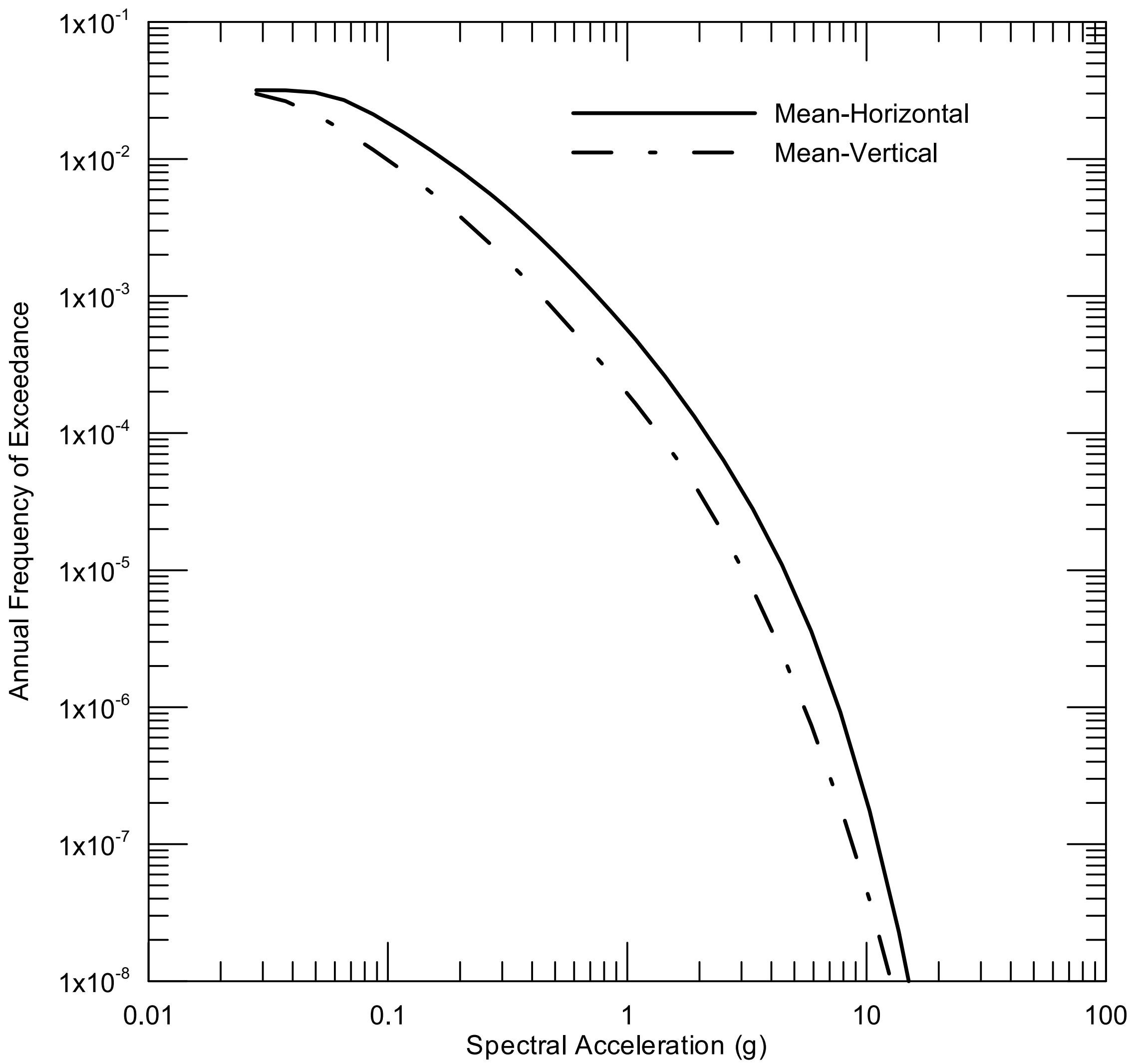
Source: Appendix D, Table D-1

Figure 6.5.2-9. Mean Horizontal and Vertical Seismic Hazard Curves for 30 ft of Alluvium over Tuff, Northeast of the Fault, for 1.0 Sec SA at SFA



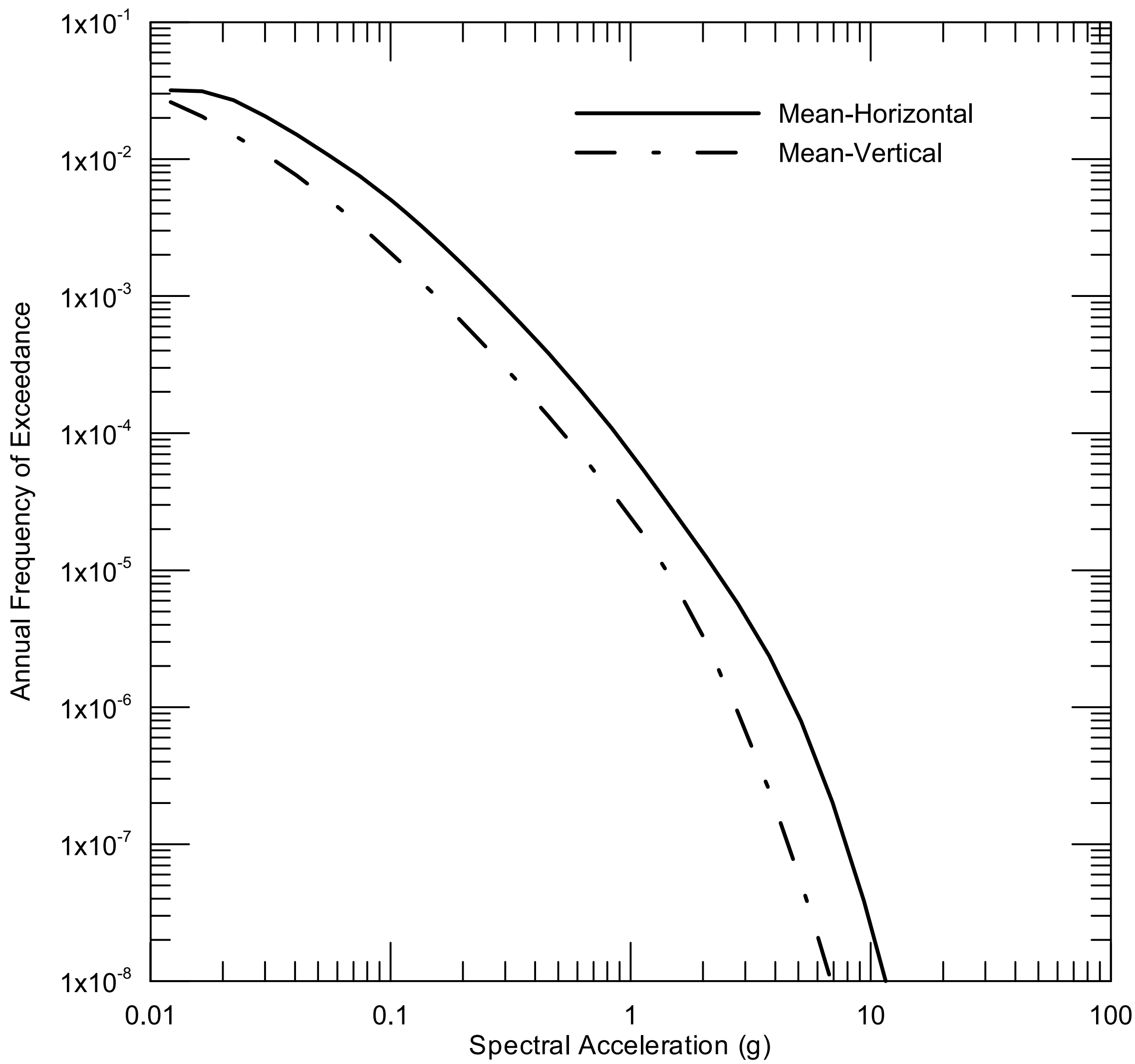
Source: Appendix D, Table D-1

Figure 6.5.2-10. Mean Horizontal and Vertical Seismic Hazard Curves for 70 ft of Alluvium over Tuff, Northeast of the Fault, for PGA at SFA



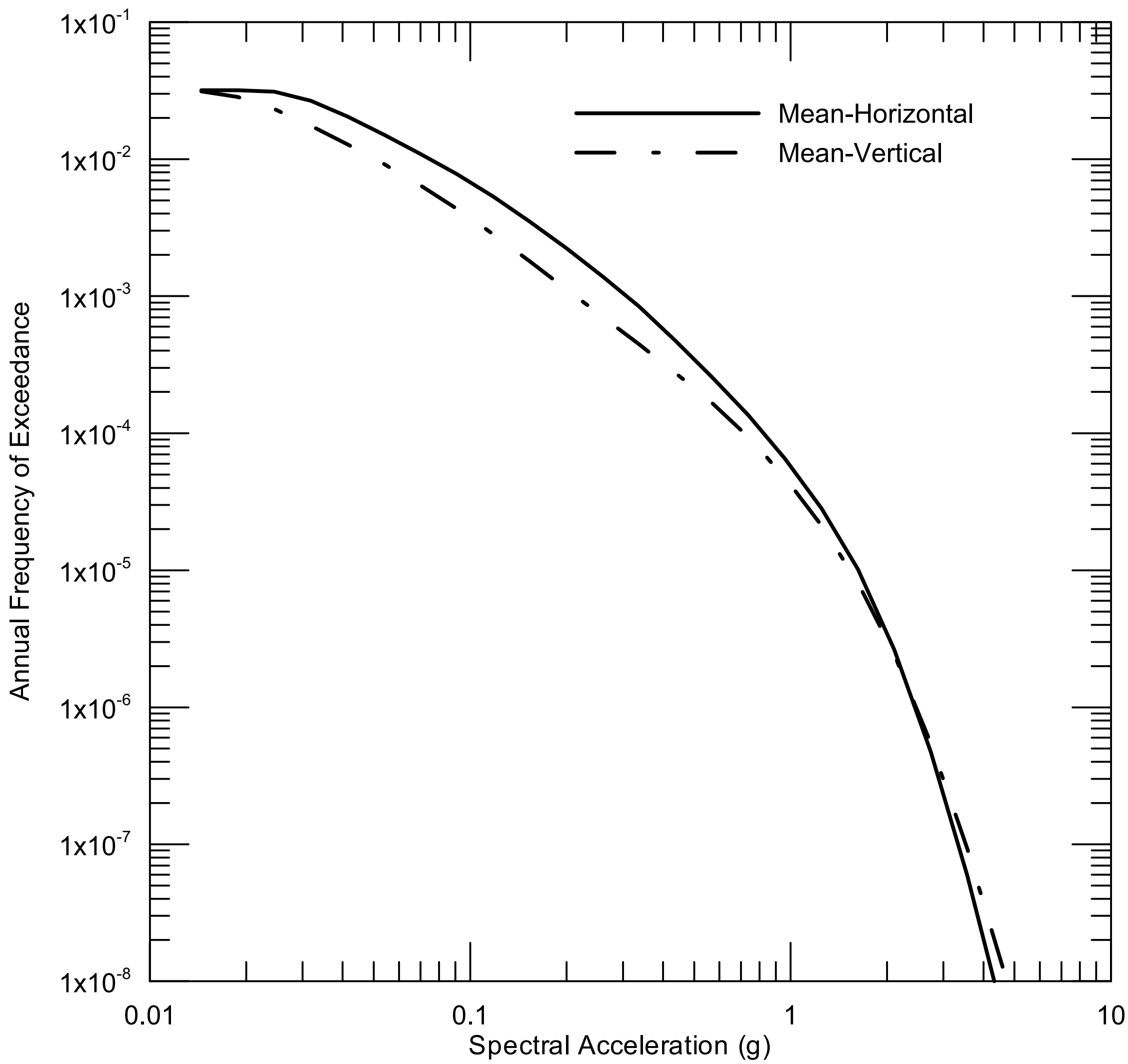
Source: Appendix D, Table D-1

Figure 6.5.2-11. Mean Horizontal and Vertical Seismic Hazard Curves for 70 ft of Alluvium over Tuff, Northeast of the Fault, for 0.2 Sec SA at SFA



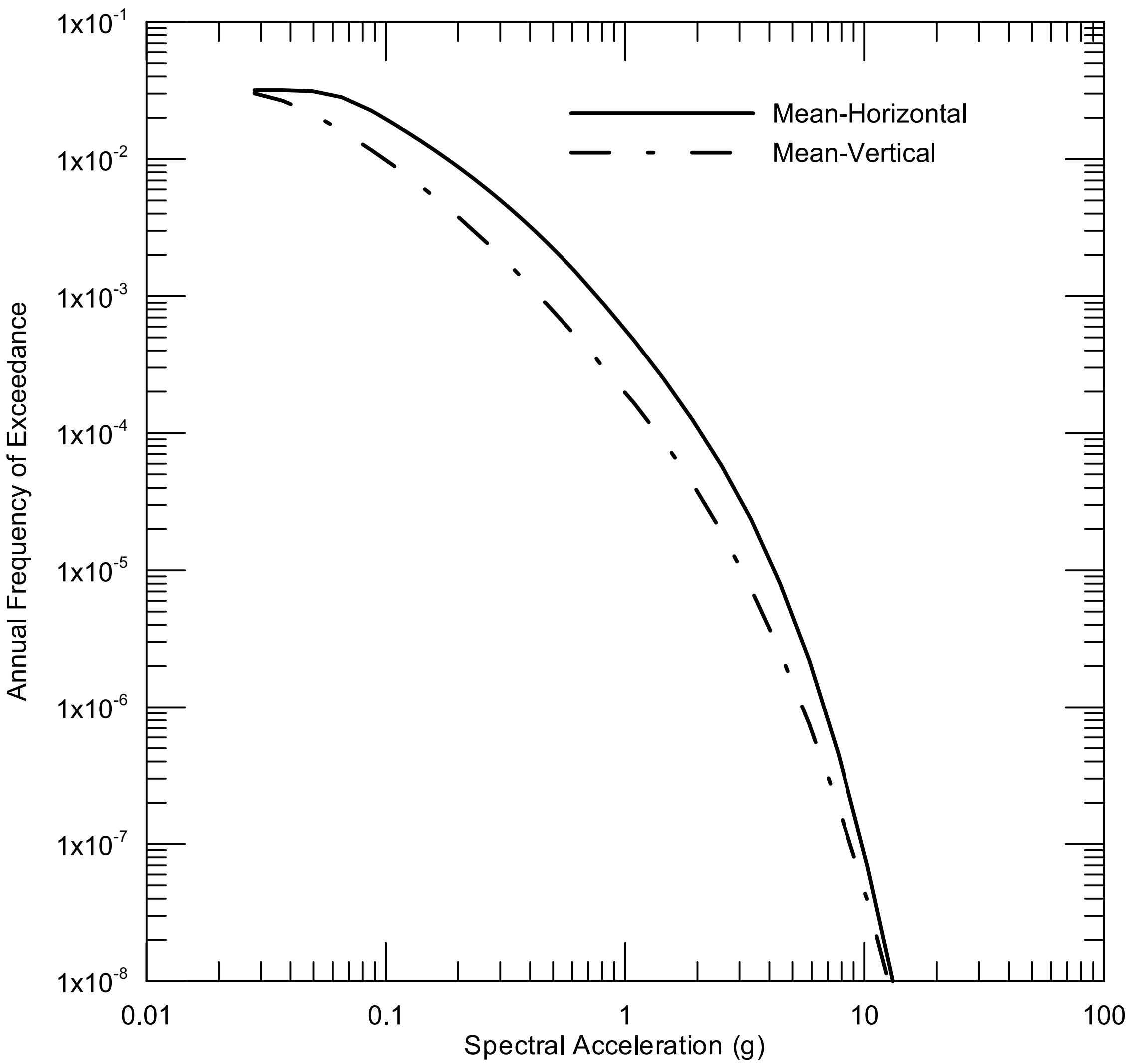
Source: Appendix D, Table D-1

Figure 6.5.2-12. Mean Horizontal and Vertical Seismic Hazard Curves for 70 ft of Alluvium over Tuff, Northeast of the Fault, for 1.0 Sec SA at SFA



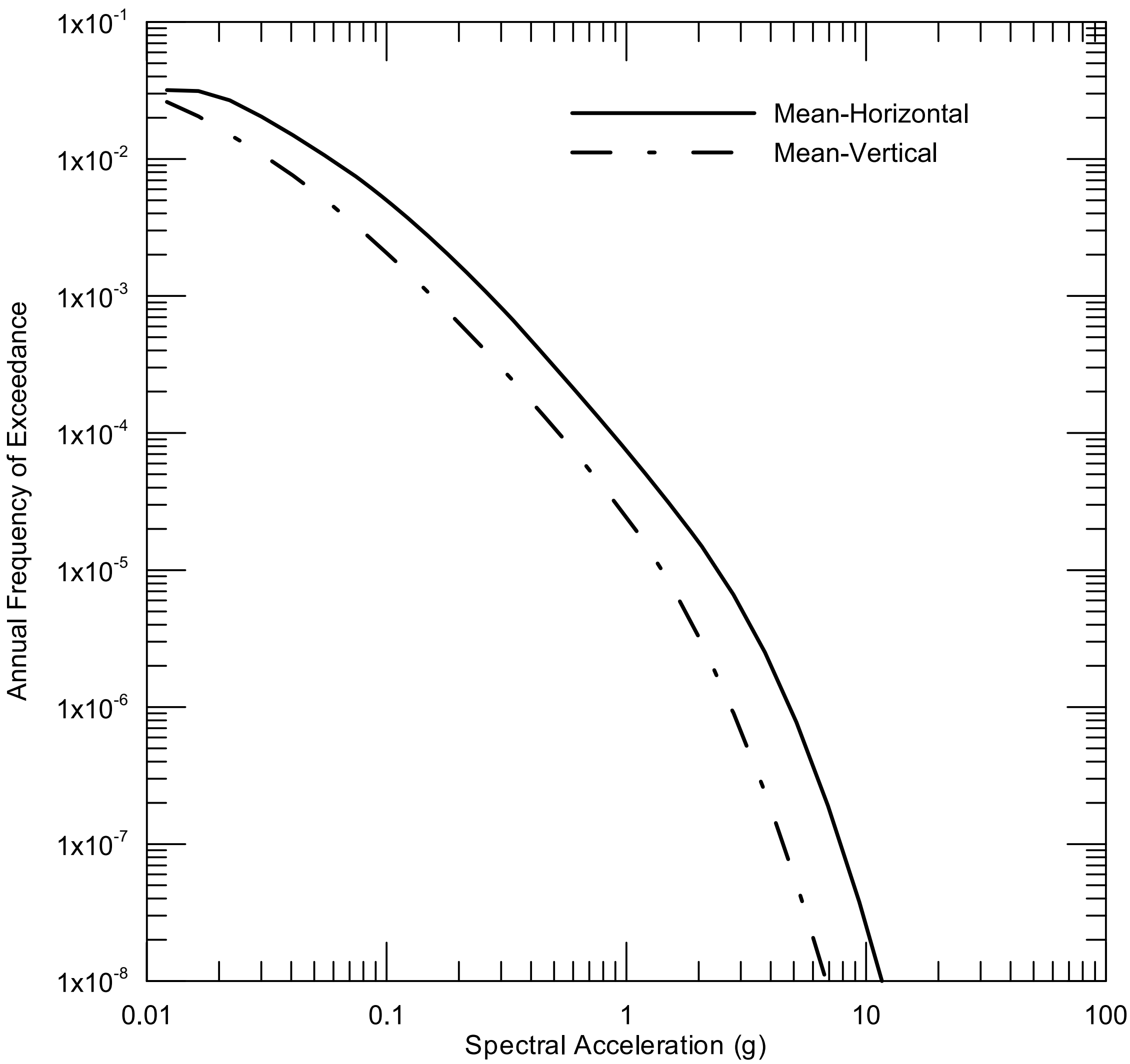
Source: Appendix D, Table D-1

Figure 6.5.2-13. Mean Horizontal and Vertical Seismic Hazard Curves for 100 ft of Alluvium over Tuff, Northeast of the Fault, for PGA at SFA



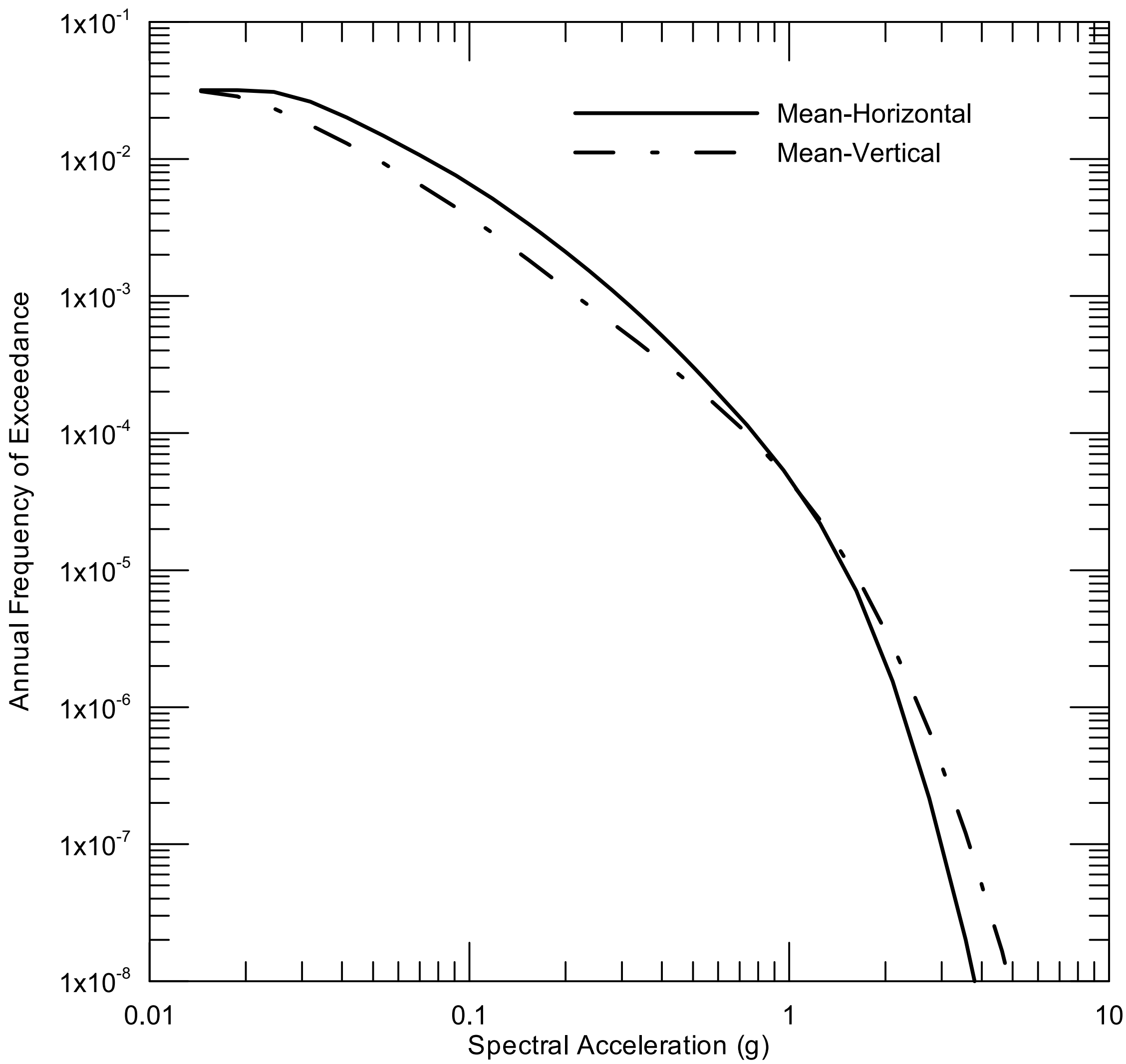
Source: Appendix D, Table D-1

Figure 6.5.2-14. Mean Horizontal and Vertical Seismic Hazard Curves for 100 ft of Alluvium over Tuff, Northeast of the Fault, for 0.2 Sec SA at SFA



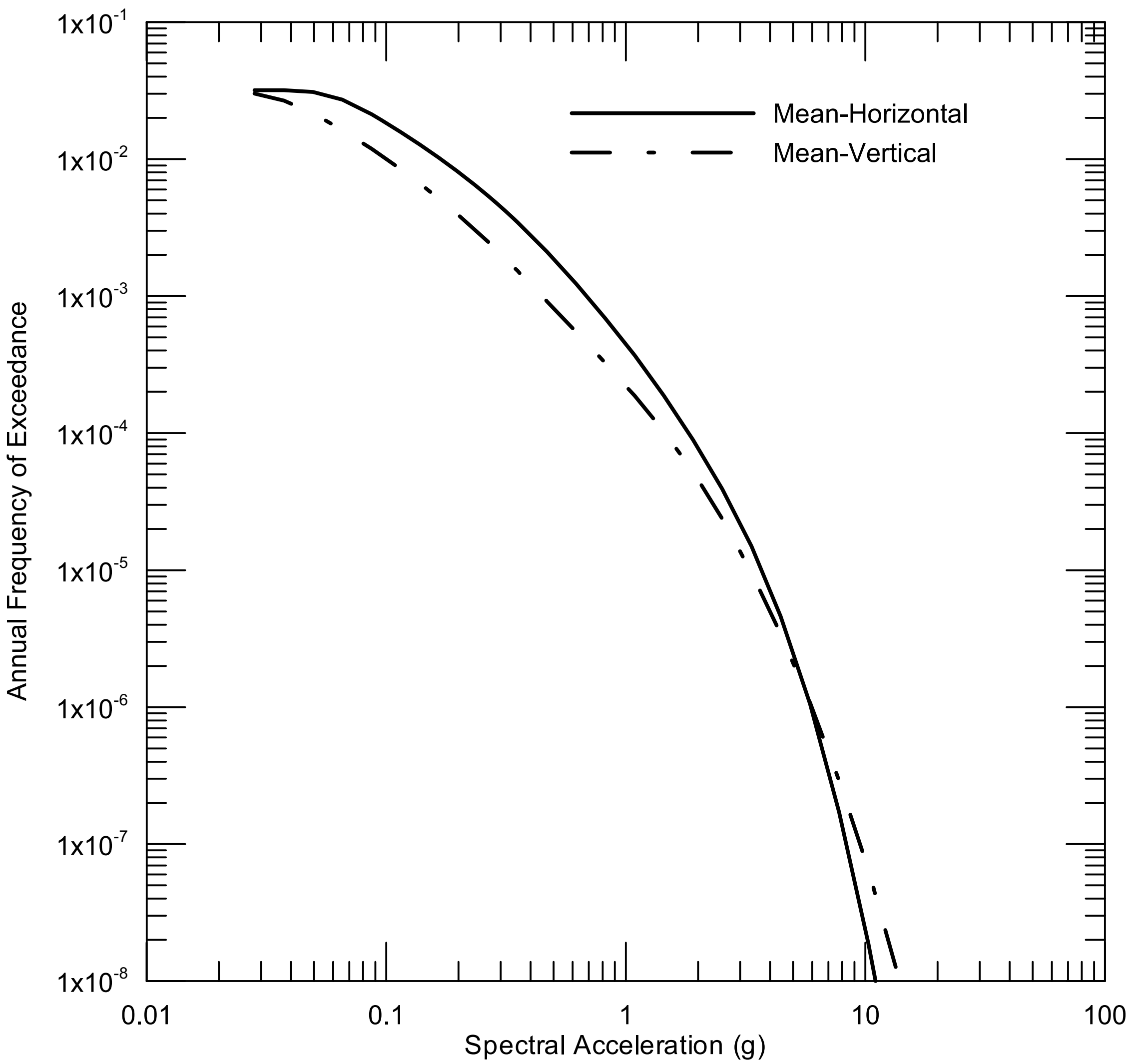
Source: Appendix D, Table D-1

Figure 6.5.2-15. Mean Horizontal and Vertical Seismic Hazard Curves for 100 ft of Alluvium over Tuff, Northeast of the Fault, for 1.0 Sec SA at SFA



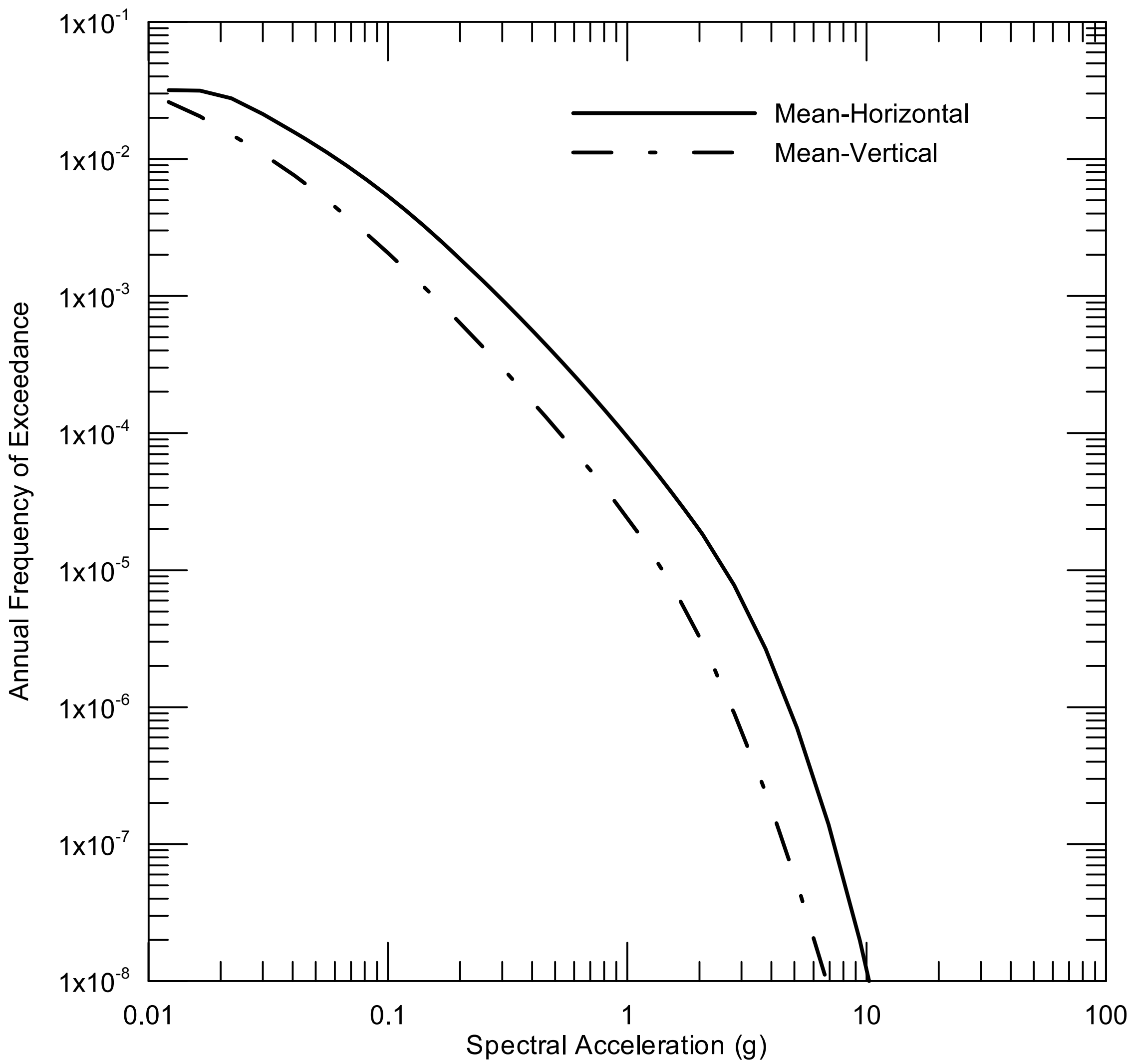
Source: Appendix D, Table D-1

Figure 6.5.2-16. Mean Horizontal and Vertical Seismic Hazard Curves for 200 ft of Alluvium over Tuff, Northeast of the Fault, for PGA at SFA



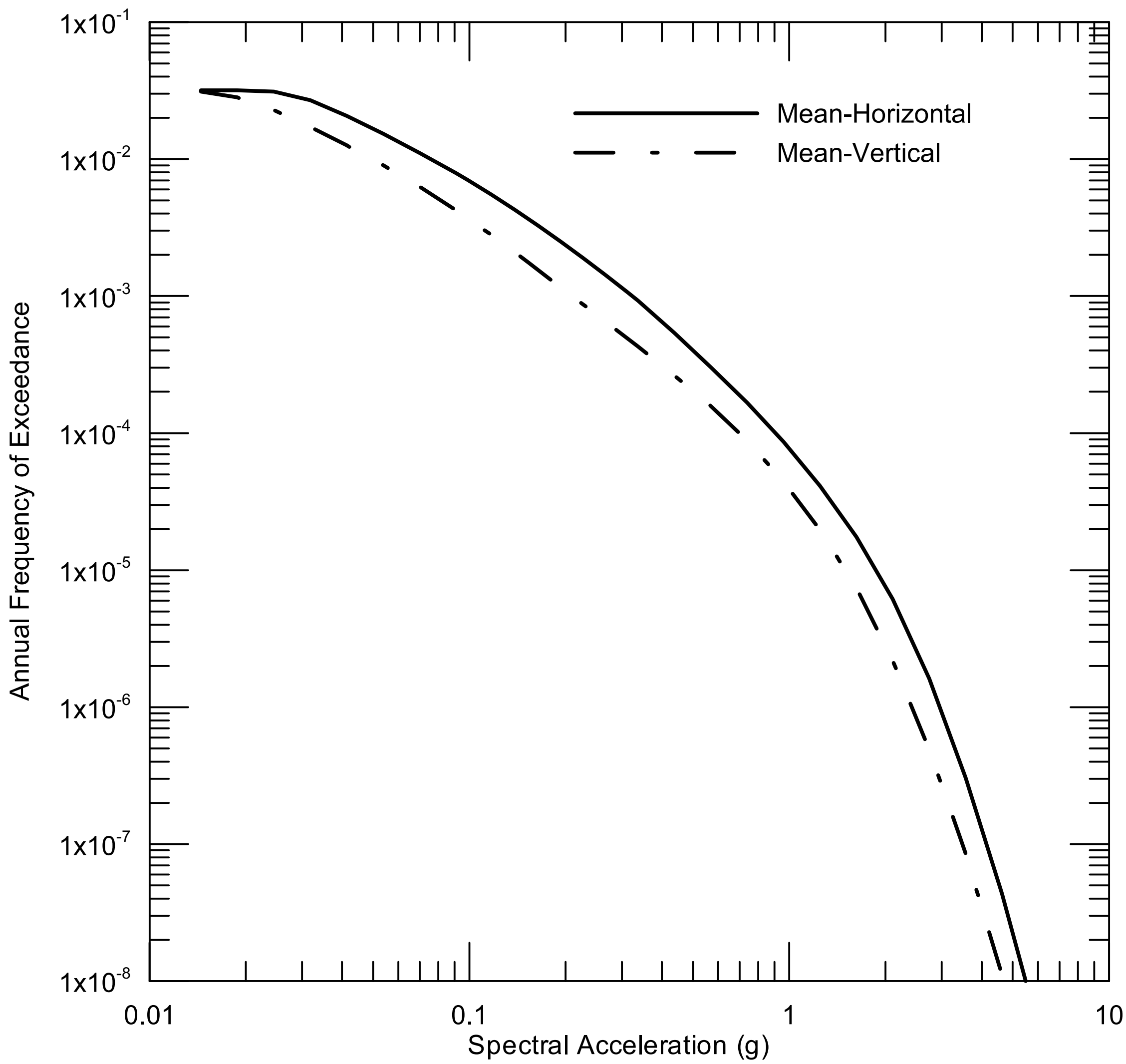
Source: Appendix D, Table D-1

Figure 6.5.2-17. Mean Horizontal and Vertical Seismic Hazard Curves for 200 ft of Alluvium over Tuff, Northeast of the Fault, for 0.2 Sec SA at SFA



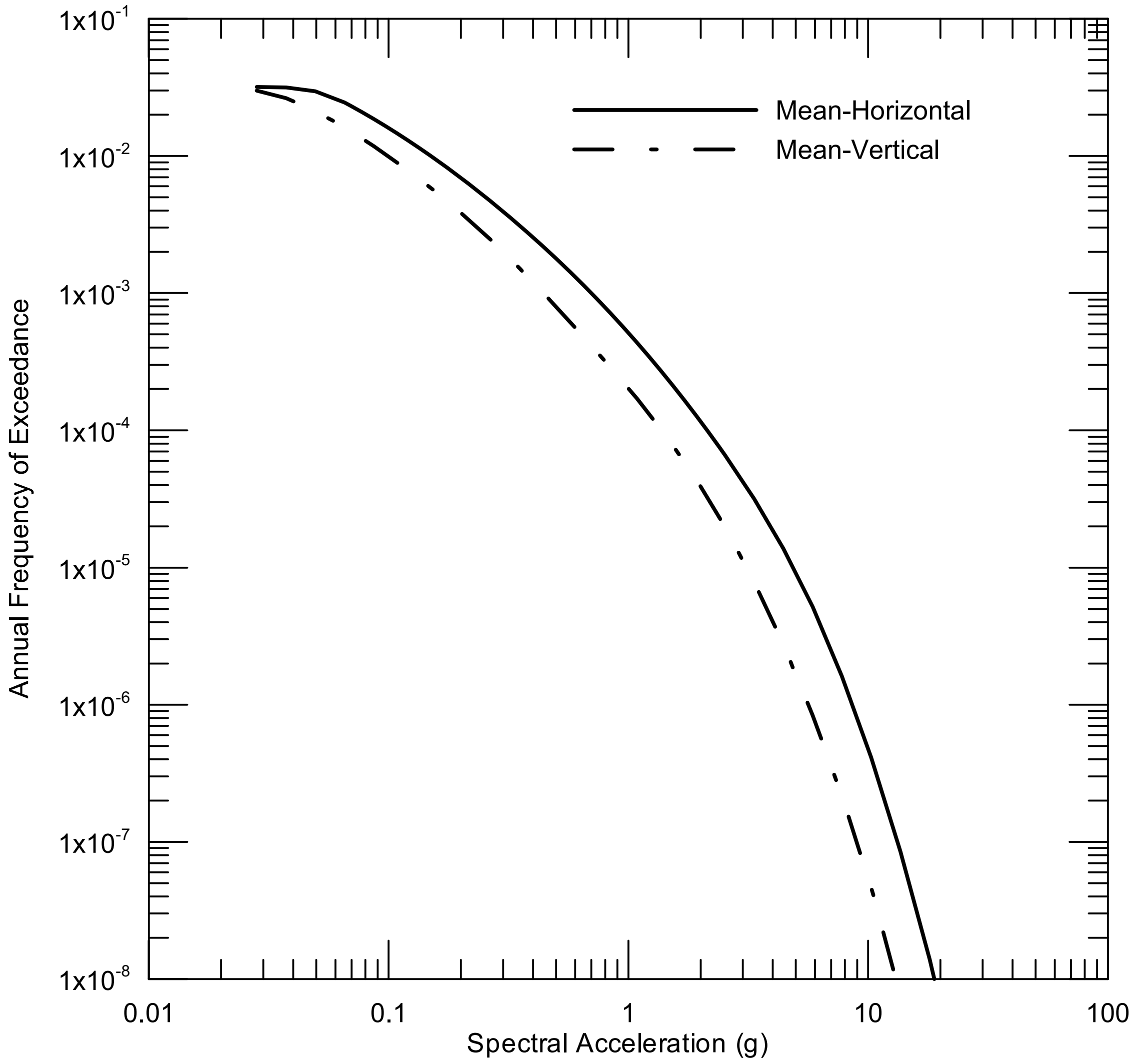
Source: Appendix D, Table D-1

Figure 6.5.2-18. Mean Horizontal and Vertical Seismic Hazard Curves for 200 ft of Alluvium over Tuff, Northeast of the Fault, for 1.0 Sec SA at SFA



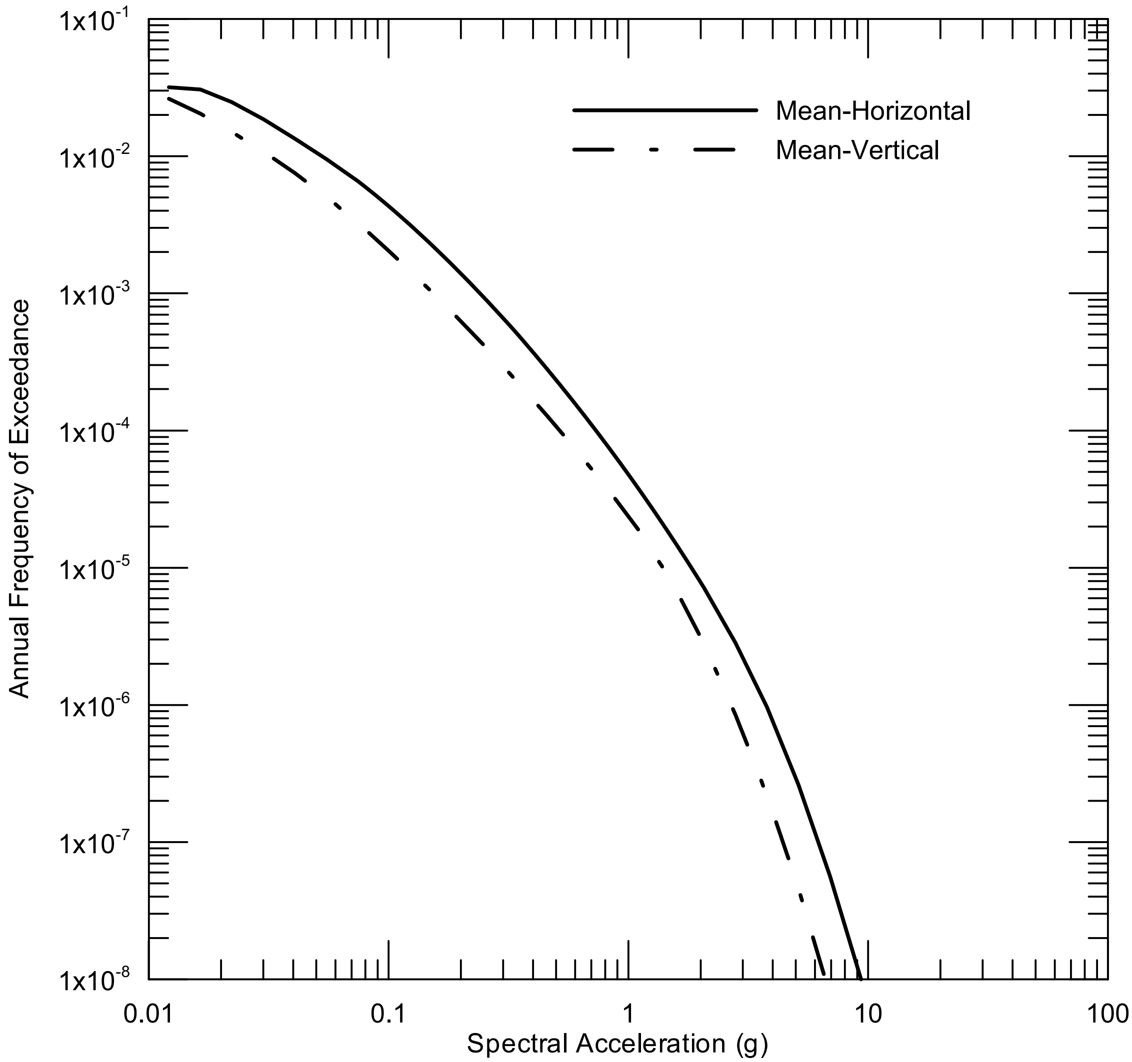
Source: Appendix D, Table D-1

Figure 6.5.2-19. Mean Horizontal and Vertical Seismic Hazard Curves for 30 ft of Alluvium over Tuff, South of the Fault, for PGA at SFA



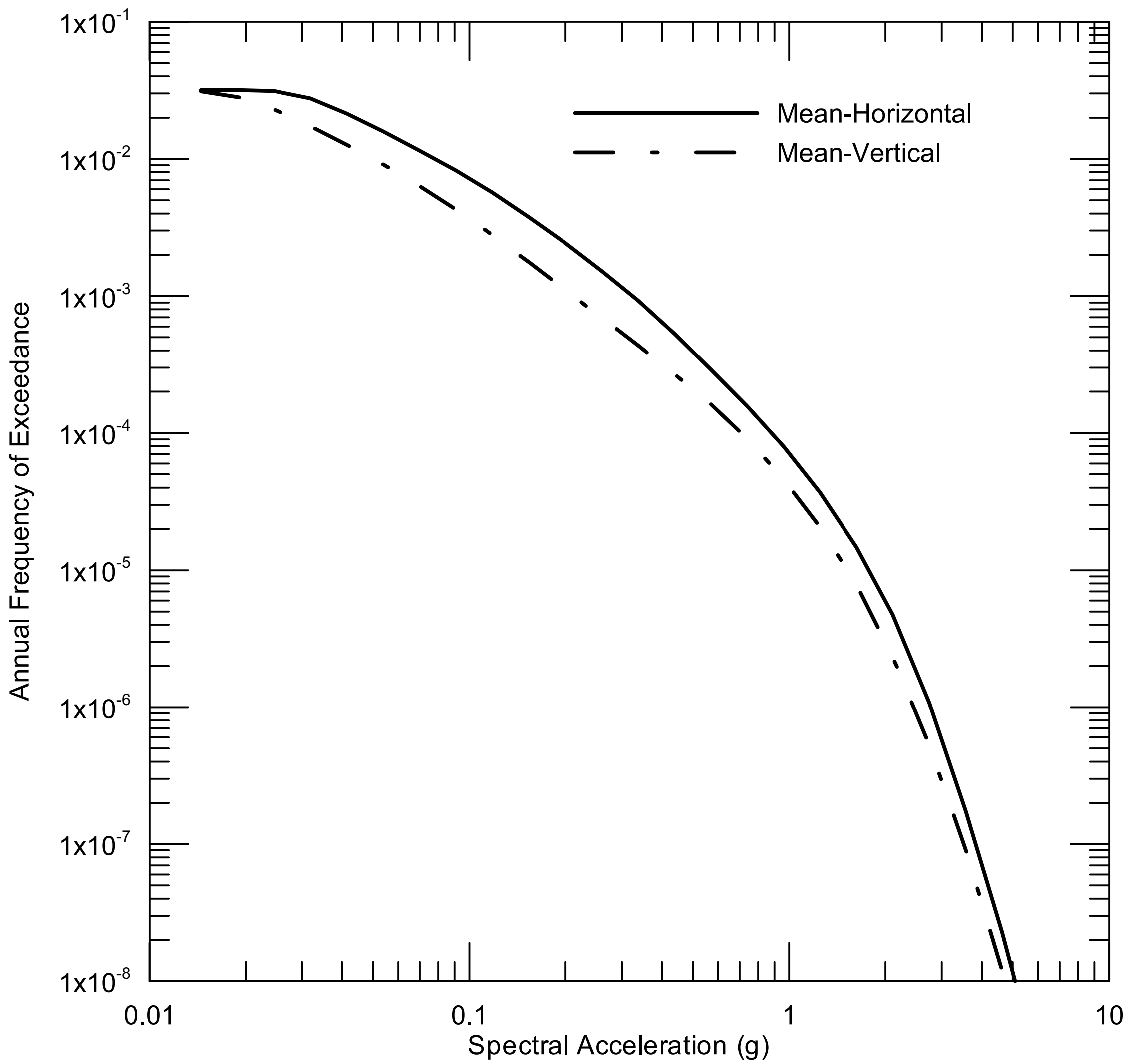
Source: Appendix D, Table D-1

Figure 6.5.2-20. Mean Horizontal and Vertical Seismic Hazard Curves for 30 ft of Alluvium over Tuff, South of the Fault, for 0.2 Sec SA at SFA



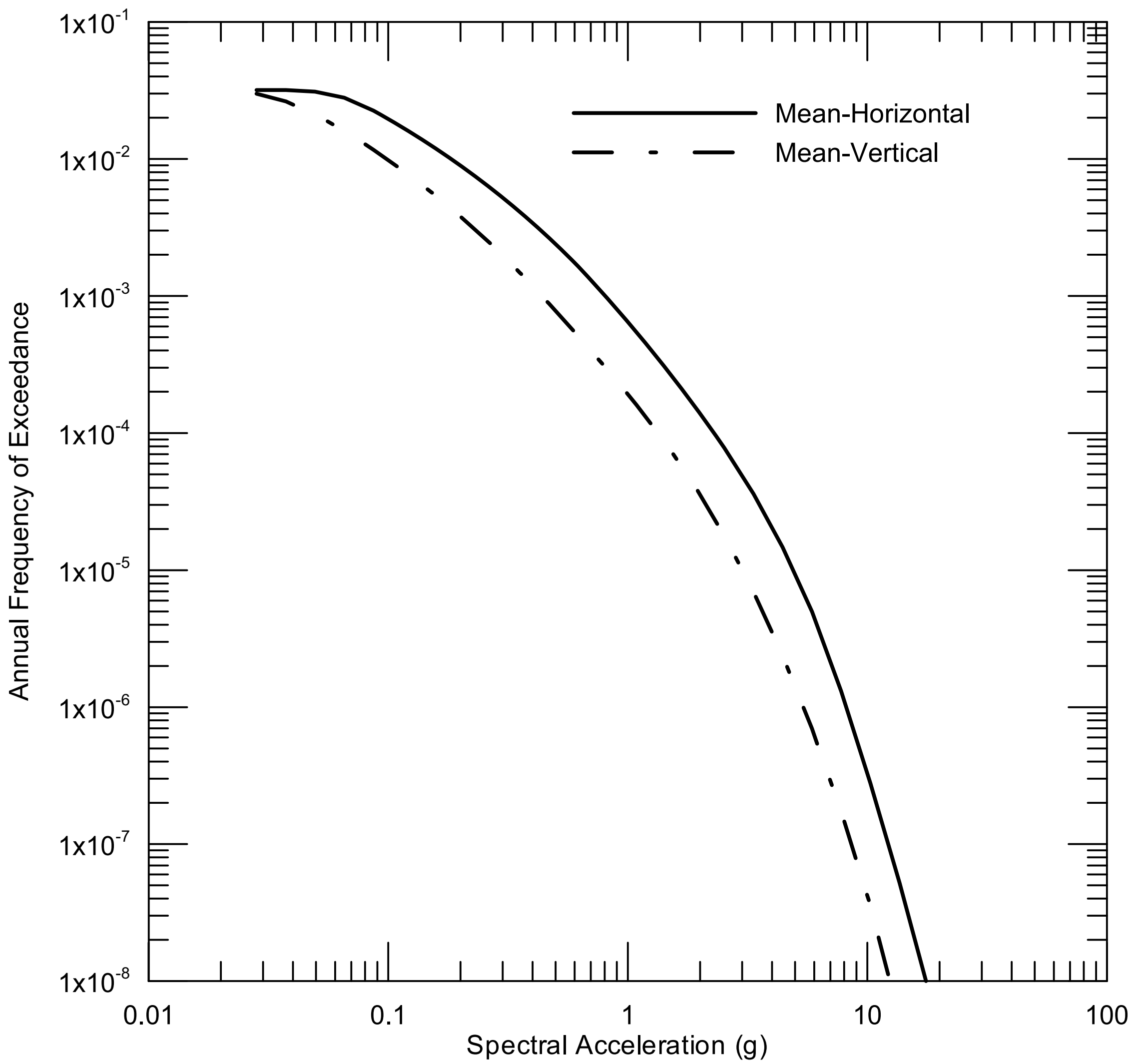
Source: Appendix D, Table D-1

Figure 6.5.2-21. Mean Horizontal and Vertical Seismic Hazard Curves for 30 ft of Alluvium over Tuff, South of the Fault, for 1.0 Sec SA at SFA



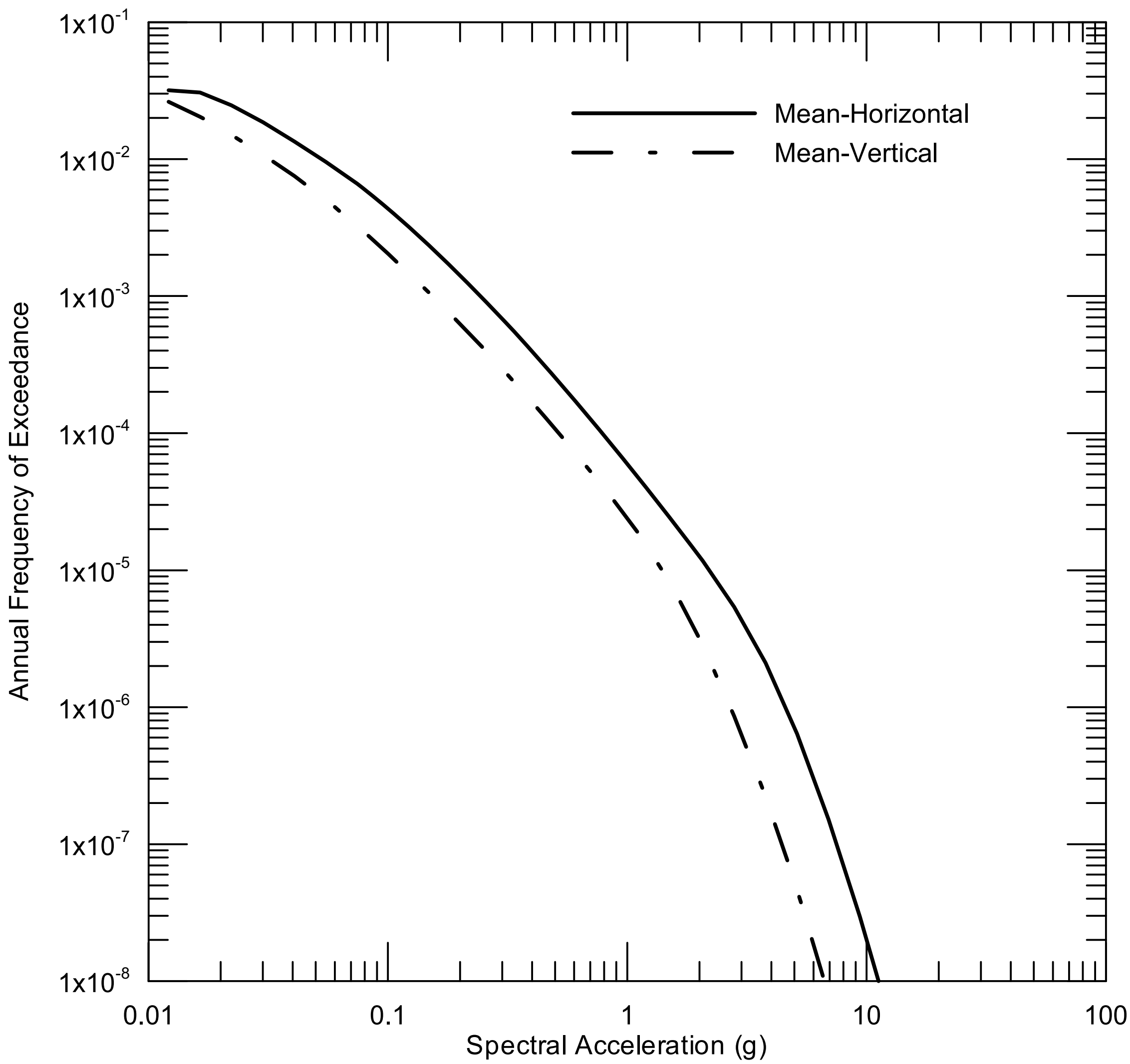
Source: Appendix D, Table D-1

Figure 6.5.2-22. Mean Horizontal and Vertical Seismic Hazard Curves for 70 ft of Alluvium over Tuff, South of the Fault, for PGA at SFA



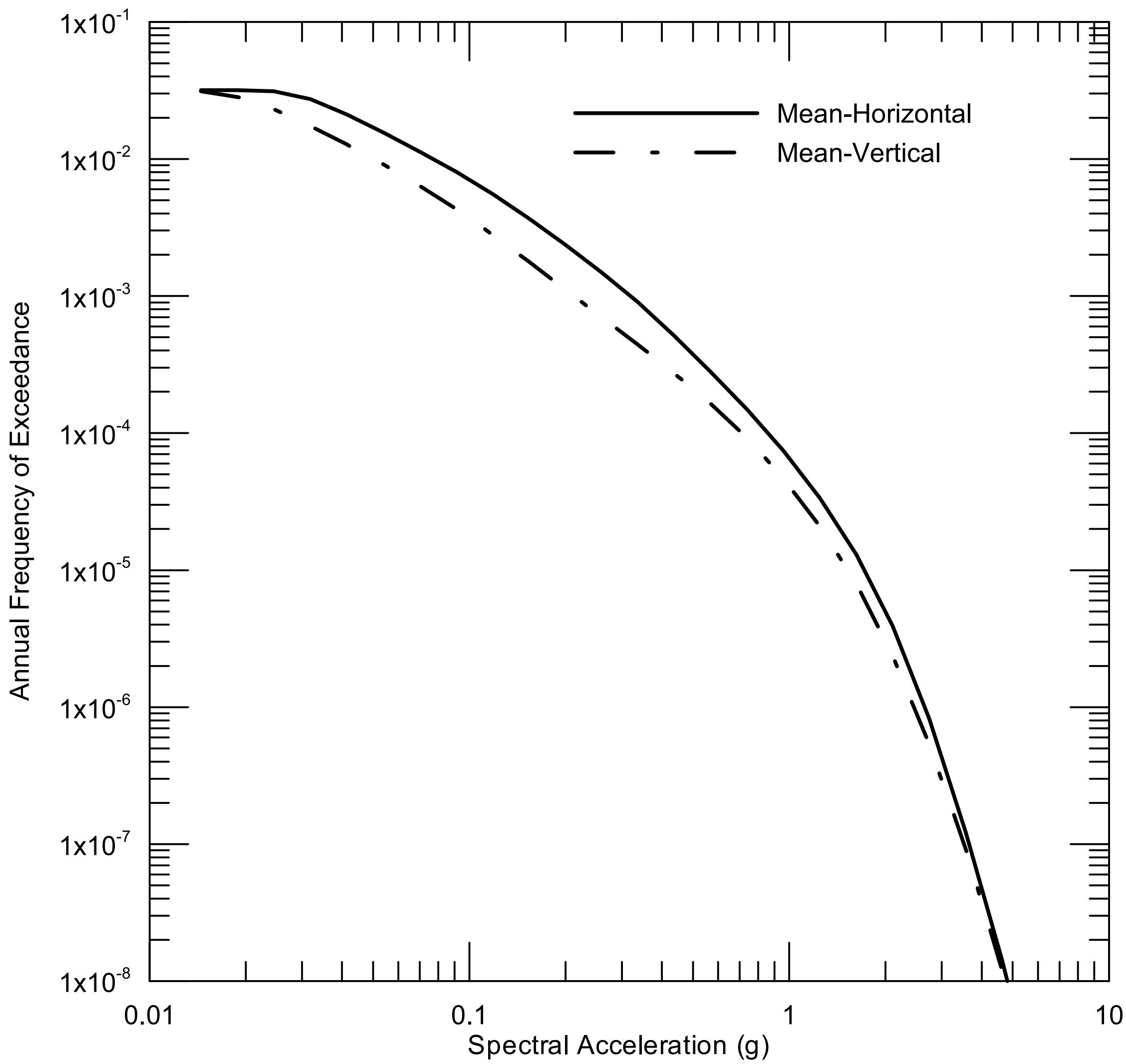
Source: Appendix D, Table D-1

Figure 6.5.2-23. Mean Horizontal and Vertical Seismic Hazard Curves for 70 ft of Alluvium over Tuff, South of the Fault, for 0.2 Sec SA at SFA



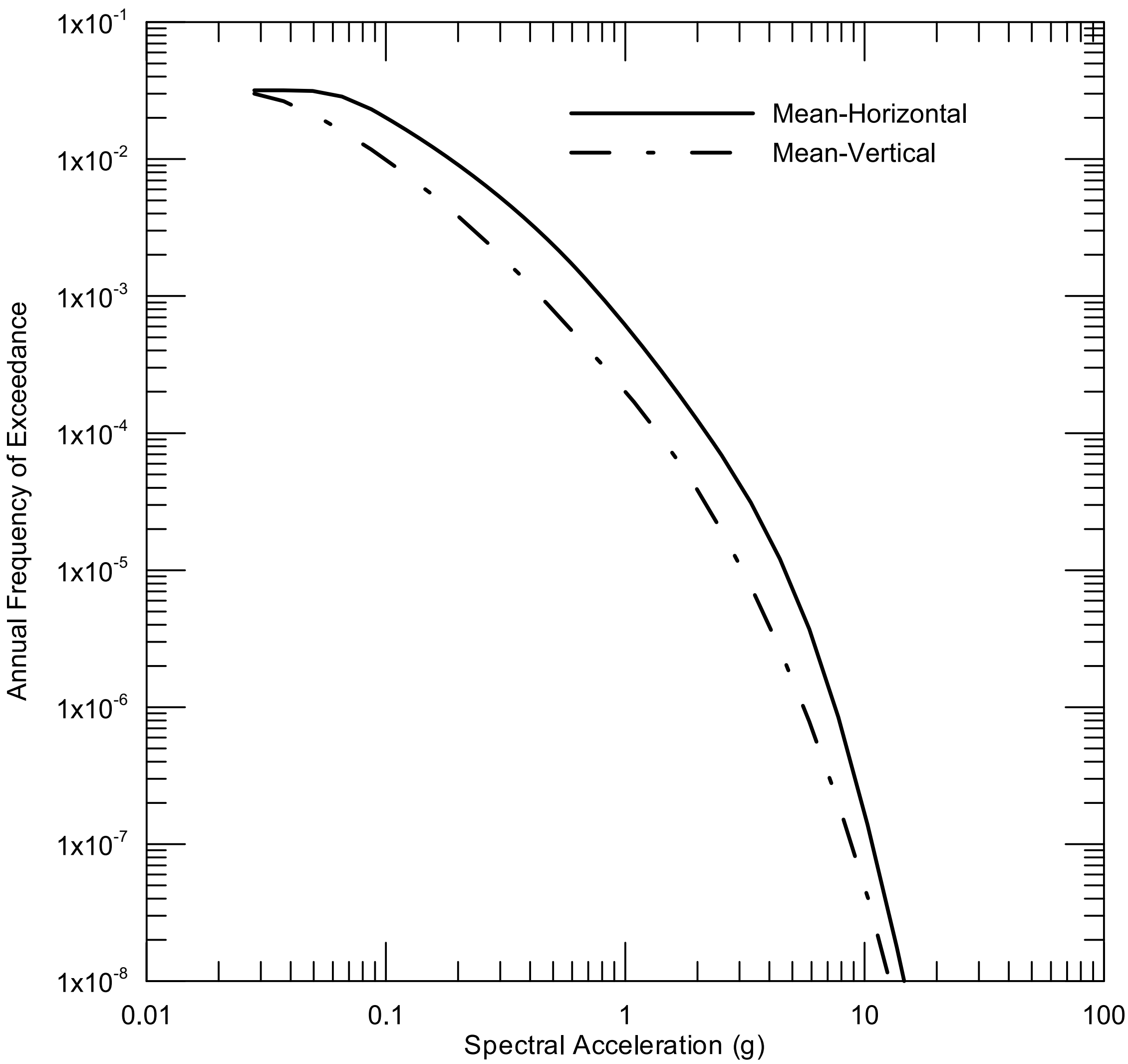
Source: Appendix D, Table D-1

Figure 6.5.2-24. Mean Horizontal and Vertical Seismic Hazard Curves for 70 ft of Alluvium over Tuff, South of the Fault, for 1.0 Sec SA at SFA



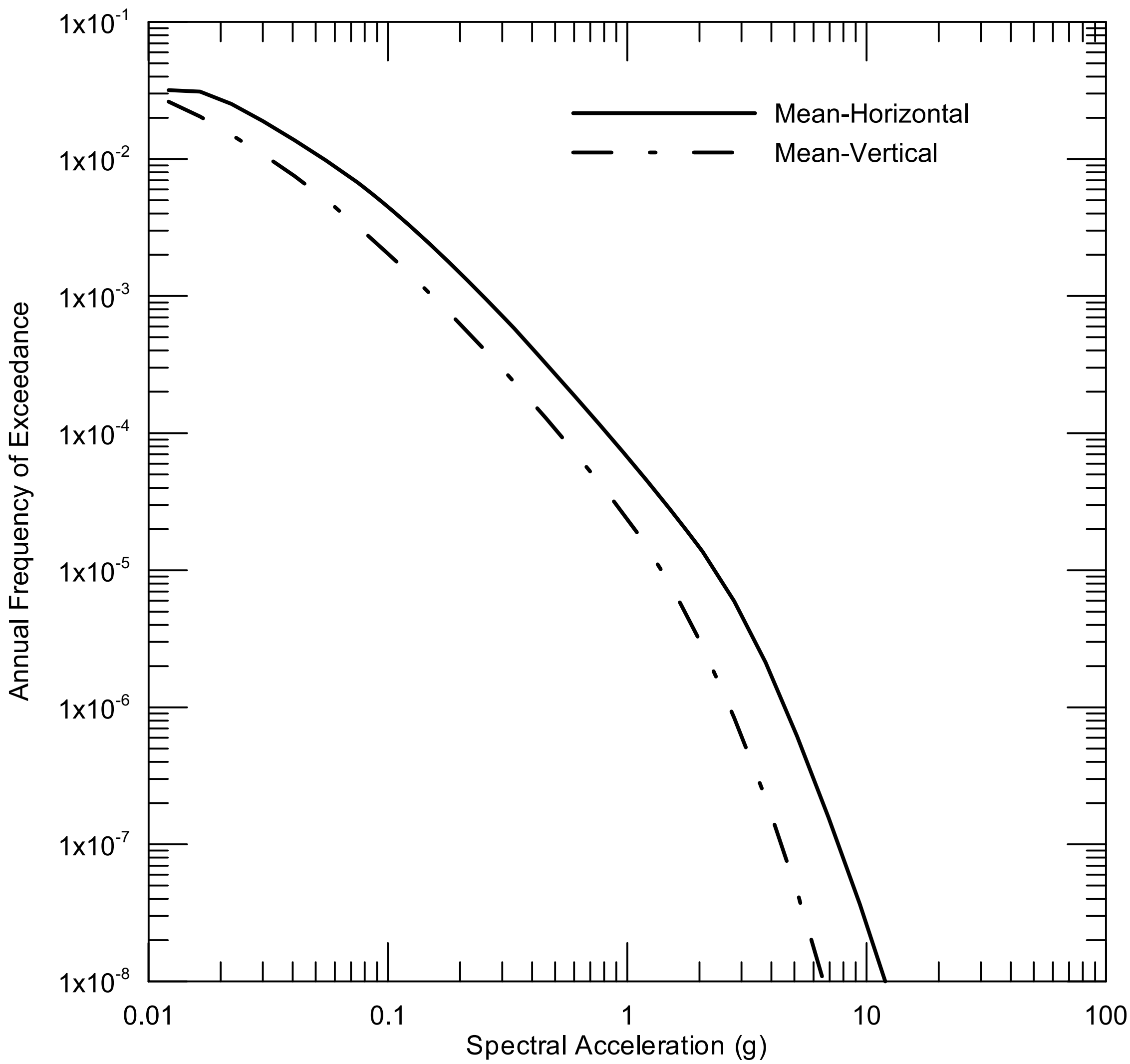
Source: Appendix D, Table D-1

Figure 6.5.2-25. Mean Horizontal and Vertical Seismic Hazard Curves for 100 ft of Alluvium over Tuff, South of the Fault, for PGA at SFA



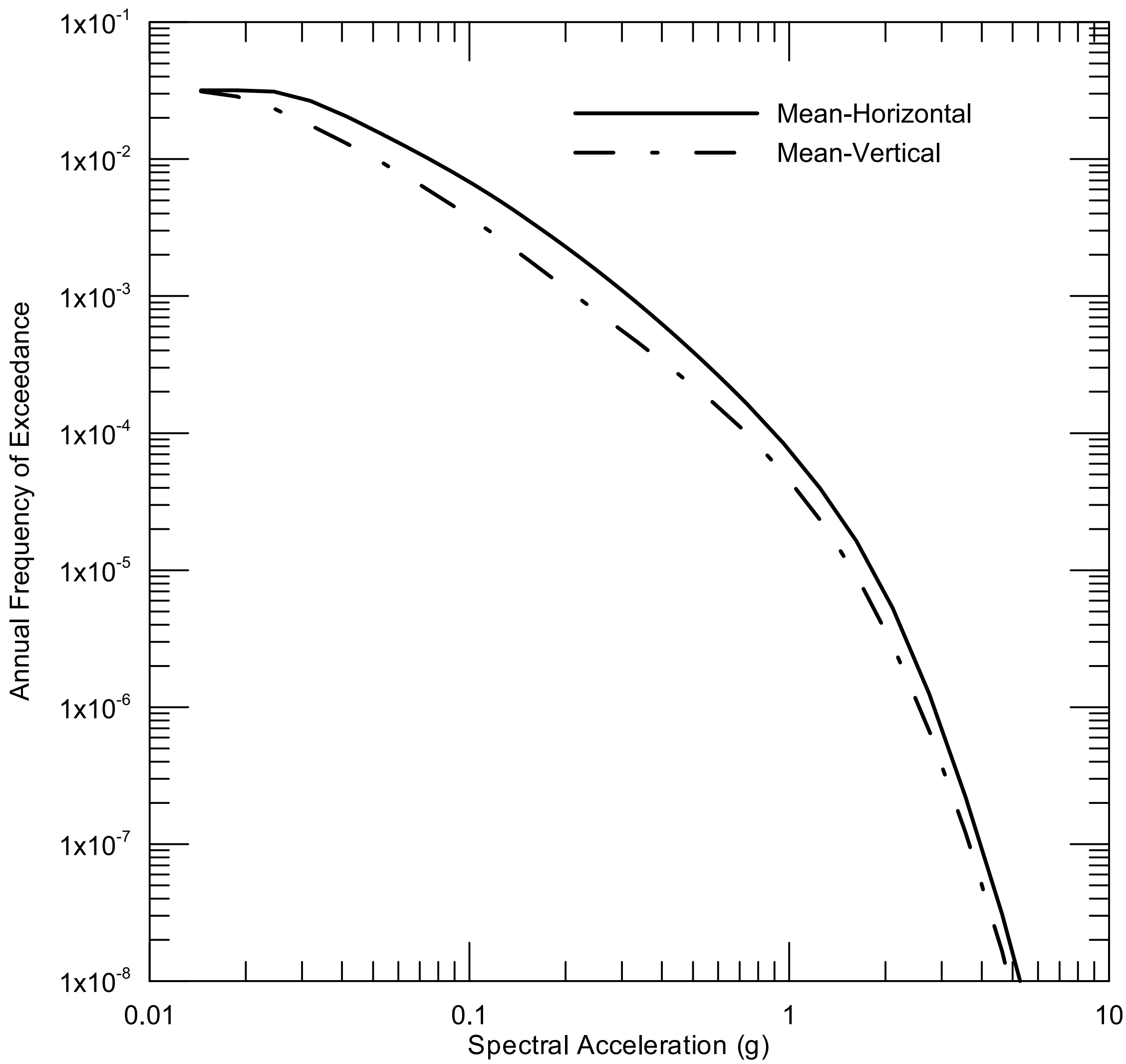
Source: Appendix D, Table D-1

Figure 6.5.2-26. Mean Horizontal and Vertical Seismic Hazard Curves for 100 ft of Alluvium over Tuff, South of the Fault, for 0.2 Sec SA at SFA



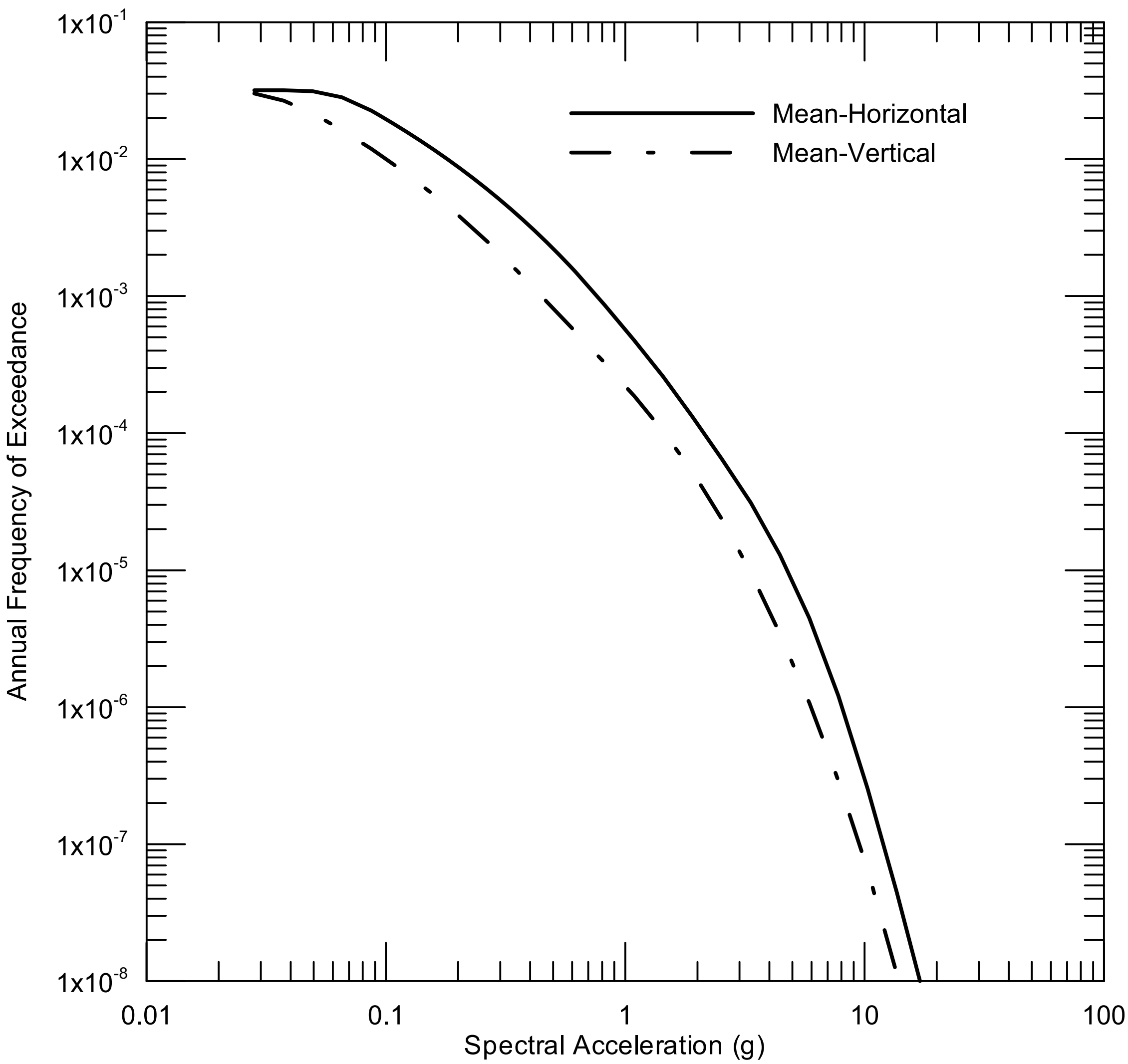
Source: Appendix D, Table D-1

Figure 6.5.2-27. Mean Horizontal and Vertical Seismic Hazard Curves for 100 ft of Alluvium over Tuff, South of the Fault, for 1.0 Sec SA at SFA



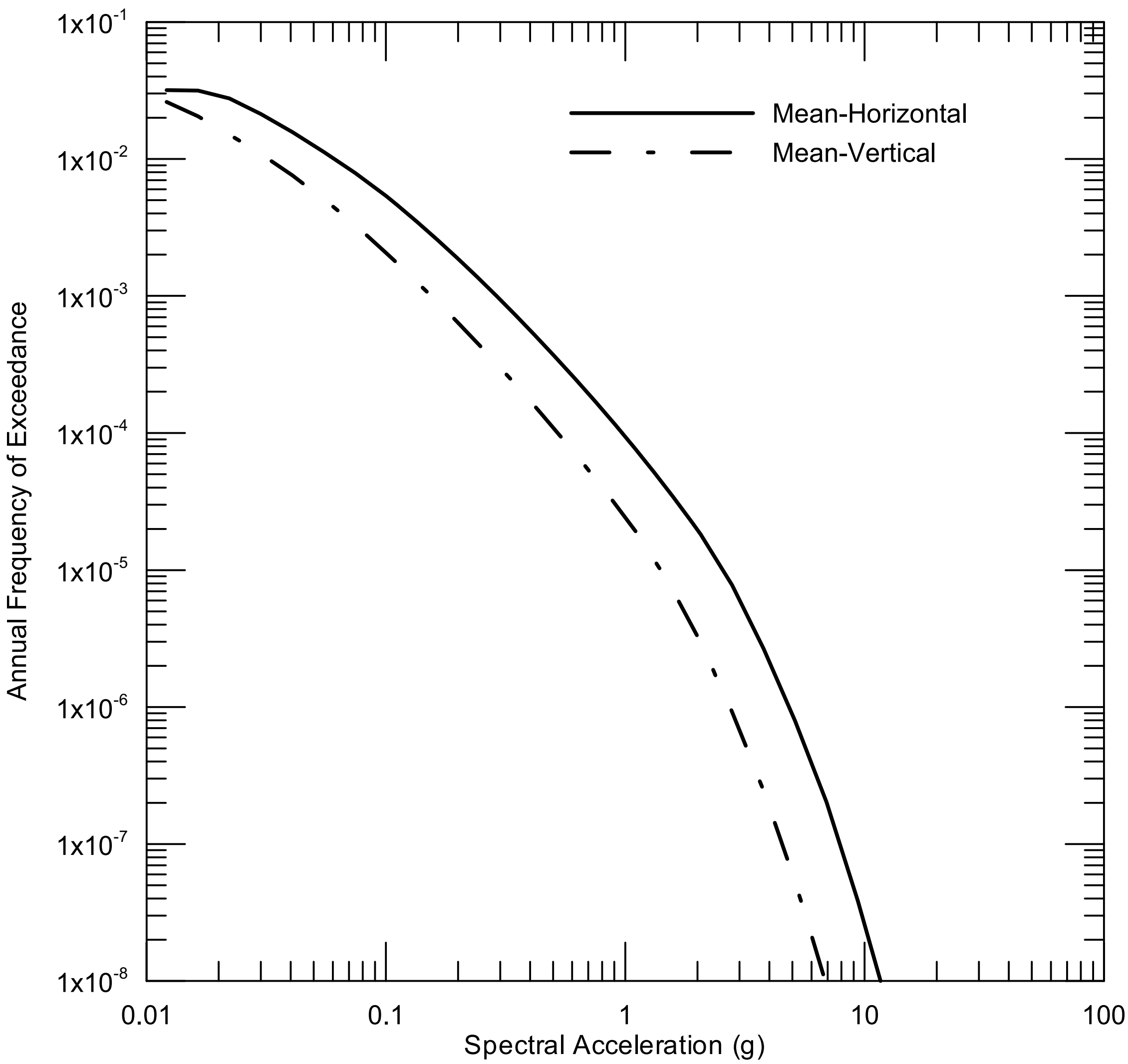
Source: Appendix D, Table D-1

Figure 6.5.2-28. Mean Horizontal and Vertical Seismic Hazard Curves for Northeast of the Fault, for PGA at SFA



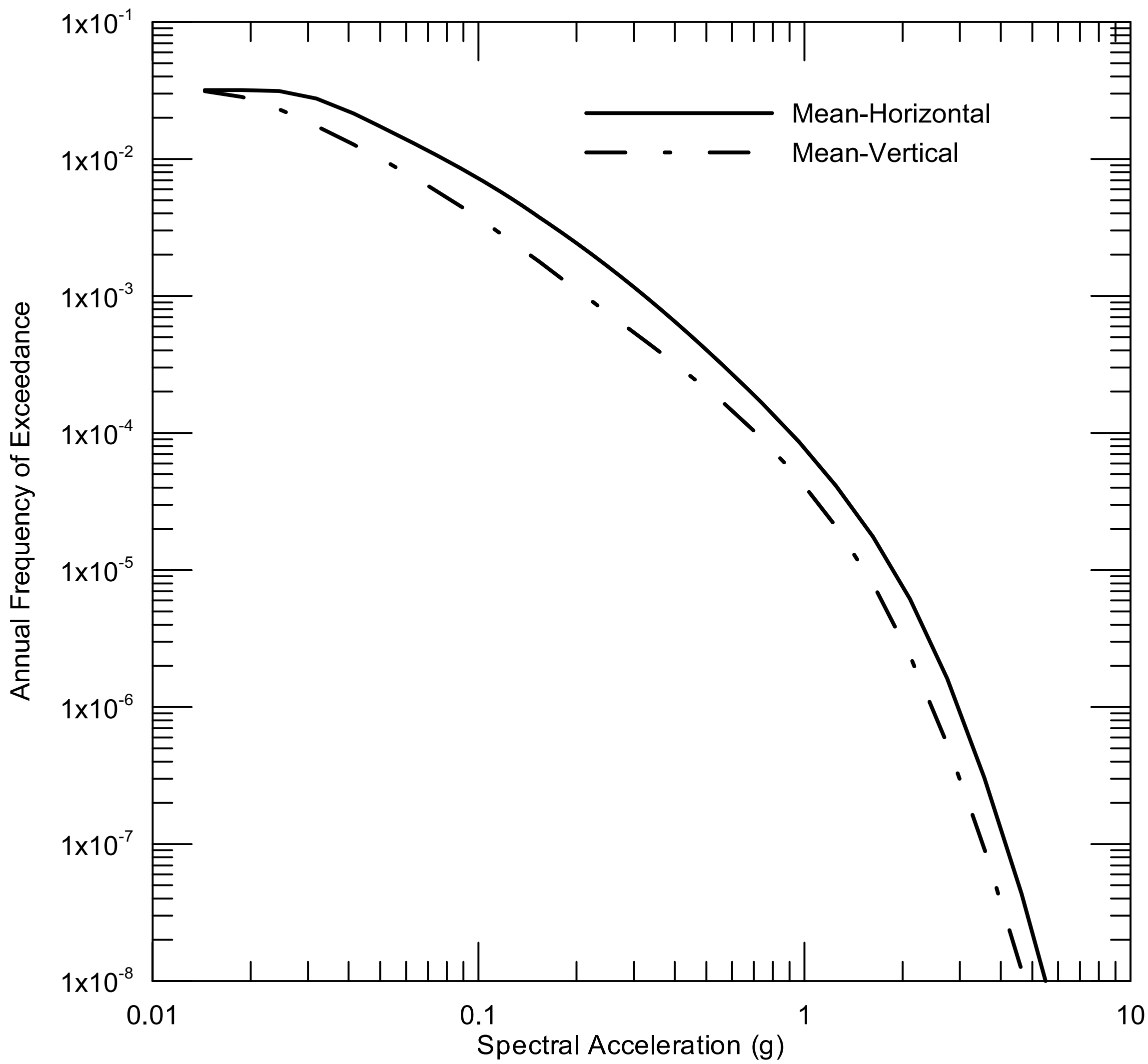
Source: Appendix D, Table D-1

Figure 6.5.2-29. Mean Horizontal and Vertical Seismic Hazard Curves for Northeast of the Fault, for 0.2 Sec SA at SFA



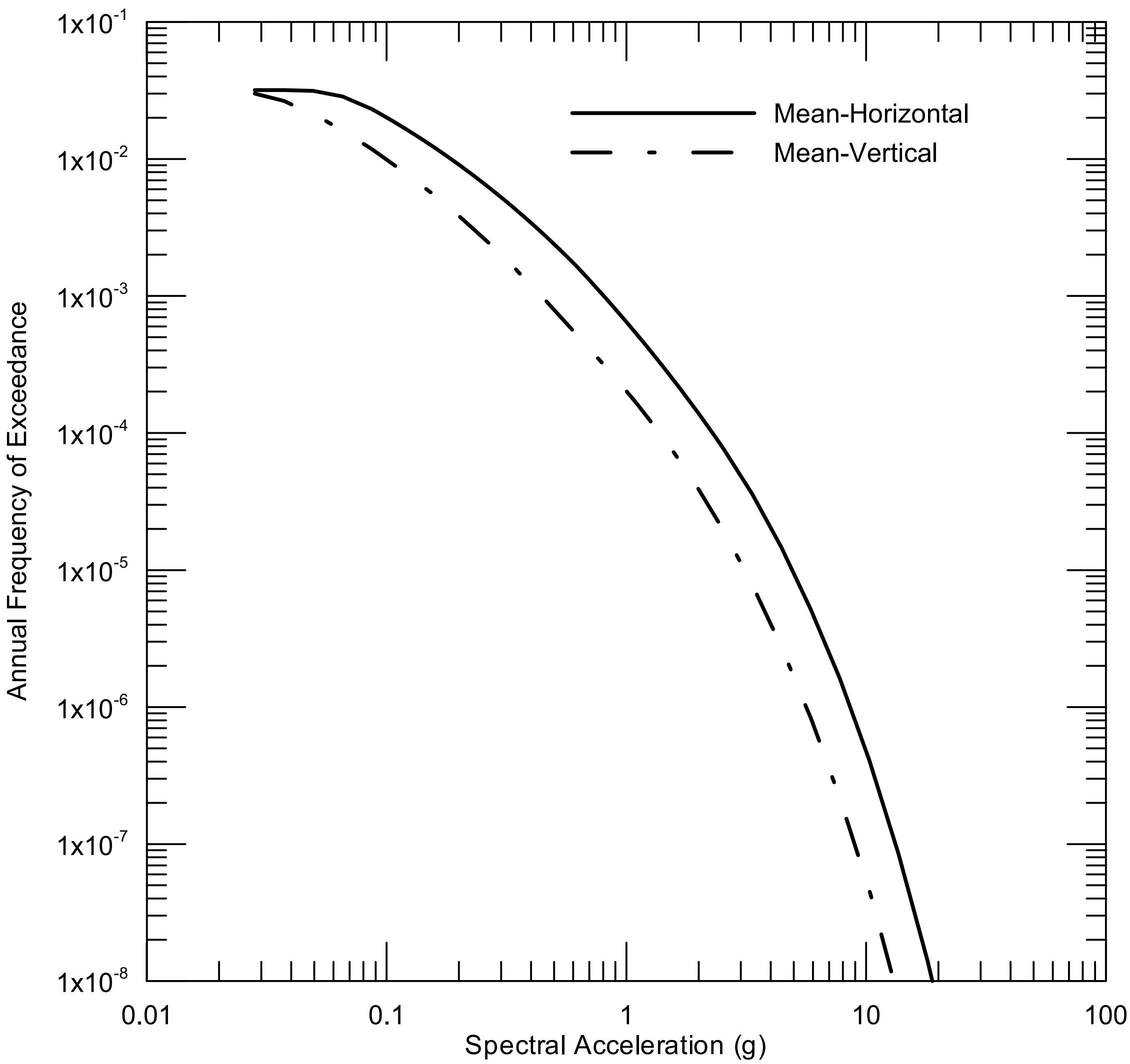
Source: Appendix D, Table D-1

Figure 6.5.2-30. Mean Horizontal and Vertical Seismic Hazard Curves for Northeast of the Fault, for 1.0 Sec SA at SFA



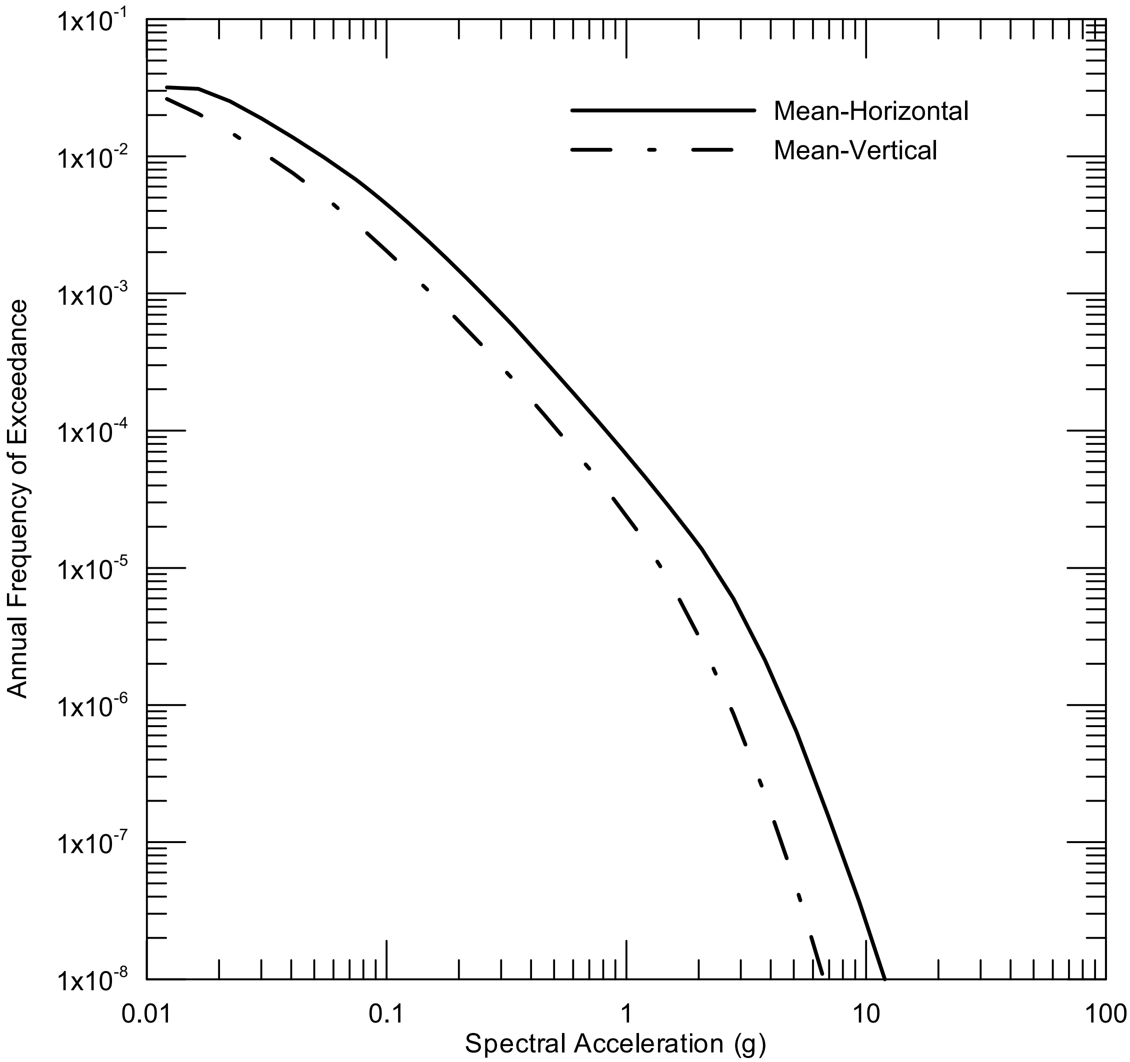
Source: Appendix D, Table D-1

Figure 6.5.2-31. Mean Horizontal and Vertical Seismic Hazard Curves for South of the Fault, for PGA at SFA



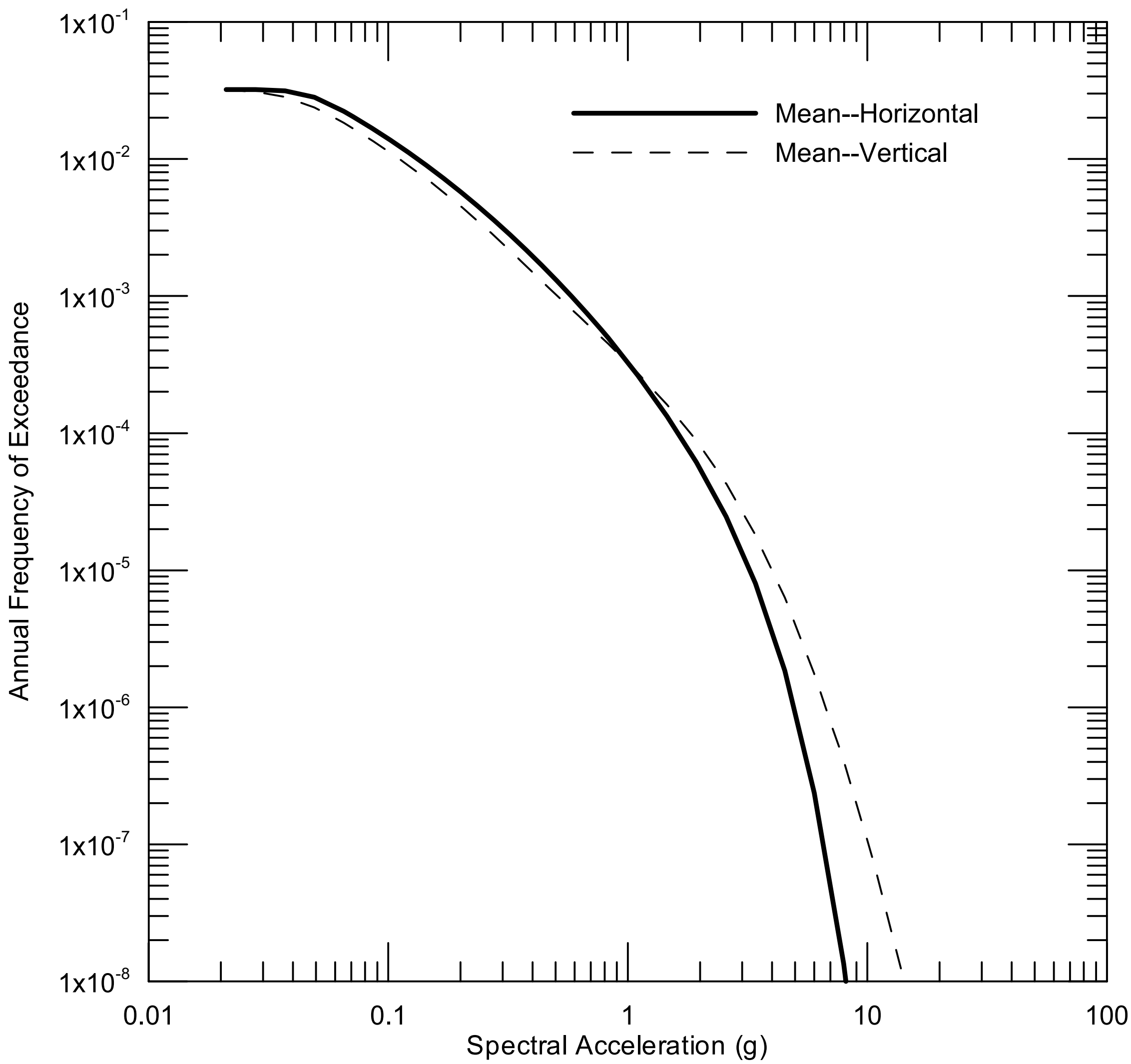
Source: Appendix D, Table D-1

Figure 6.5.2-32. Mean Horizontal and Vertical Seismic Hazard Curves for South of the Fault, for 0.2 Sec SA at SFA



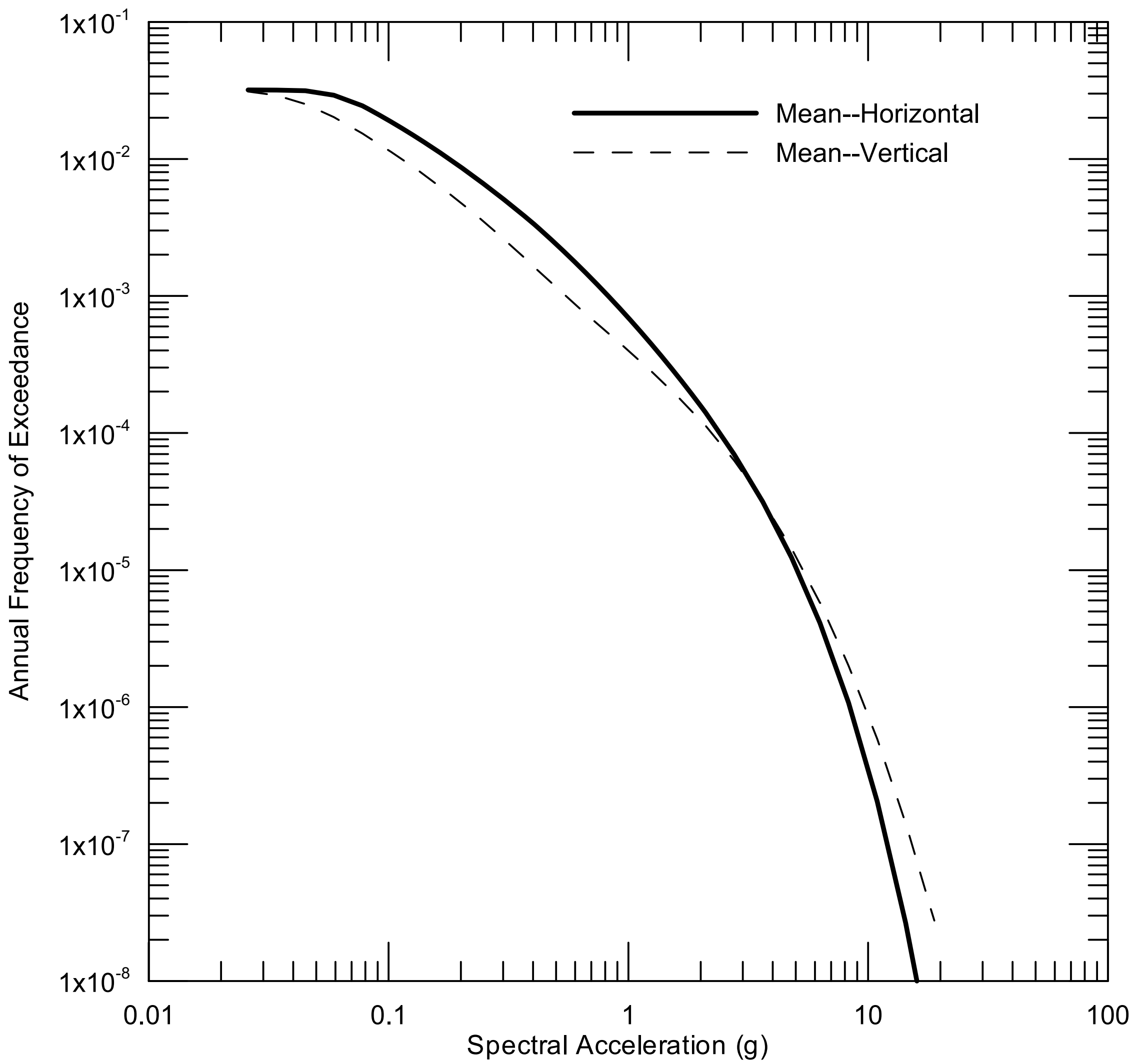
Source: Appendix D, Table D-1

Figure 6.5.2-33. Mean Horizontal and Vertical Seismic Hazard Curves for South of the Fault, for 1.0 Sec SA at SFA



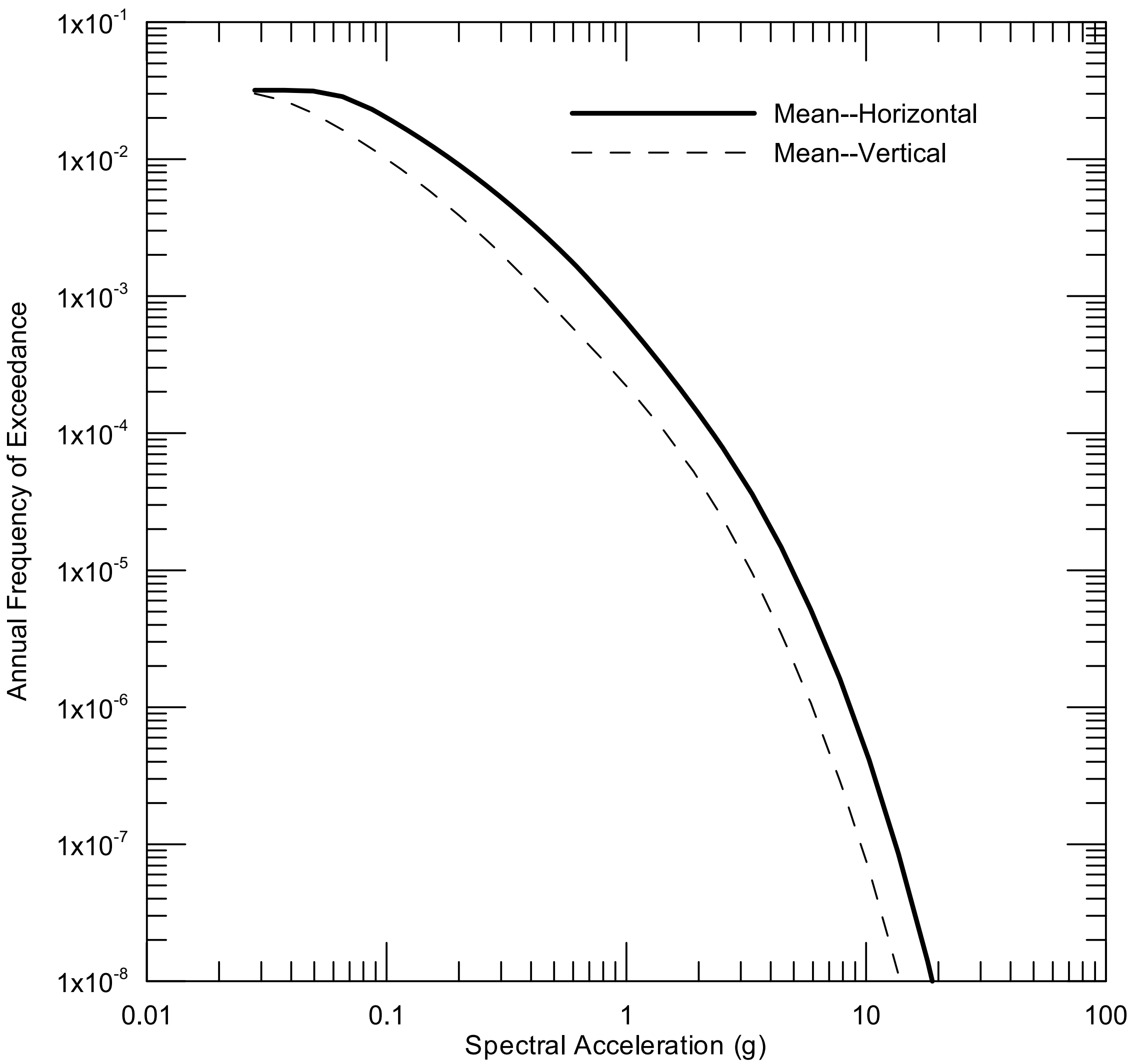
Source: Appendix D, Table D-1; MO0801HCUHSSFA.001 [DIRS 184802]

Figure 6.5.2-35. Mean Horizontal and Vertical Seismic Hazard Curves for 0.05 Sec SA at SFA



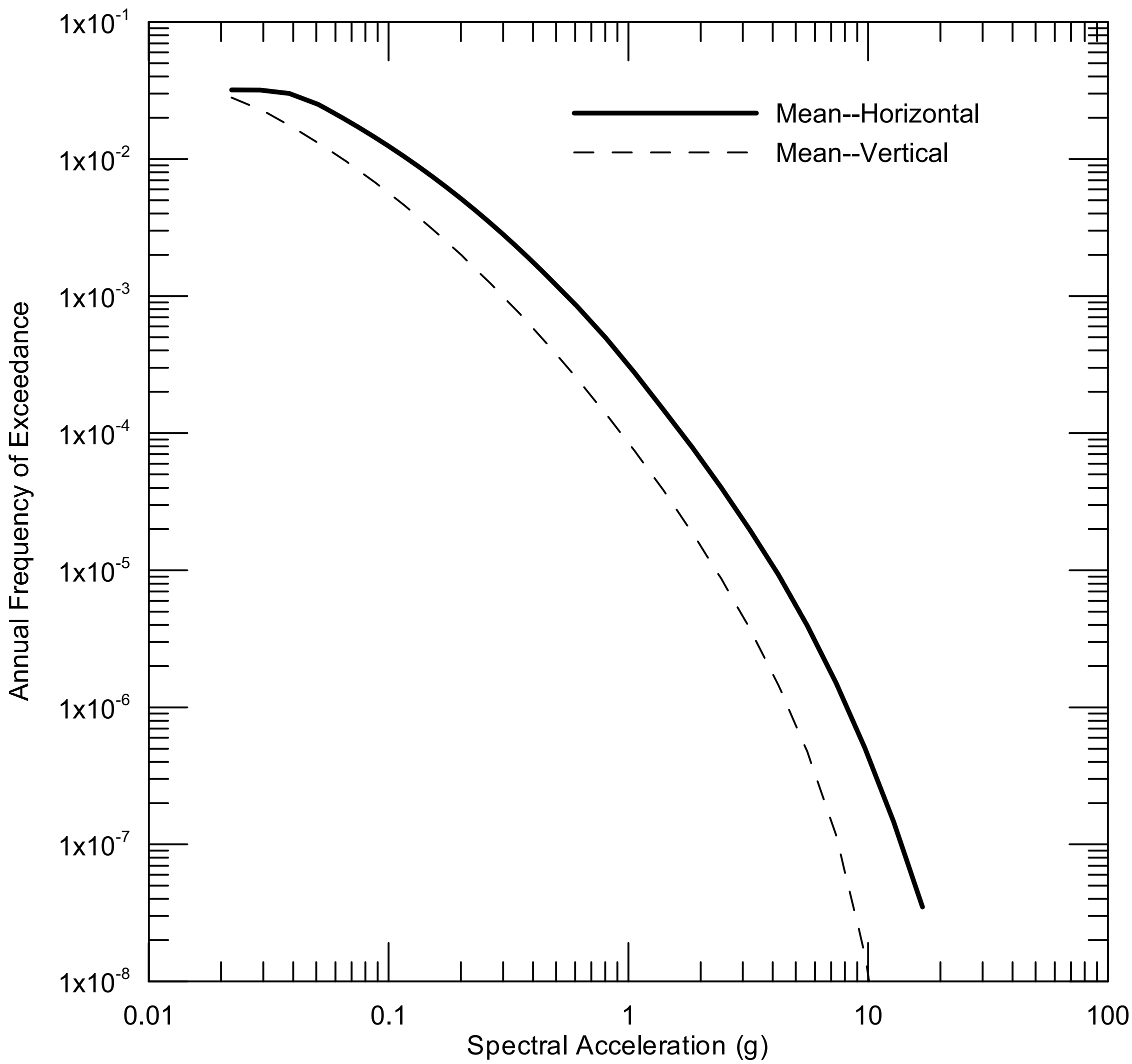
Source: Appendix D, Table D-1; MO0801HCUHSSFA.001 [DIRS 184802]

Figure 6.5.2-36. Mean Horizontal and Vertical Seismic Hazard Curves for 0.1 Sec SA at SFA



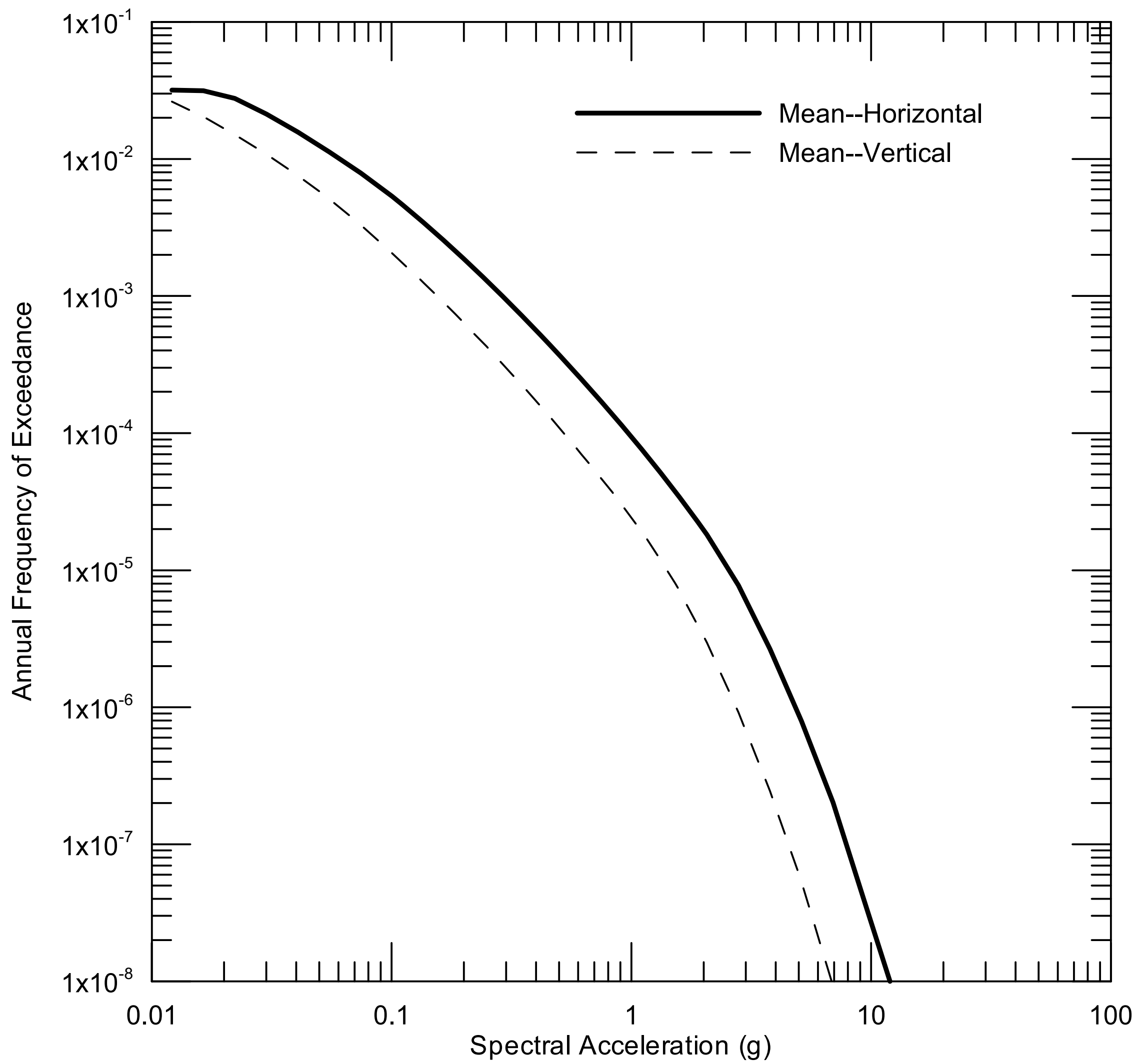
Source: Appendix D, Table D-1; MO0801HCUHSSFA.001 [DIRS 184802]

Figure 6.5.2-37. Mean Horizontal Seismic Hazard Curve for 0.2 Sec SA at SFA



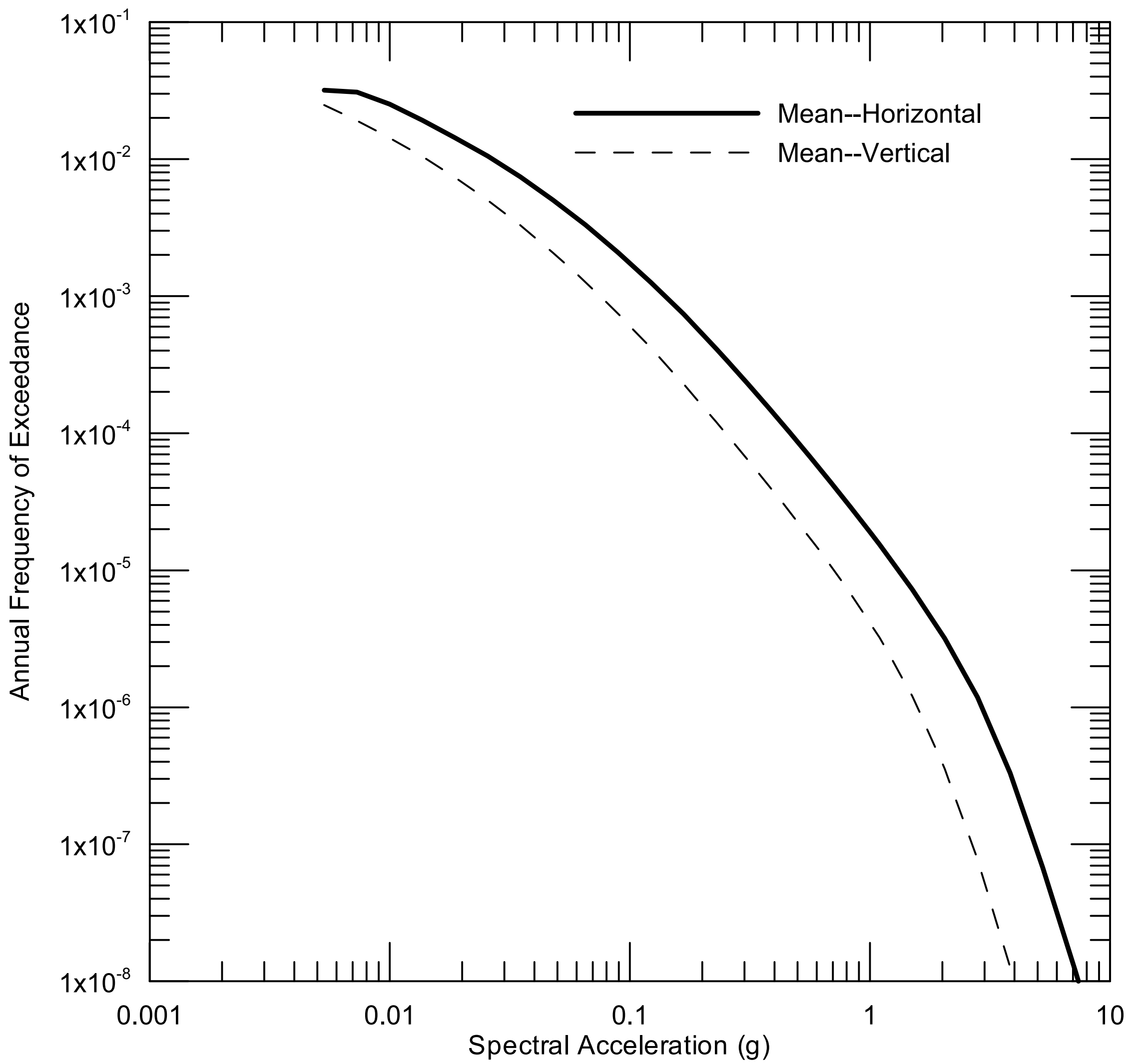
Source: Appendix D, Table D-1; MO0801HCUHSSFA.001 [DIRS 184802]

Figure 6.5.2-38. Mean Horizontal and Vertical Seismic Hazard Curves for 0.5 Sec SA at SFA



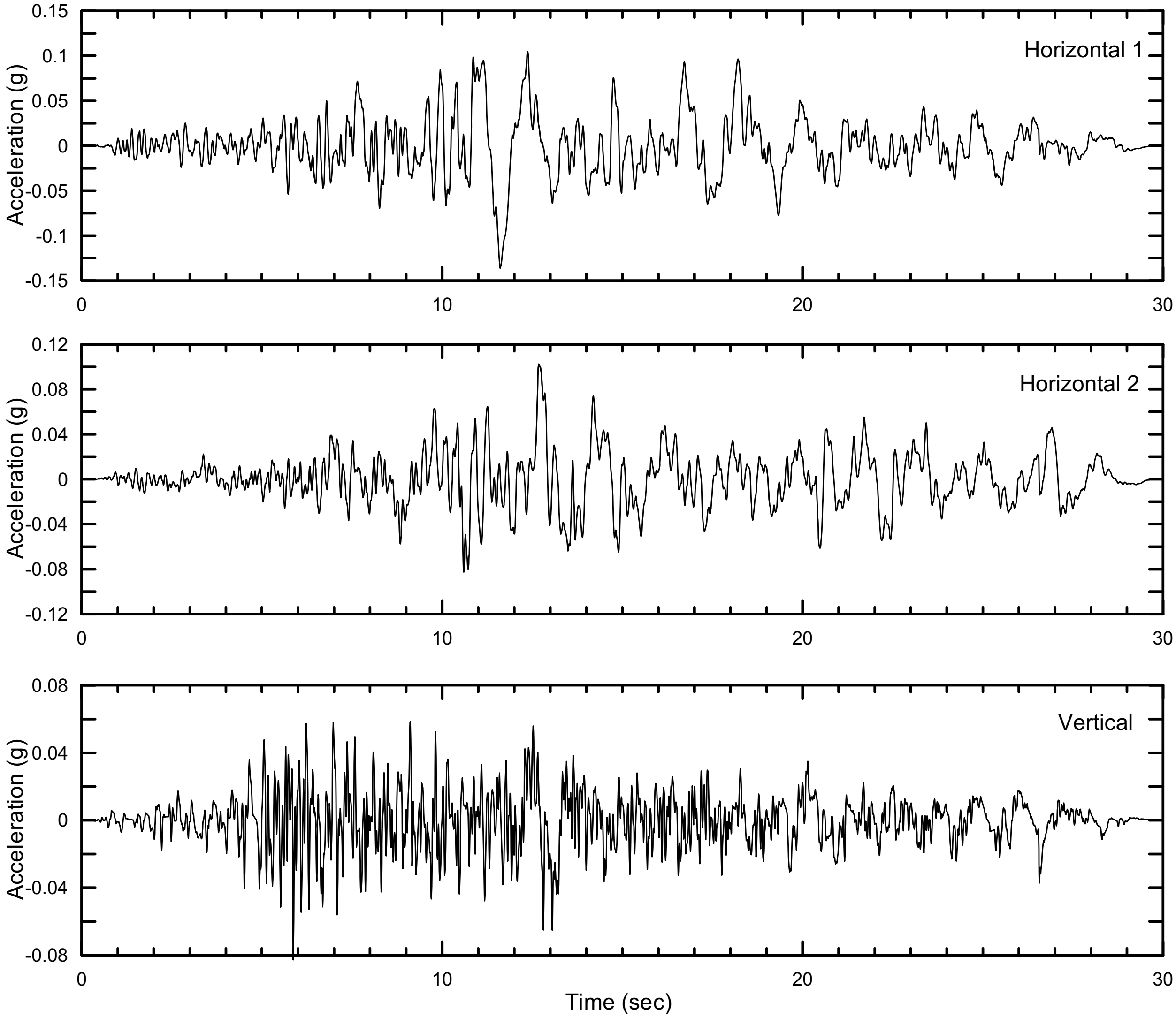
Source: Appendix D, Table D-1; MO0801HCUHSSFA.001 [DIRS 184802]

Figure 6.5.2-39. Mean Horizontal Seismic Hazard Curve for 1.0 Sec SA at SFA



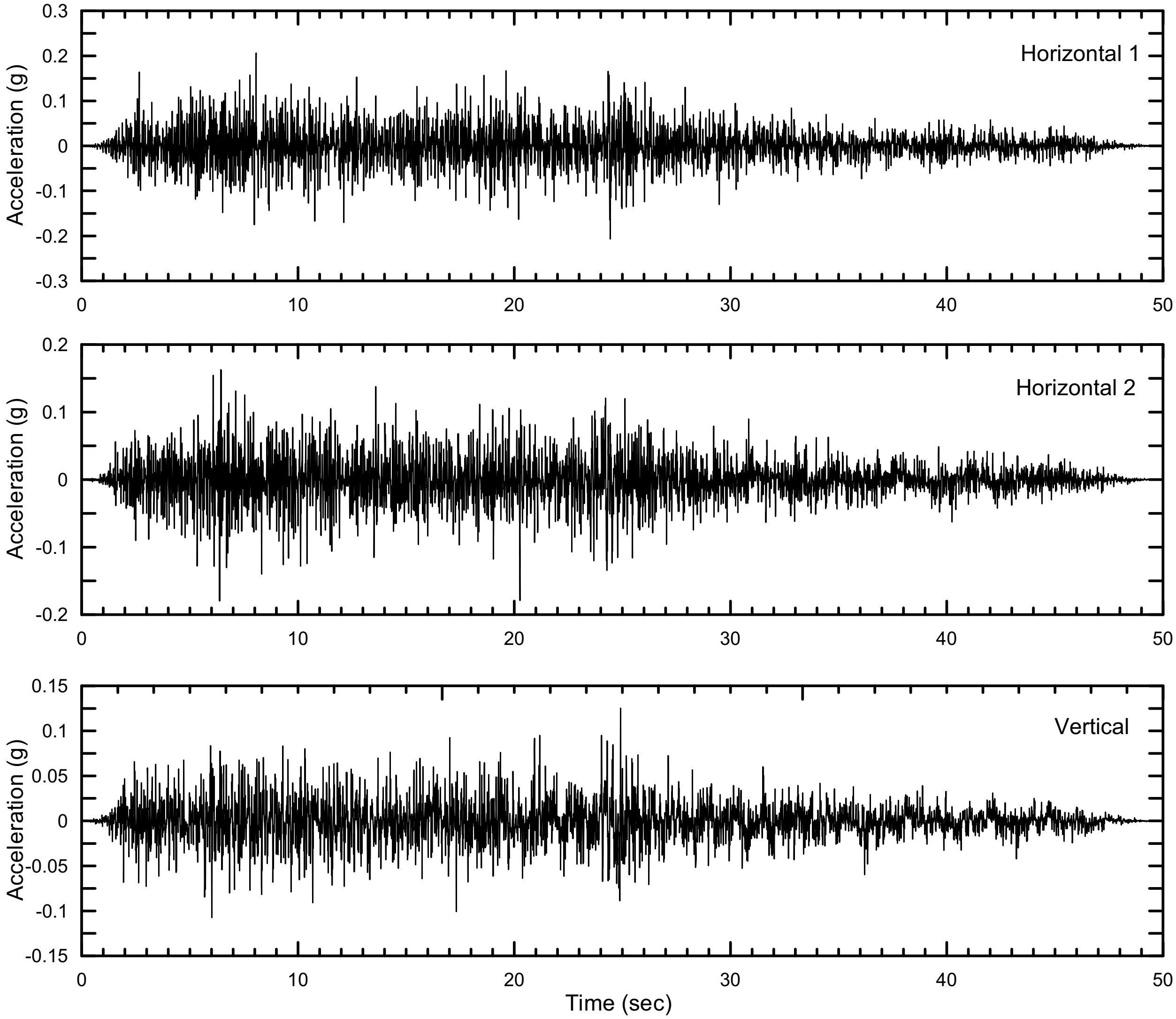
Source: Appendix D, Table D-1; MO0801HCUHSSFA.001 [DIRS 184802]

Figure 6.5.2-40. Mean Horizontal and Vertical Seismic Hazard Curves for 2.0 Sec SA at SFA



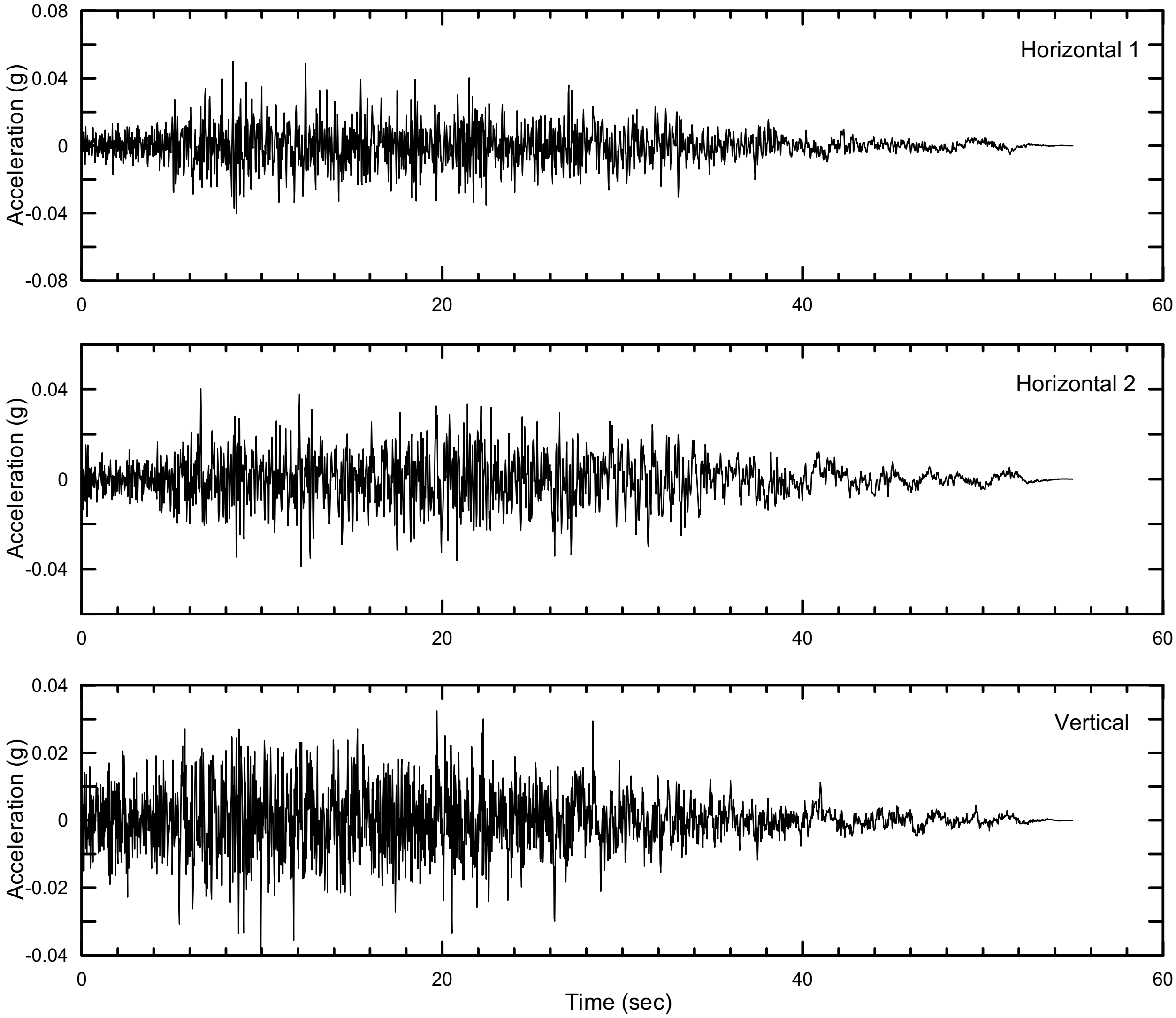
Source: Appendix D, Table D-1

Figure 6.5.2-91. Seed Time Histories, Set #1 at 10^{-4} AFE at SFA



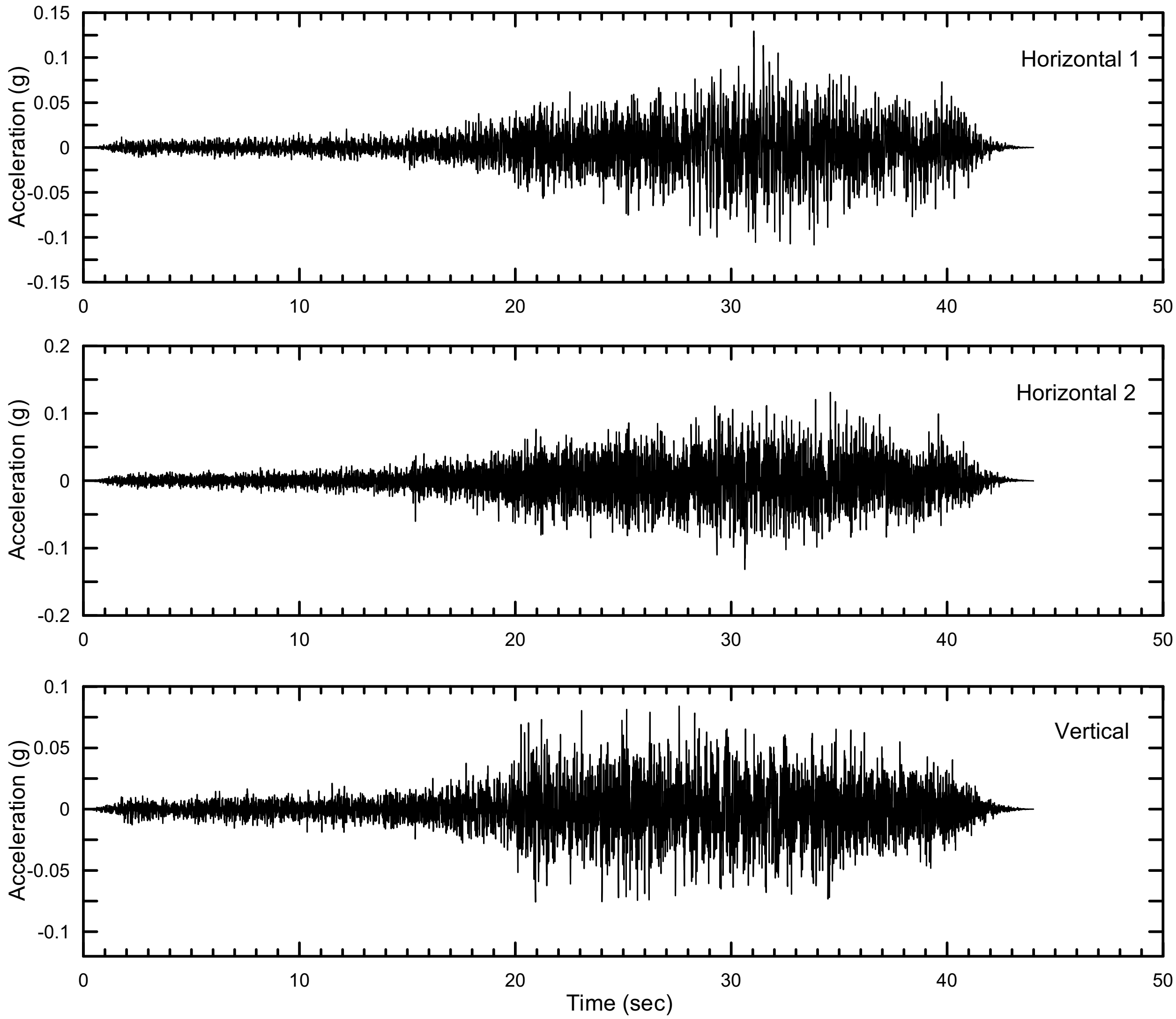
Source: Appendix D, Table D-1

Figure 6.5.2-92. Seed Time Histories, Set #2 at 10^{-4} AFE at SFA



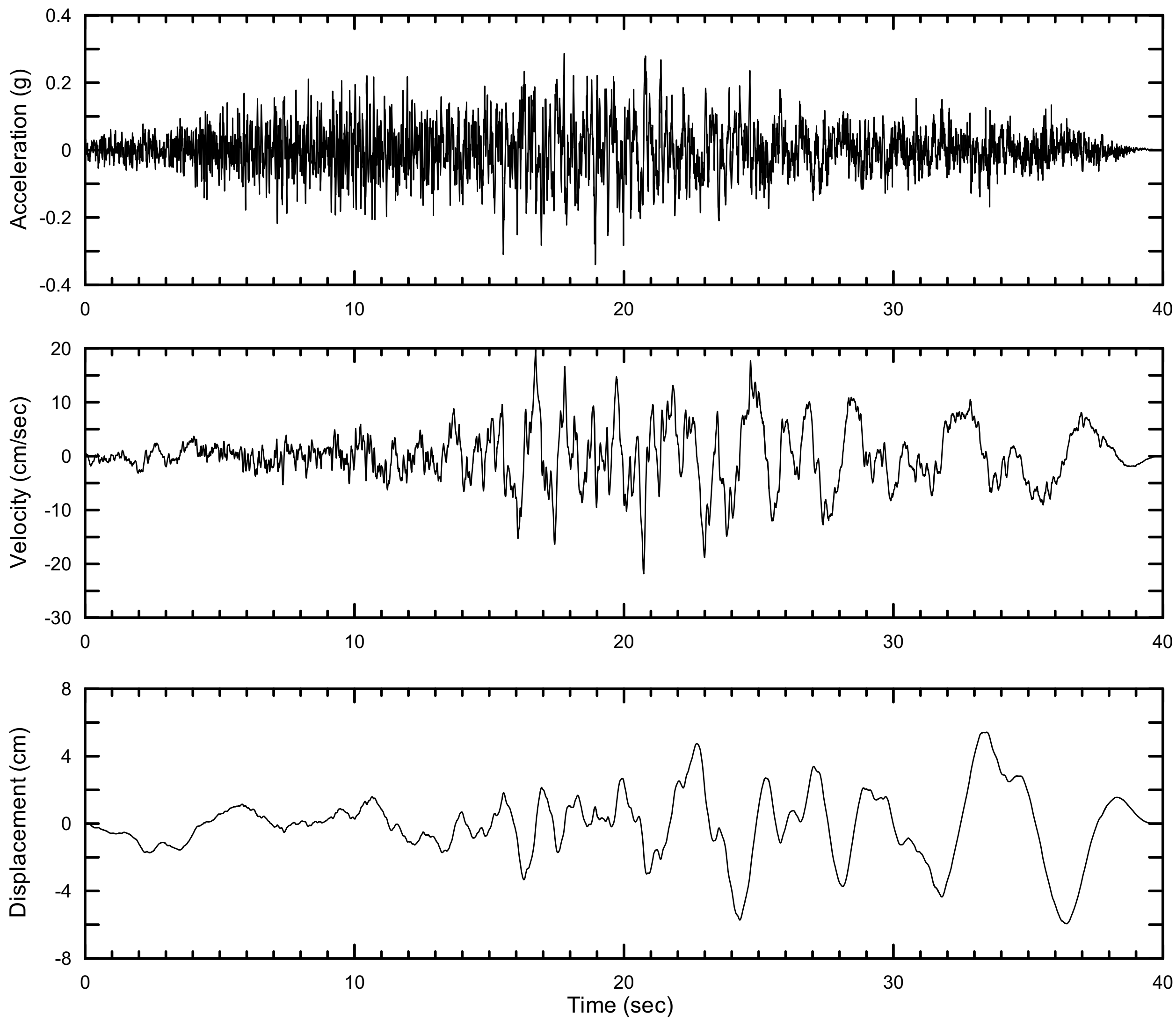
Source: Appendix D, Table D-1

Figure 6.5.2-94. Seed Time Histories, Set #4 at 10^{-4} AFE at SFA



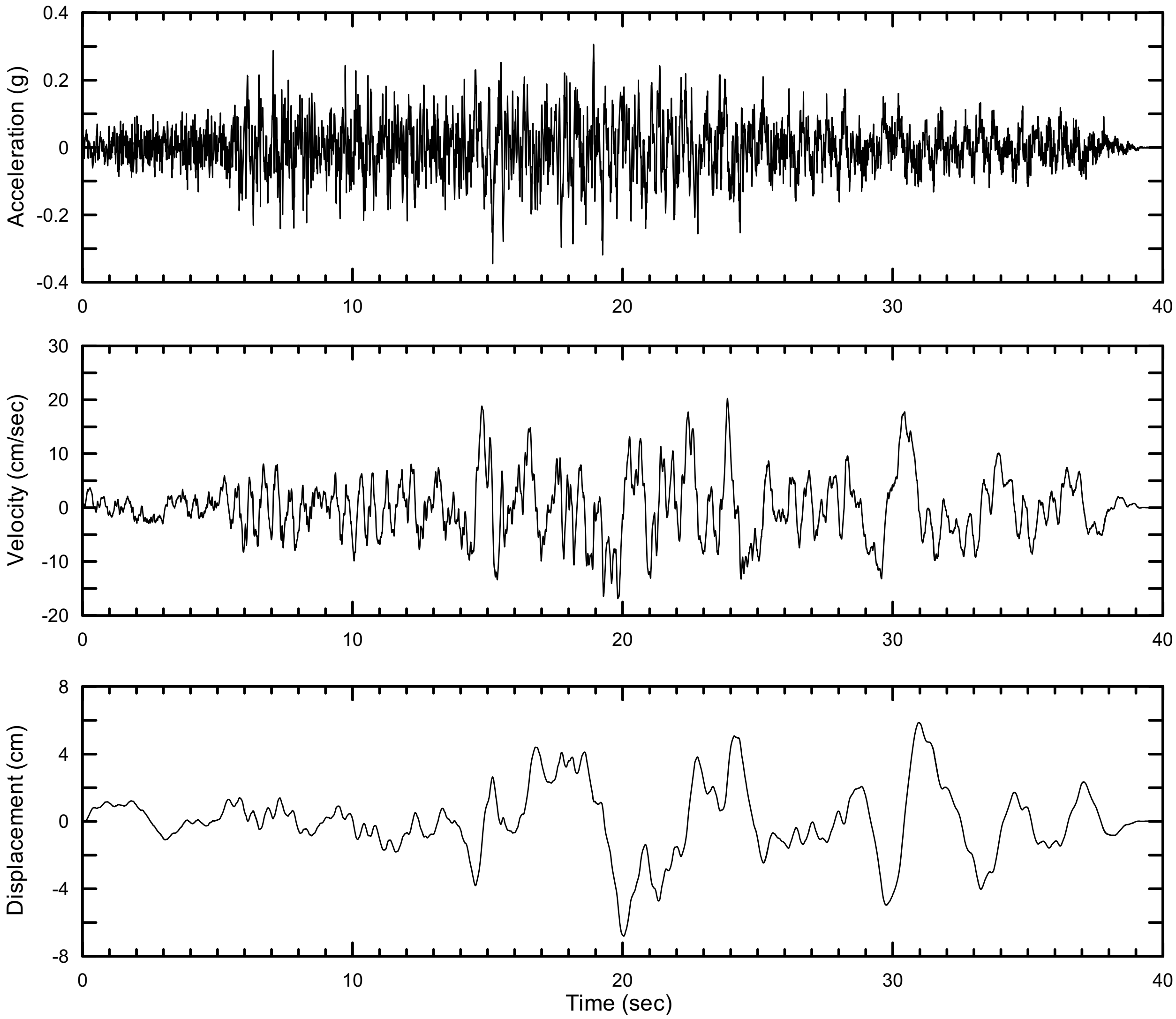
Source: Appendix D, Table D-1

Figure 6.5.2-95. Seed Time Histories, Set #5 at 10^{-4} AFE at SFA



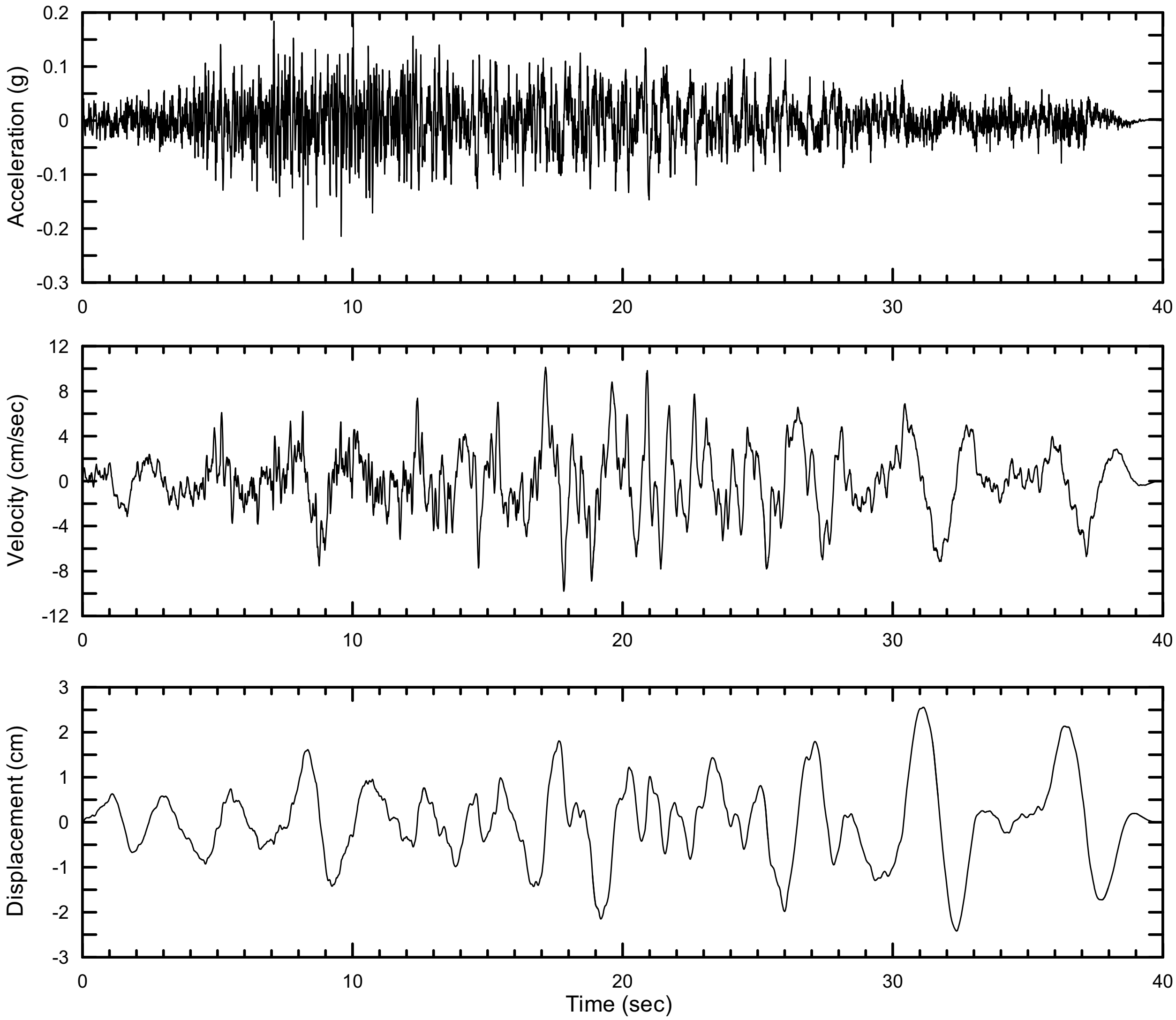
Source: Appendix D, Table D-1

Figure 6.5.2-98. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 1, Set 1



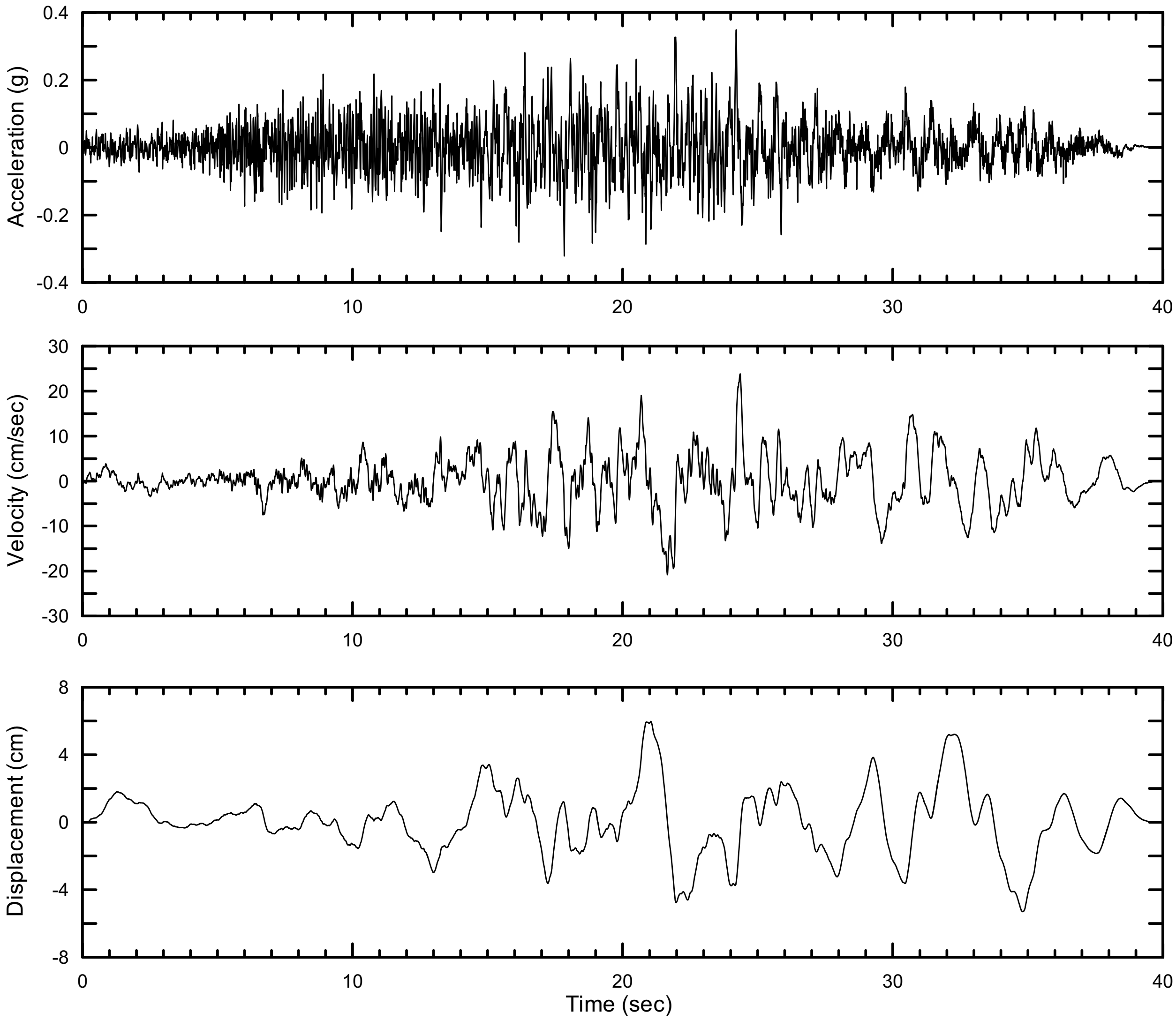
Source: Appendix D, Table D-1

Figure 6.5.2-101. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 2, Set 1



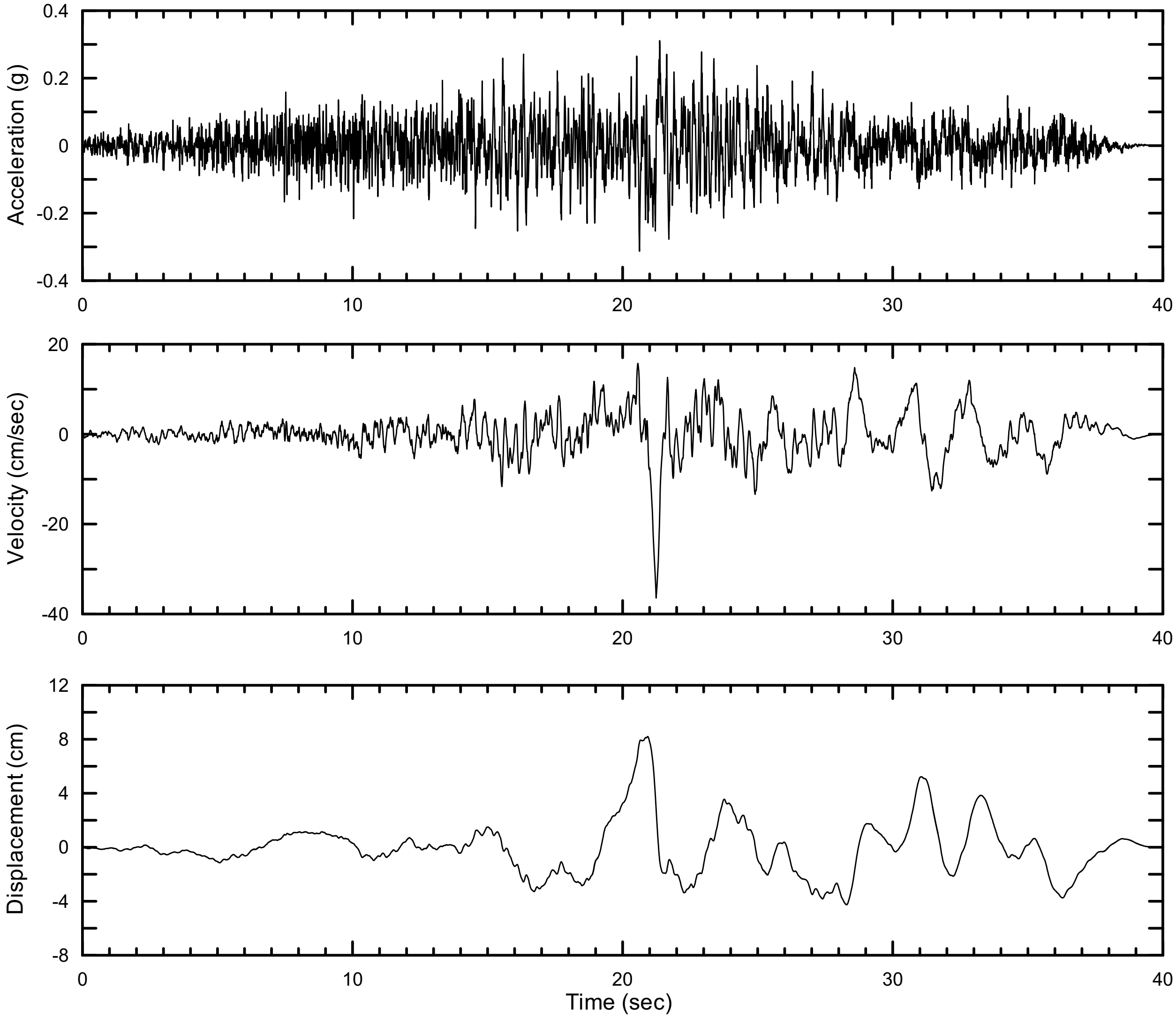
Source: Appendix D, Table D-1

Figure 6.5.2-104. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Vertical, Set 1



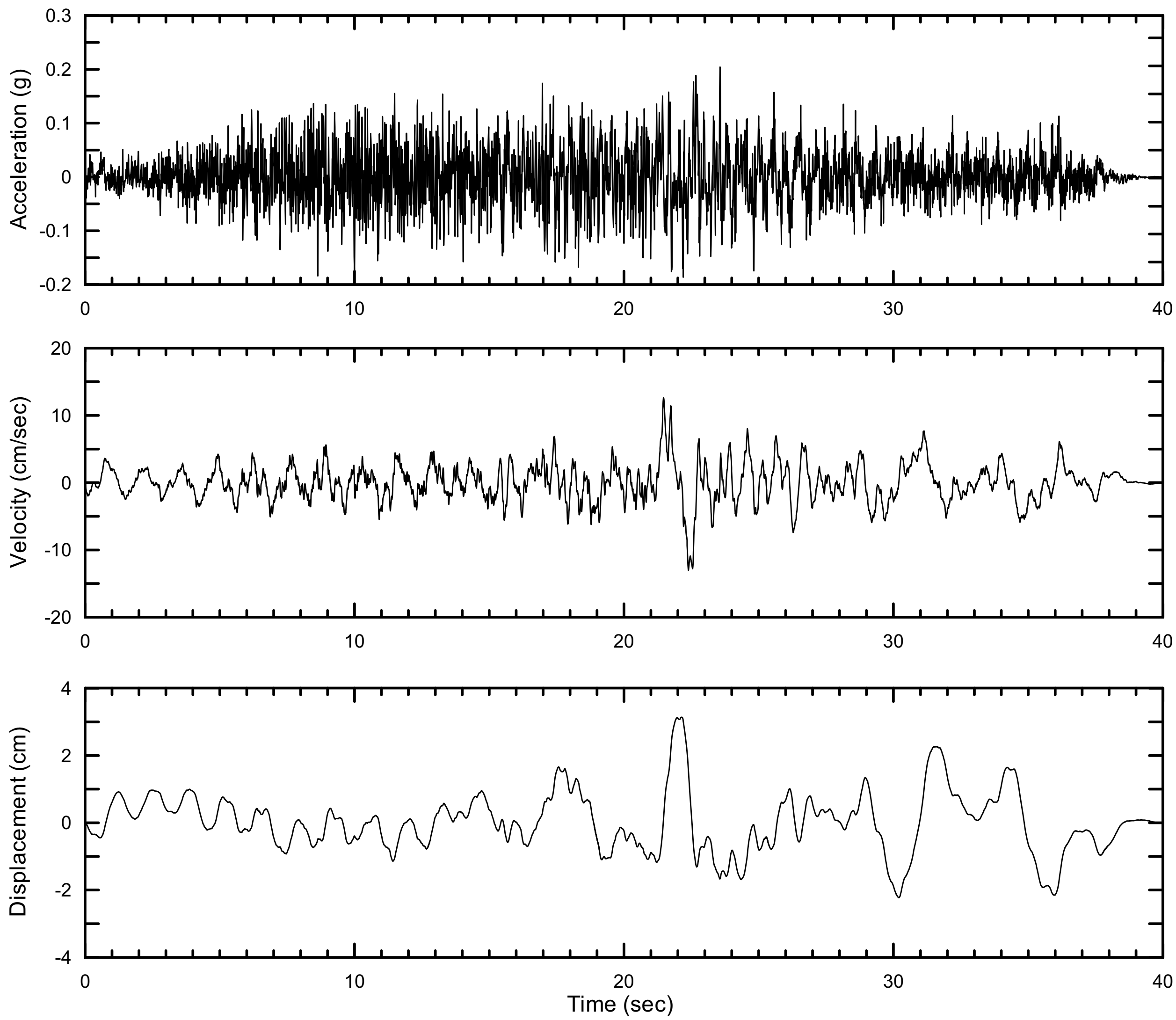
Source: Appendix D, Table D-1

Figure 6.5.2-107. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 1, Set 2



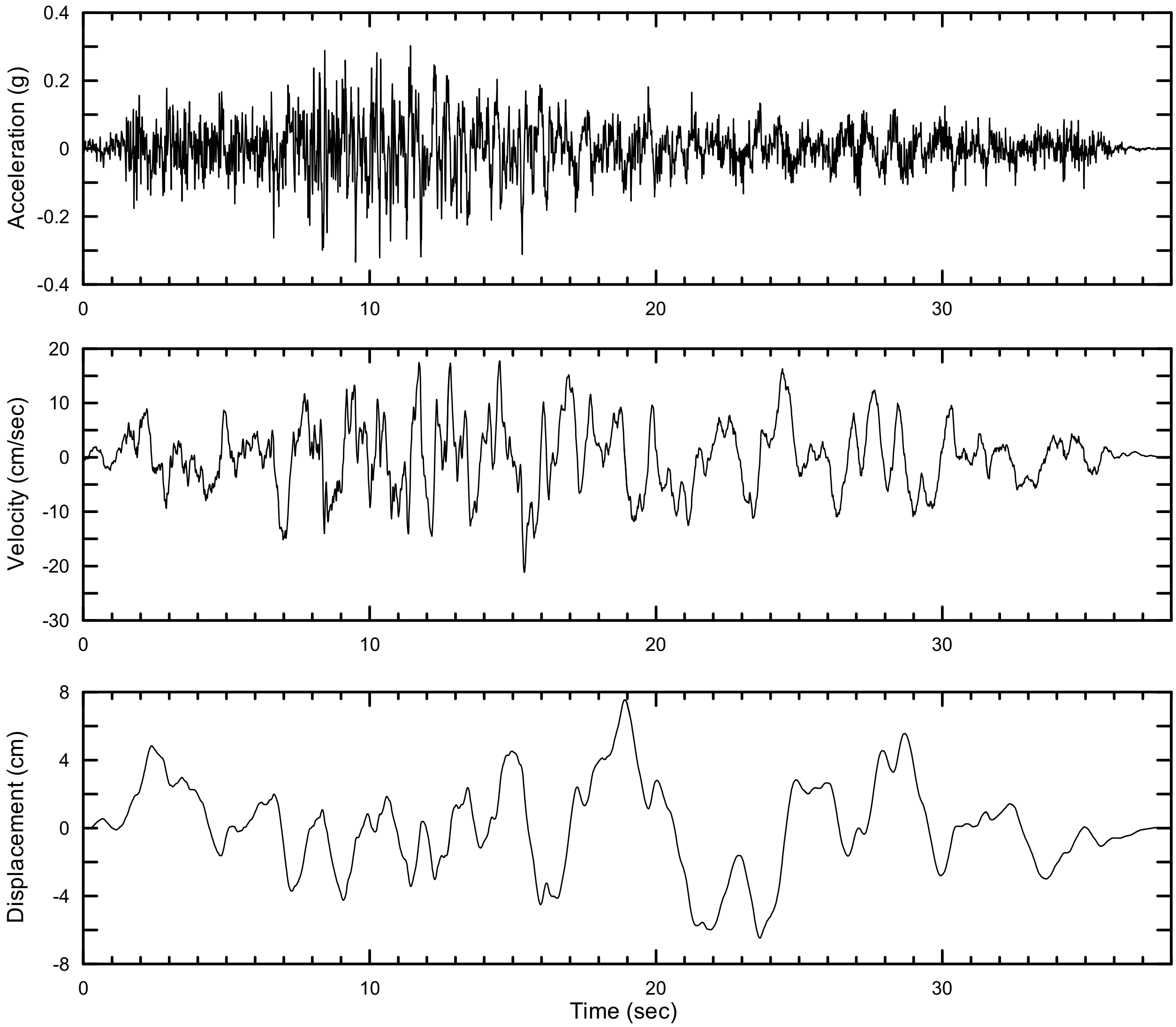
Source: Appendix D, Table D-1

Figure 6.5.2-110. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 2, Set 2



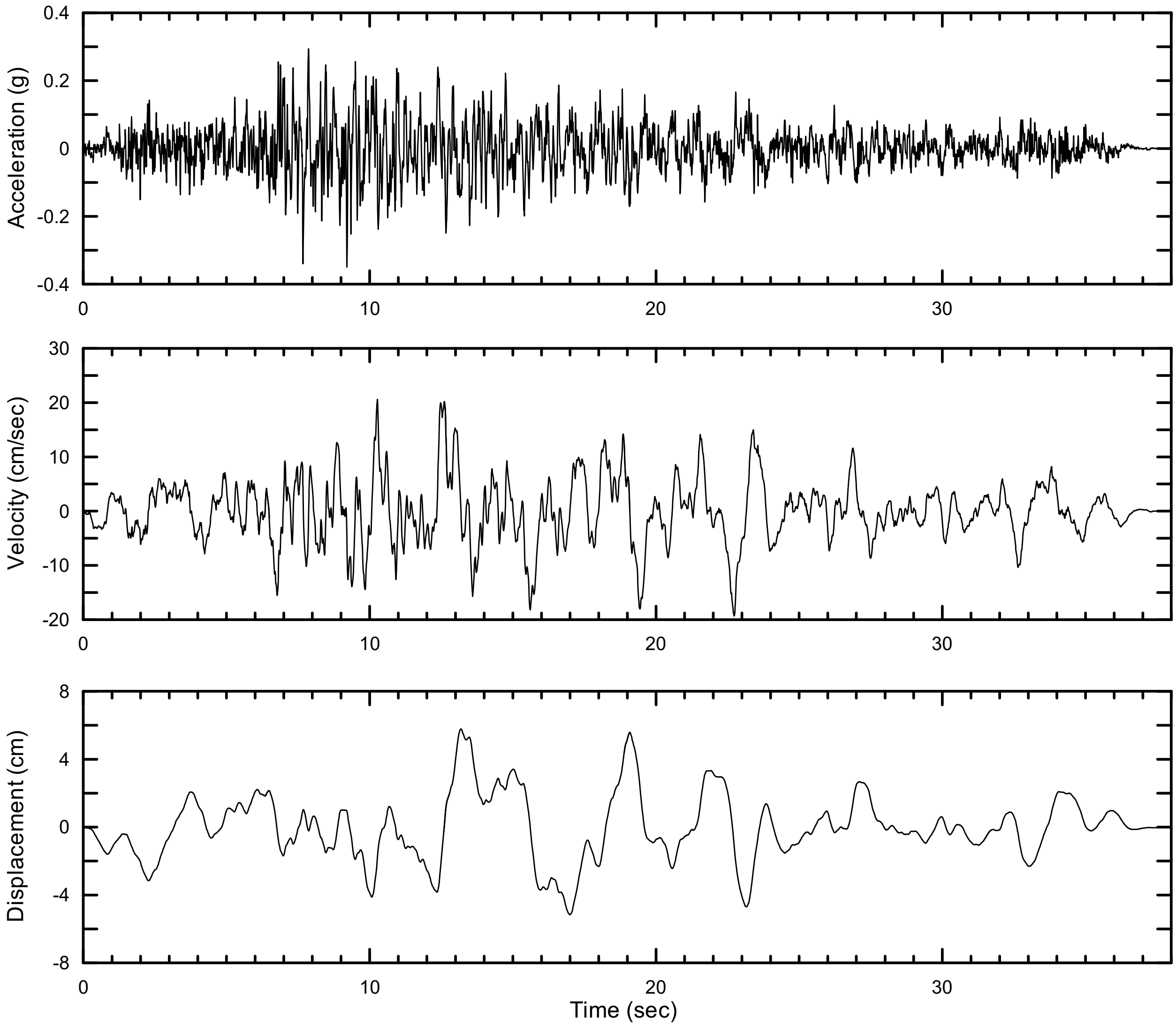
Source: Appendix D, Table D-1

Figure 6.5.2-113. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Vertical, Set 2



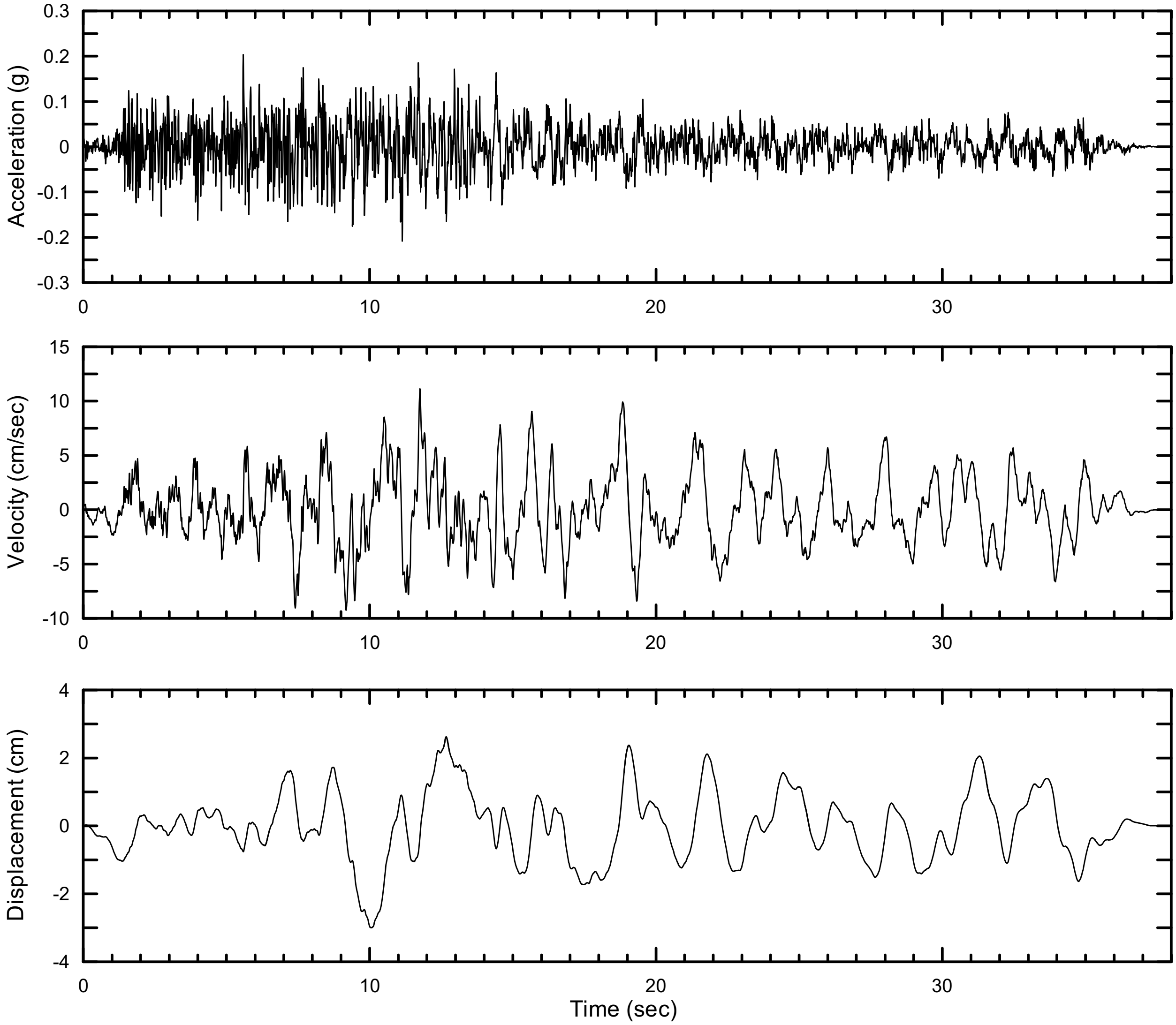
Source: Appendix D, Table D-1

Figure 6.5.2-116. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 1, Set 3



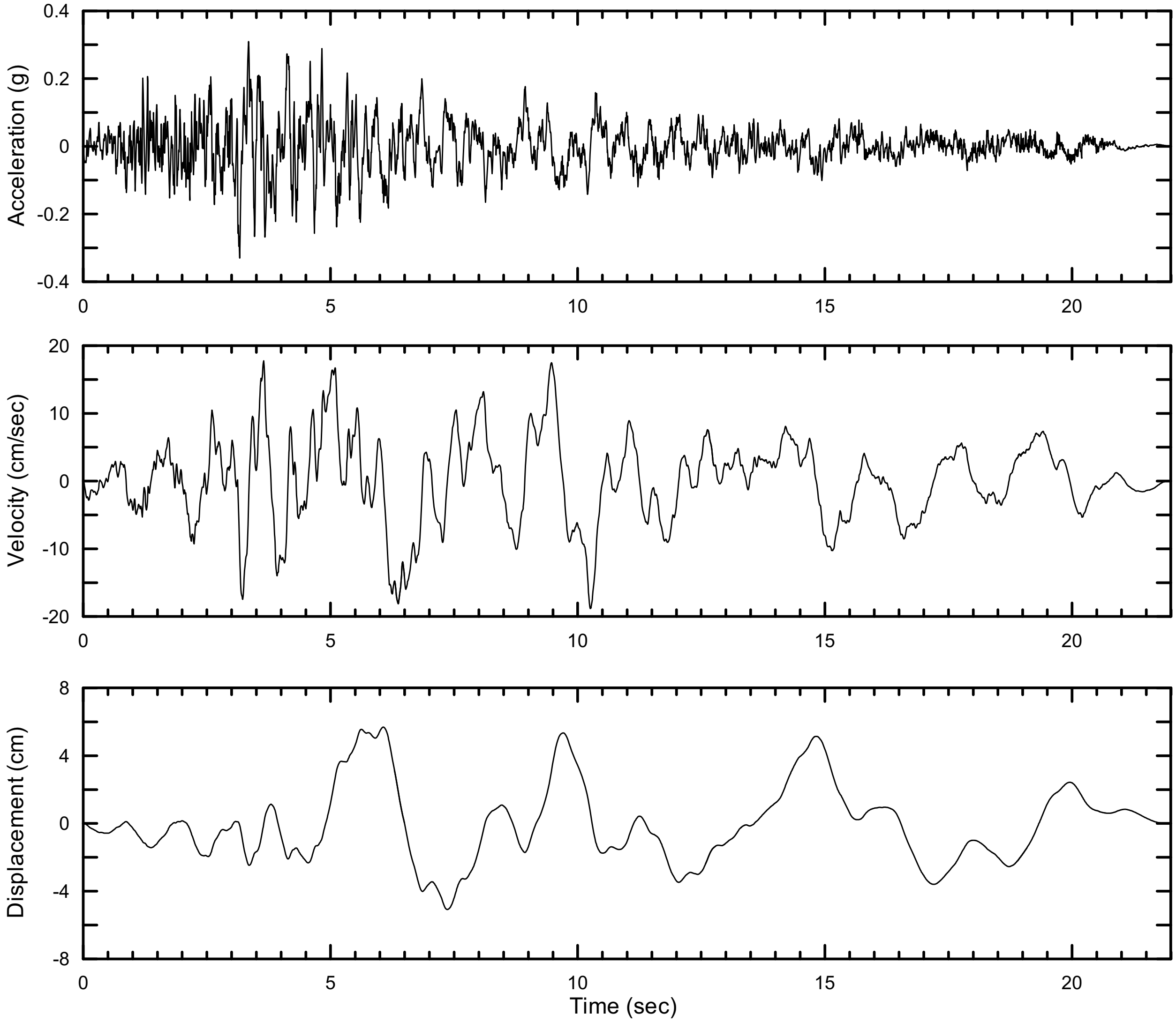
Source: Appendix D, Table D-1

Figure 6.5.2-119. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 2, Set 3



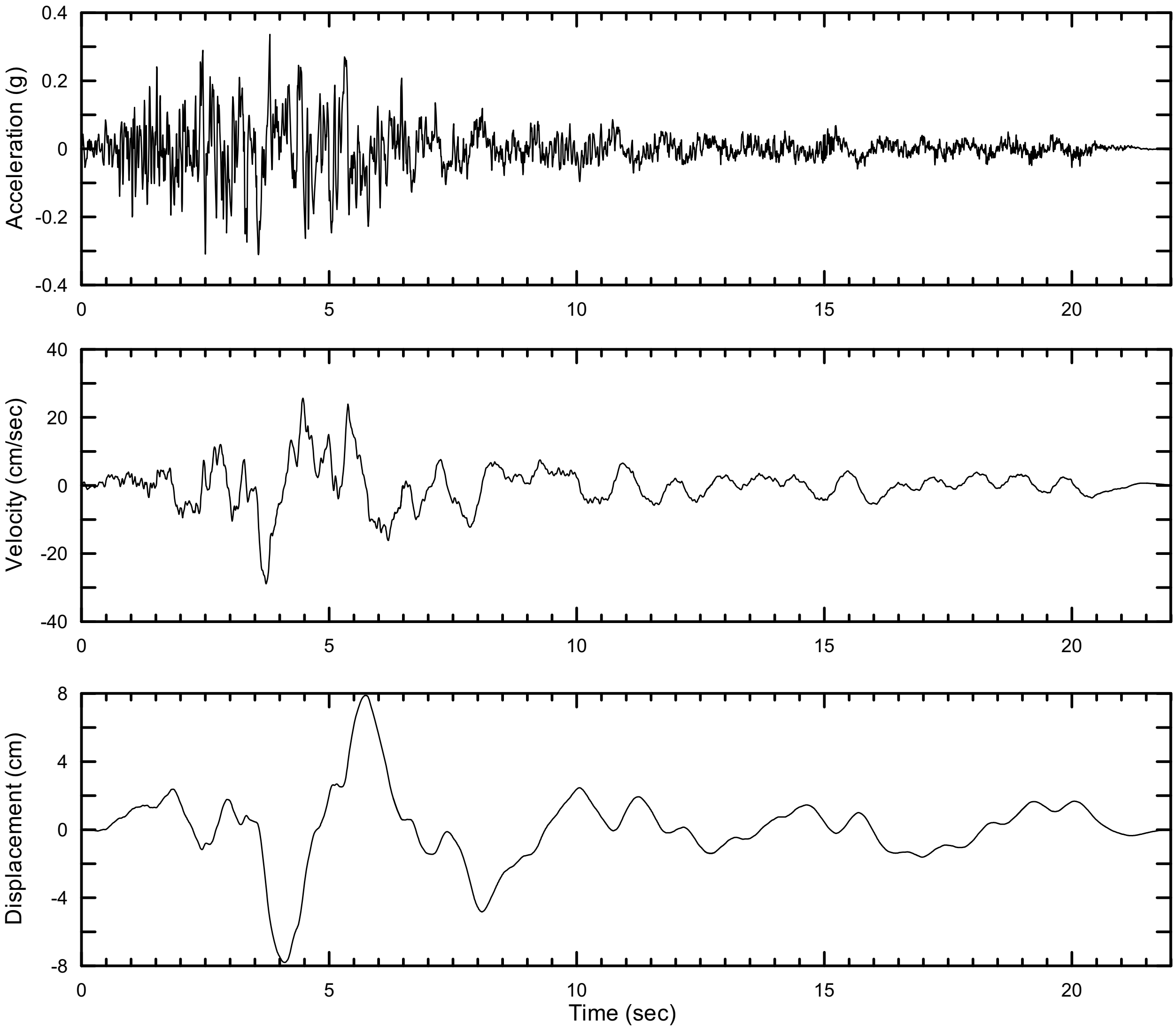
Source: Appendix D, Table D-1

Figure 6.5.2-122. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Vertical, Set 3



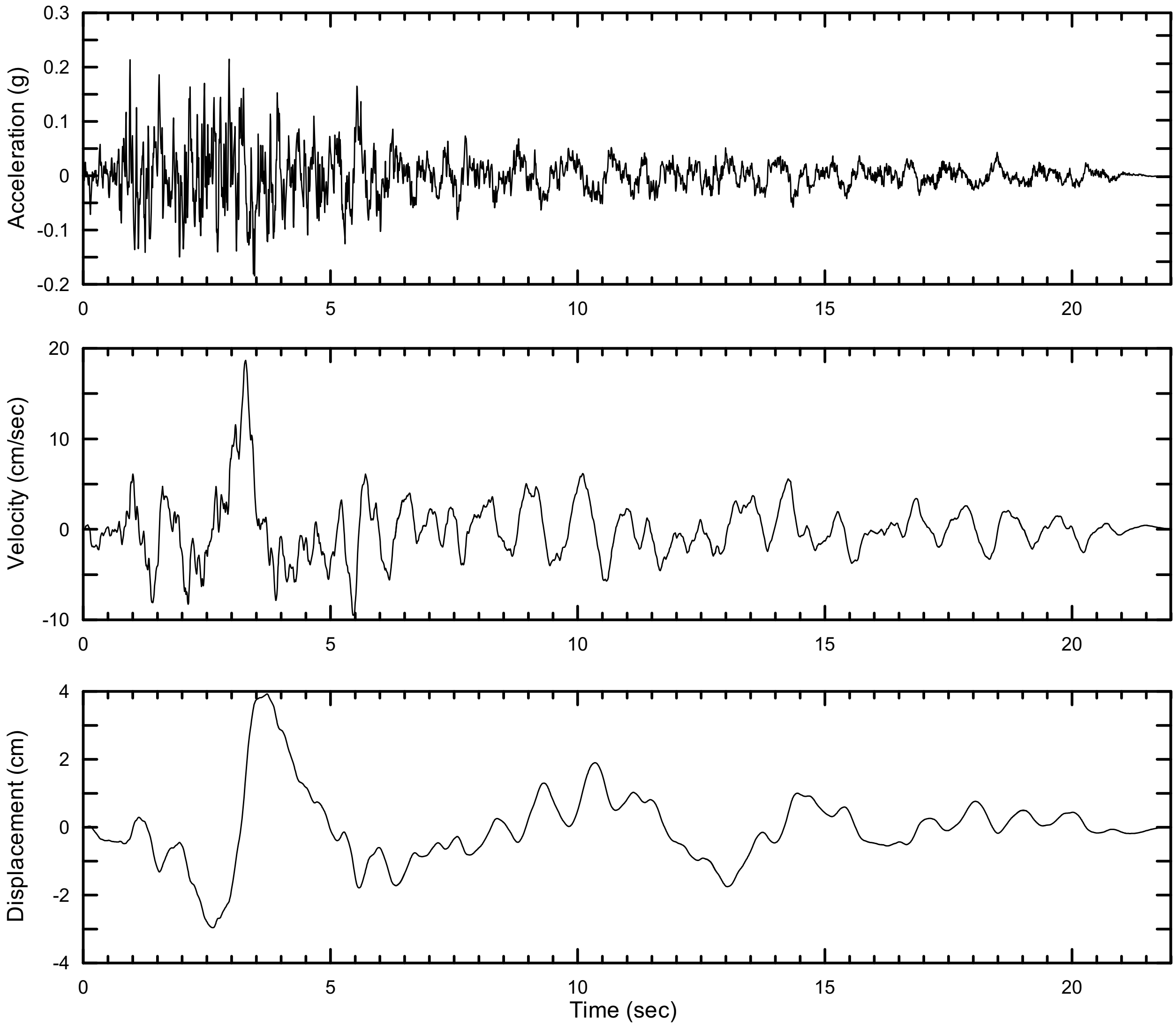
Source: Appendix D, Table D-1

Figure 6.5.2-125. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 1, Set 4



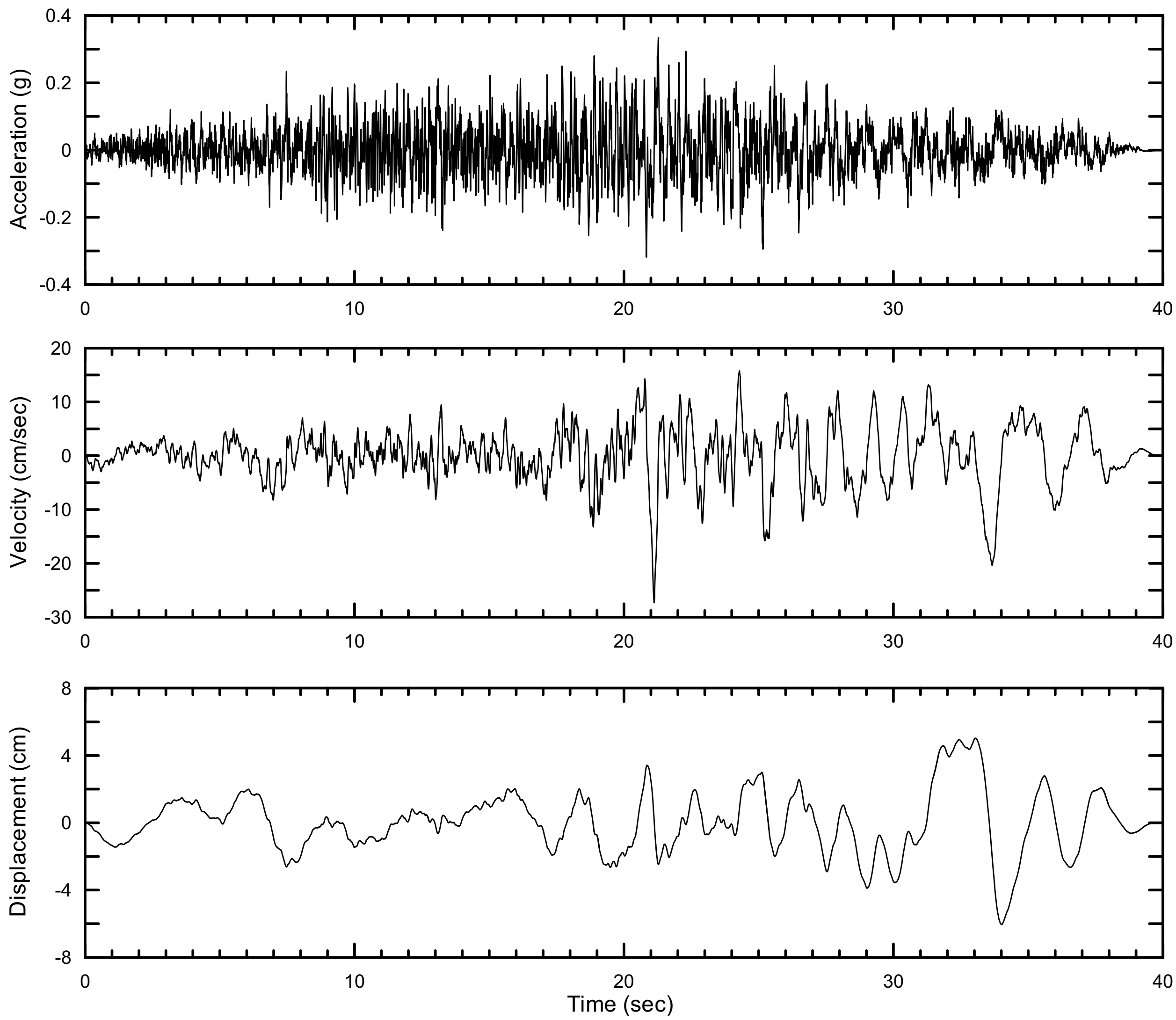
Source: Appendix D, Table D-1

Figure 6.5.2-128. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 2, Set 4



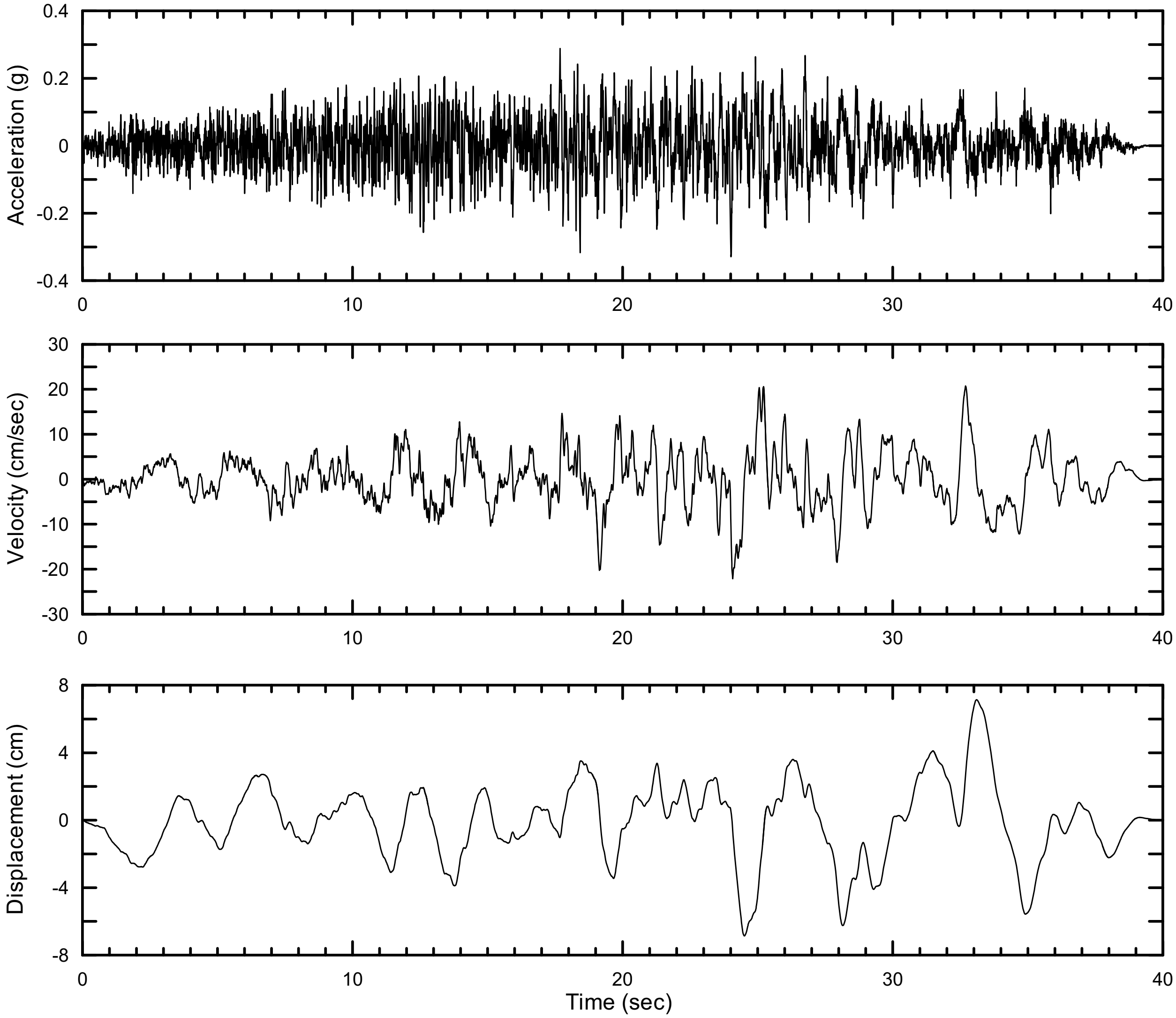
Source: Appendix D, Table D-1

Figure 6.5.2-131. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Vertical, Set 4



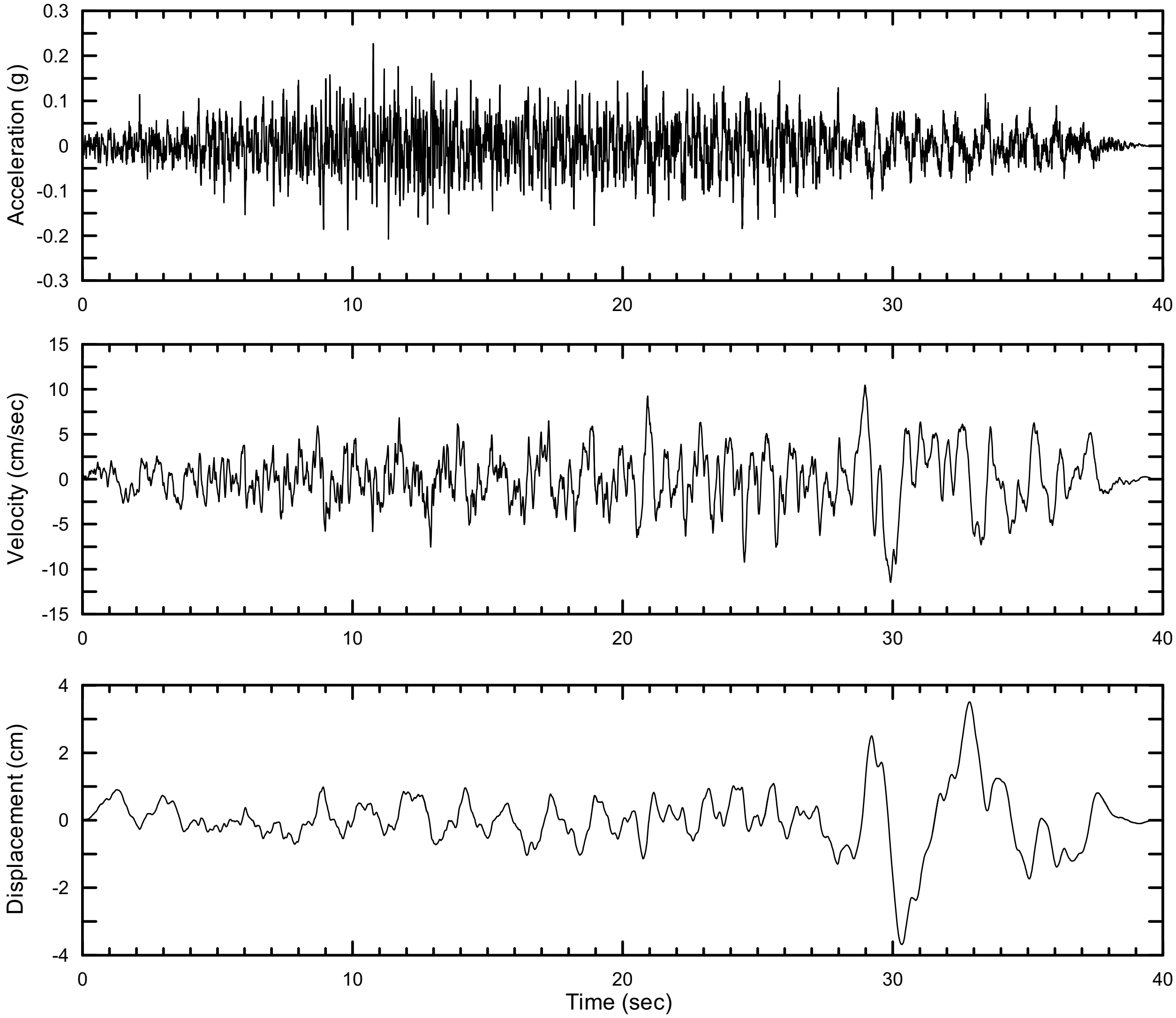
Source: Appendix D, Table D-1

Figure 6.5.2-134. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 1, Set 5



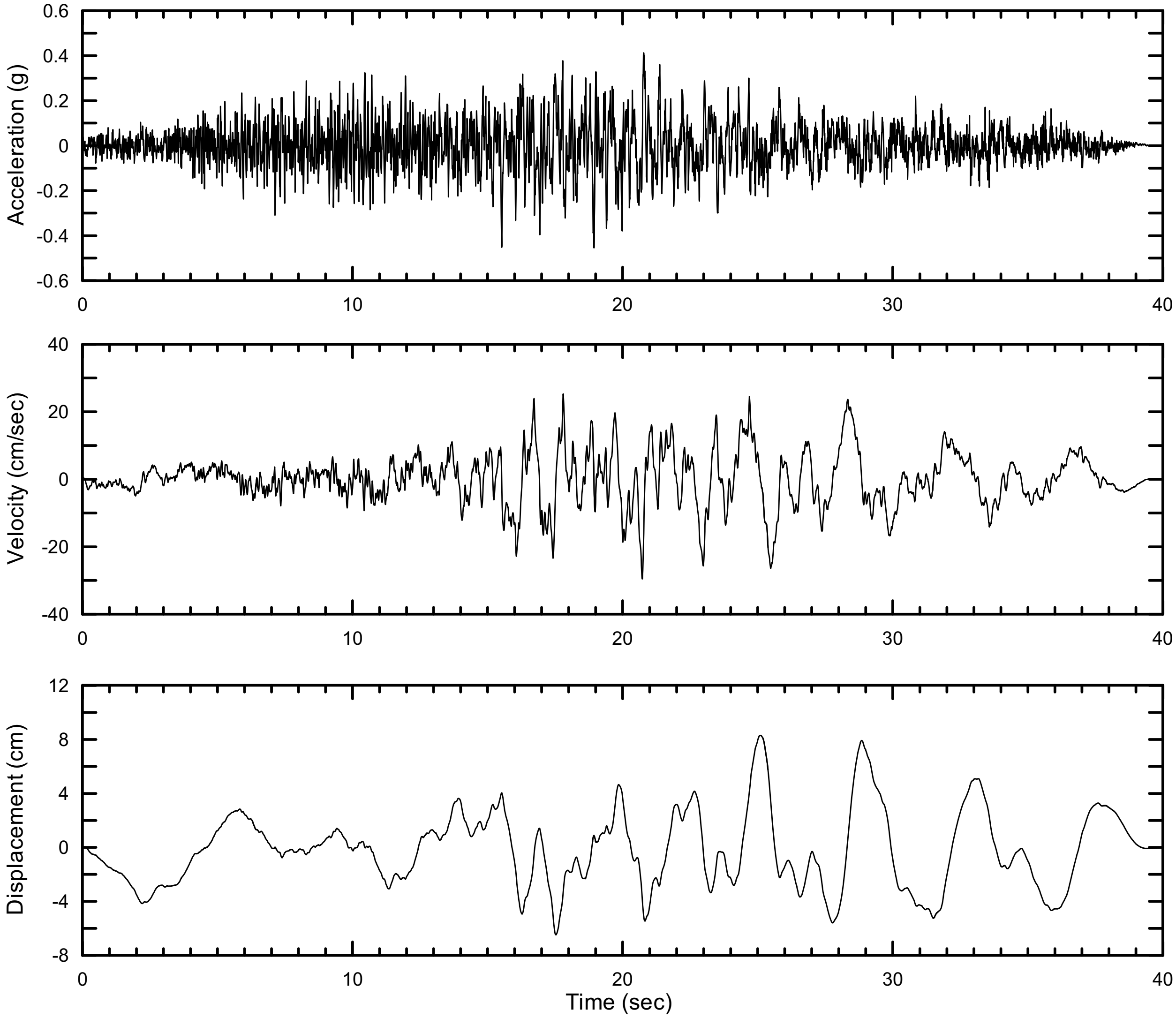
Source: Appendix D, Table D-1

Figure 6.5.2-137. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Horizontal 2, Set 5



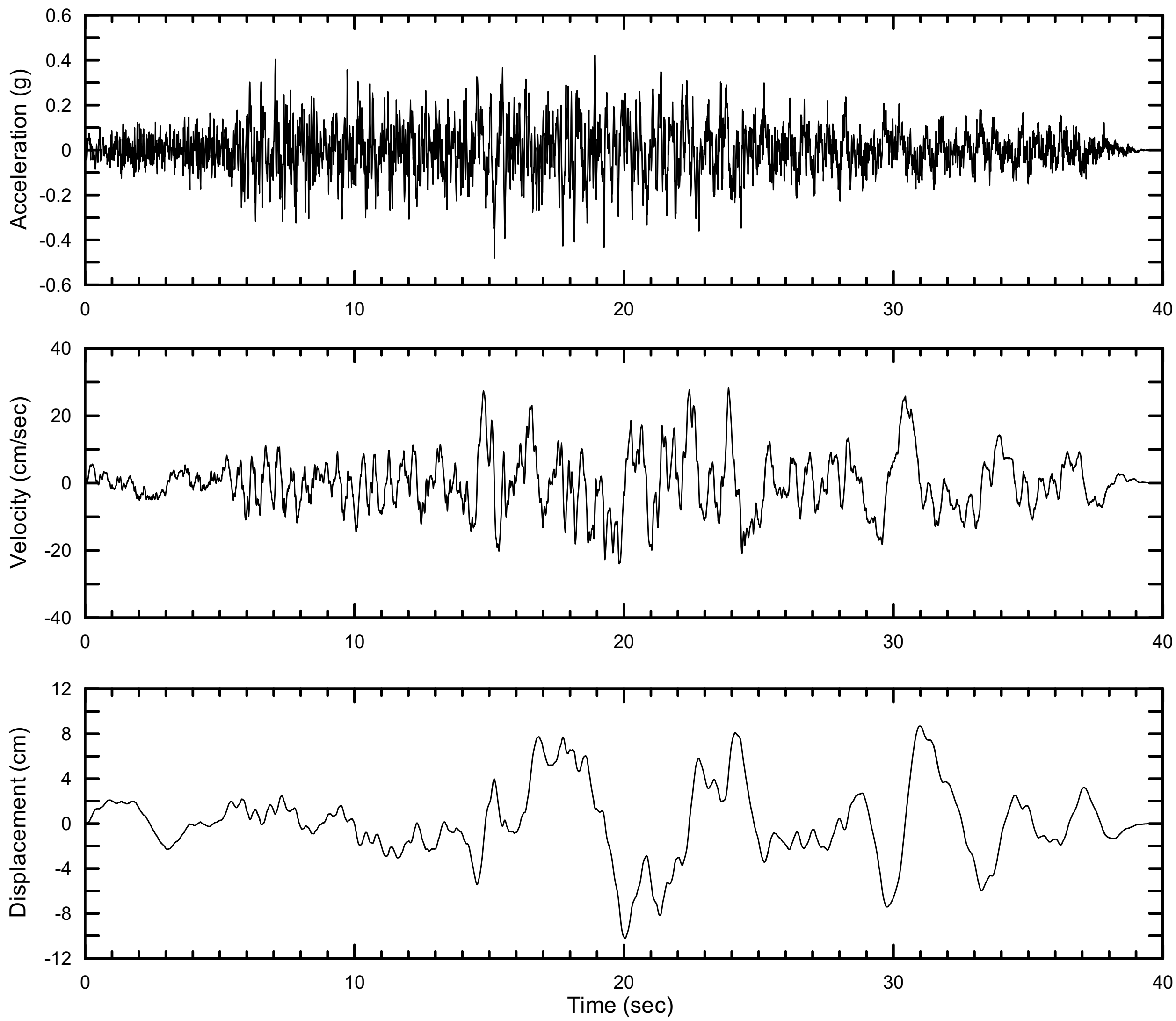
Source: Appendix D, Table D-1

Figure 6.5.2-140. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-3} AFE, Vertical, Set 5



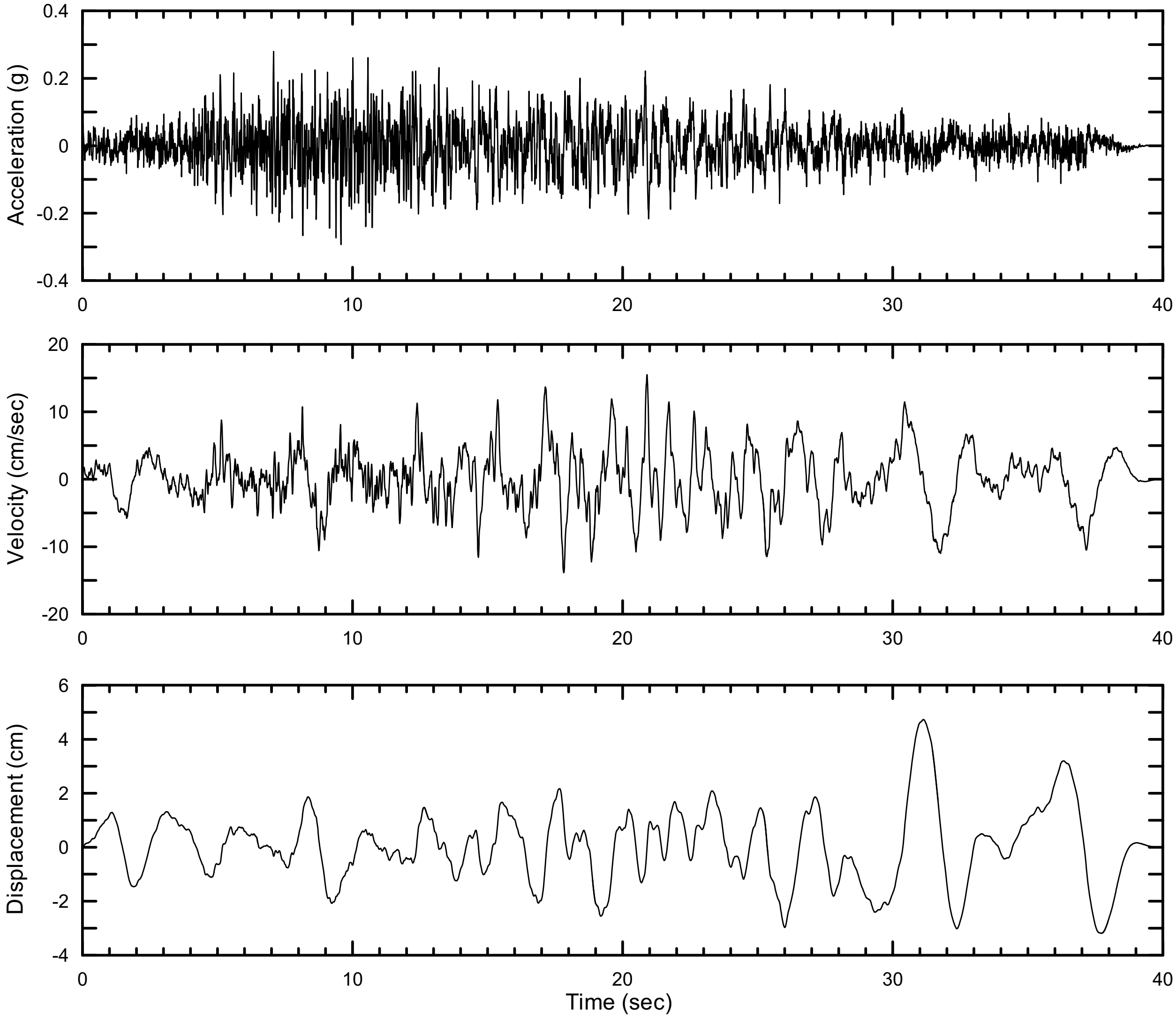
Source: Appendix D, Table D-1

Figure 6.5.2-143. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 5×10^{-4} AFE, Horizontal 1, Set 1



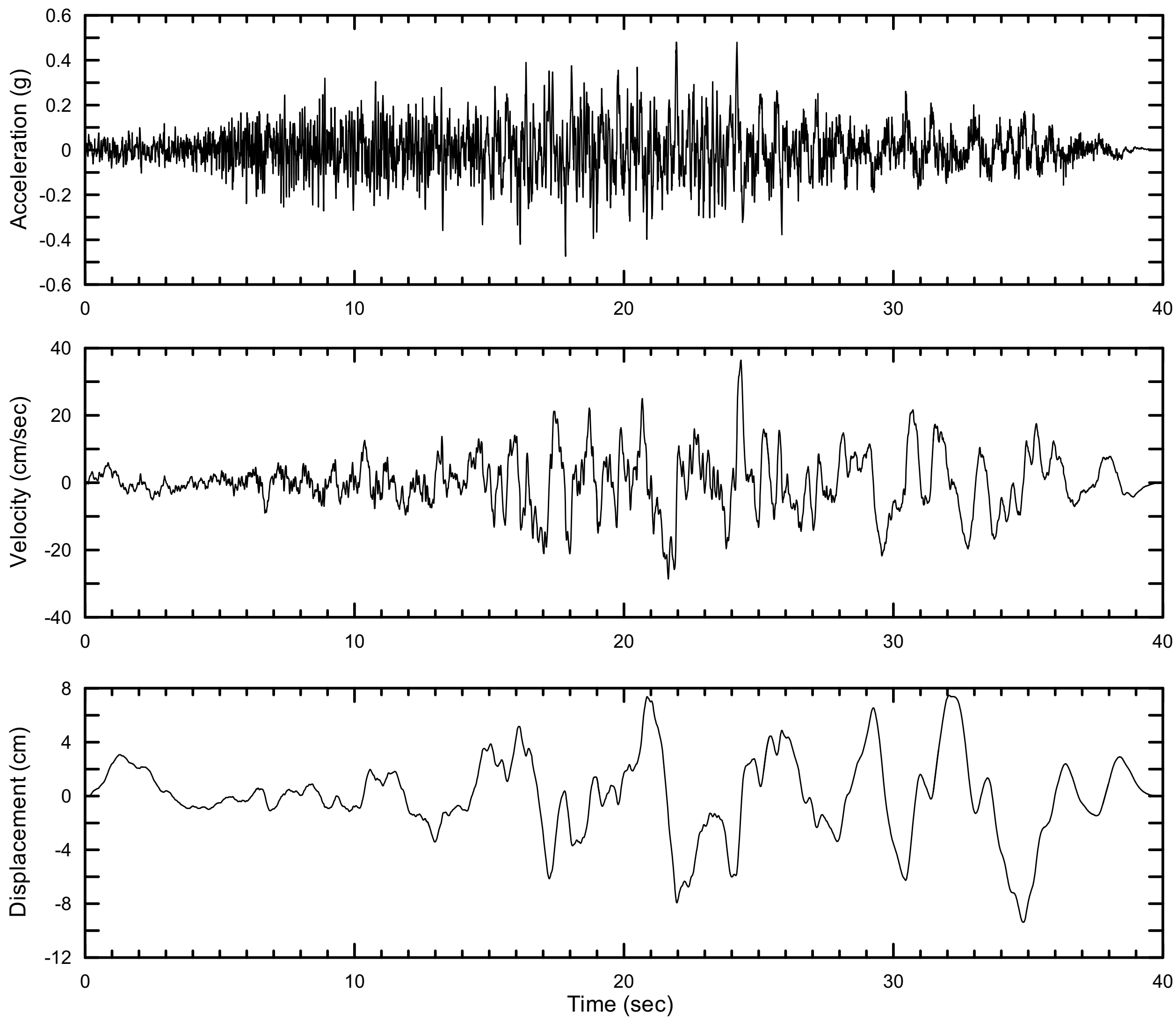
Source: Appendix D, Table D-1

Figure 6.5.2-146. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Horizontal 2, Set 1



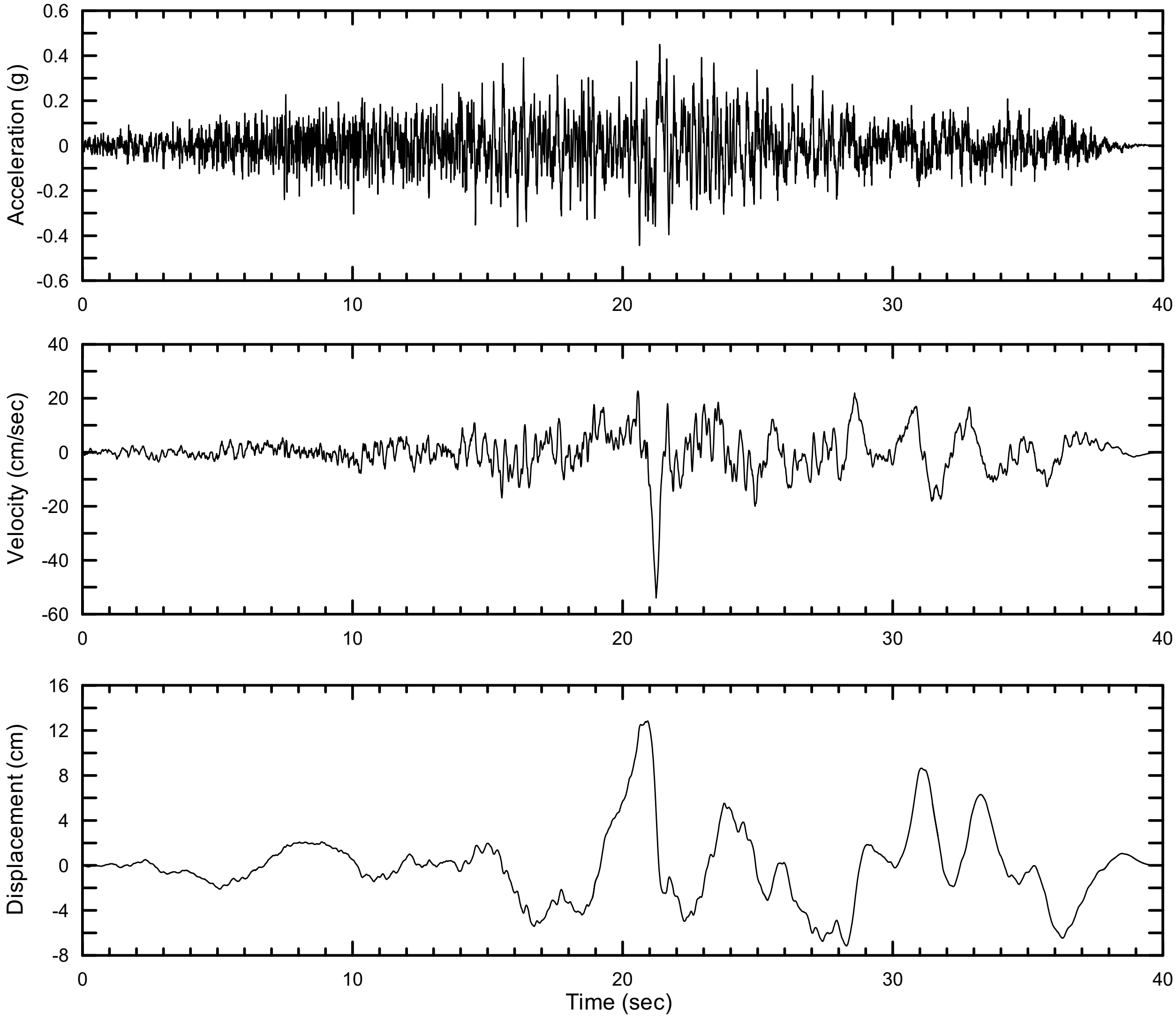
Source: Appendix D, Table D-1

Figure 6.5.2-149. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Vertical, Set 1



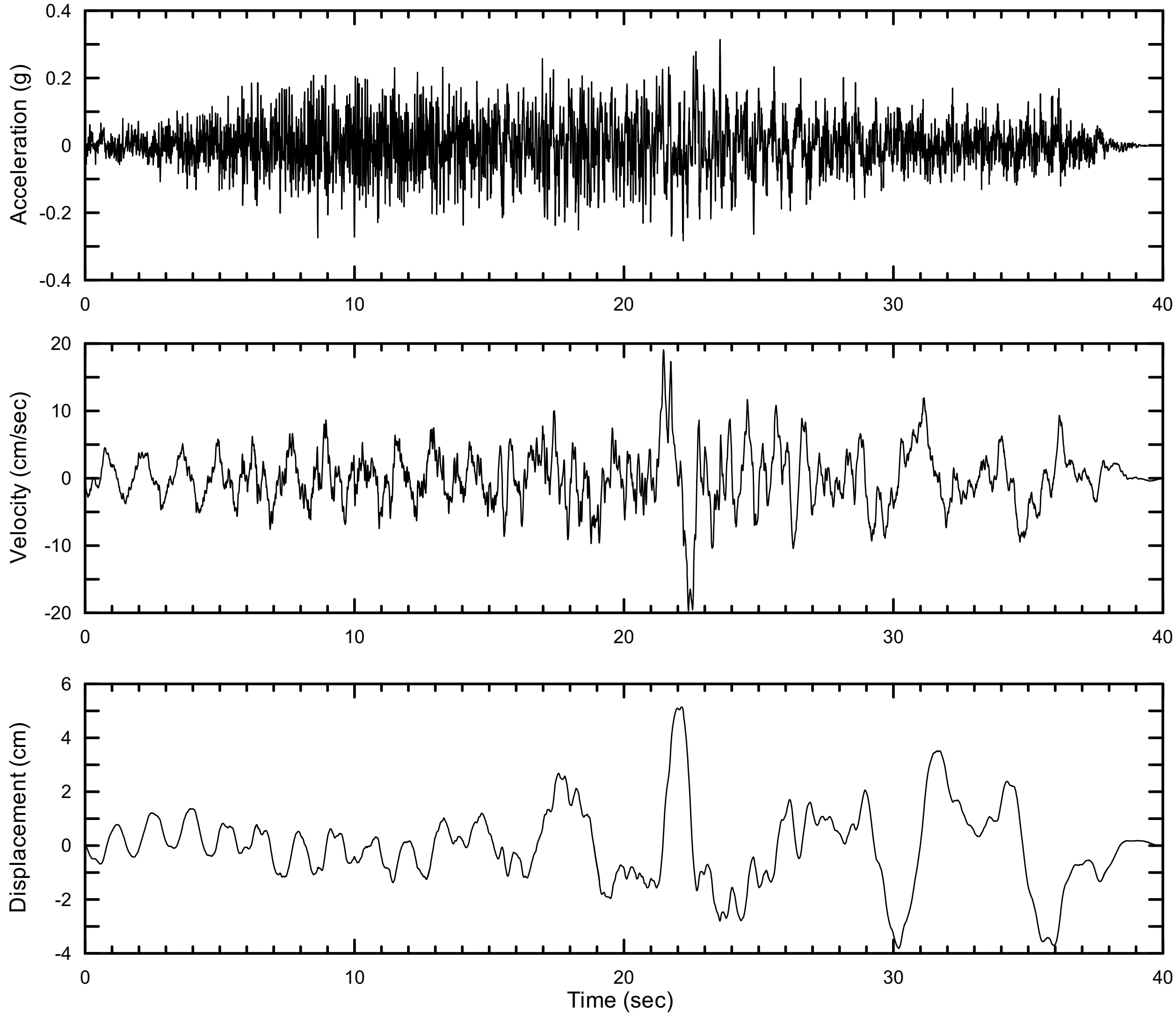
Source: Appendix D, Table D-1

Figure 6.5.2-152. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Horizontal 1, Set 2



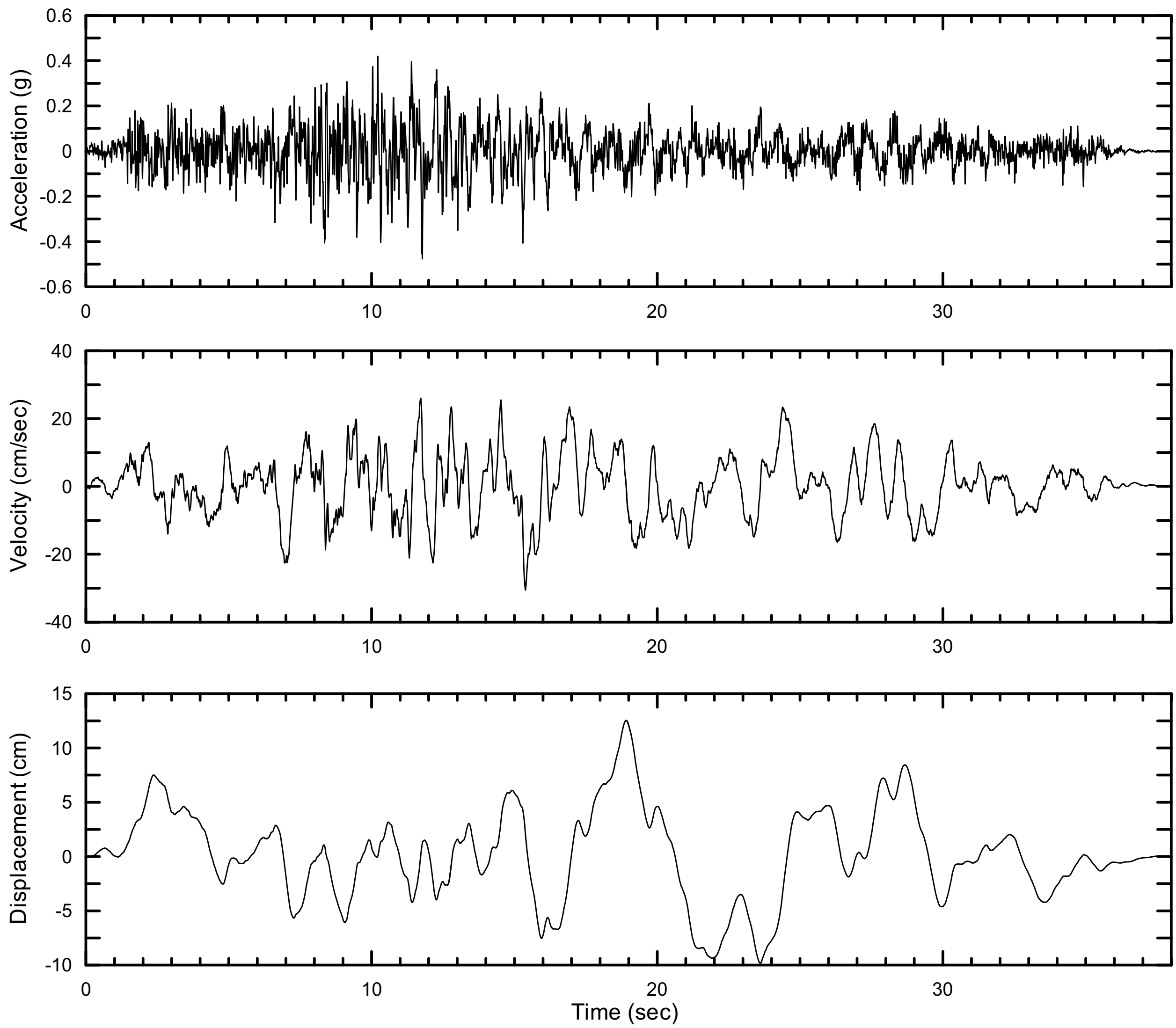
Source: Appendix D, Table D-1

Figure 6.5.2-155. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Horizontal 2, Set 2



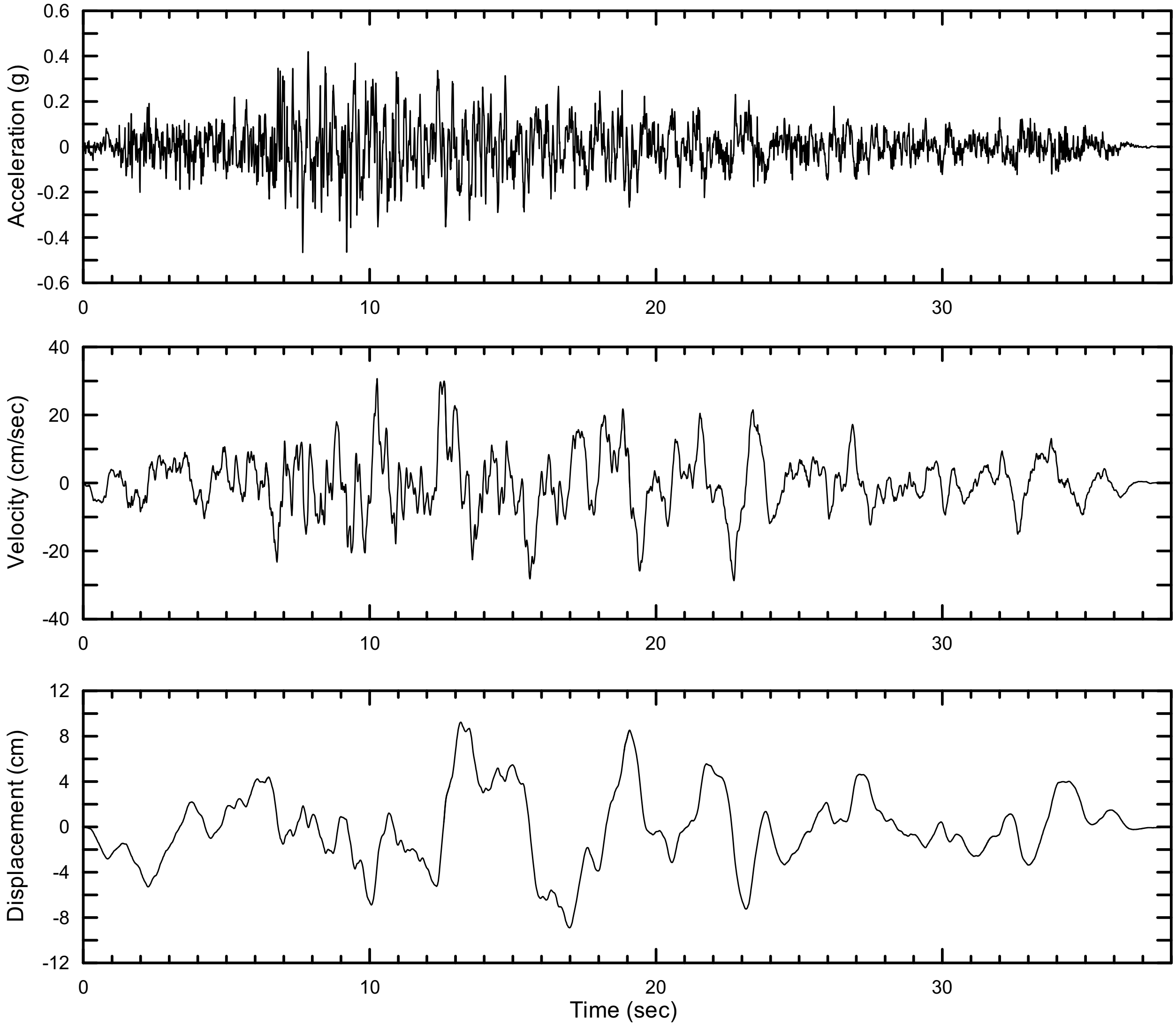
Source: Appendix D, Table D-1

Figure 6.5.2-158. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Vertical, Set 2



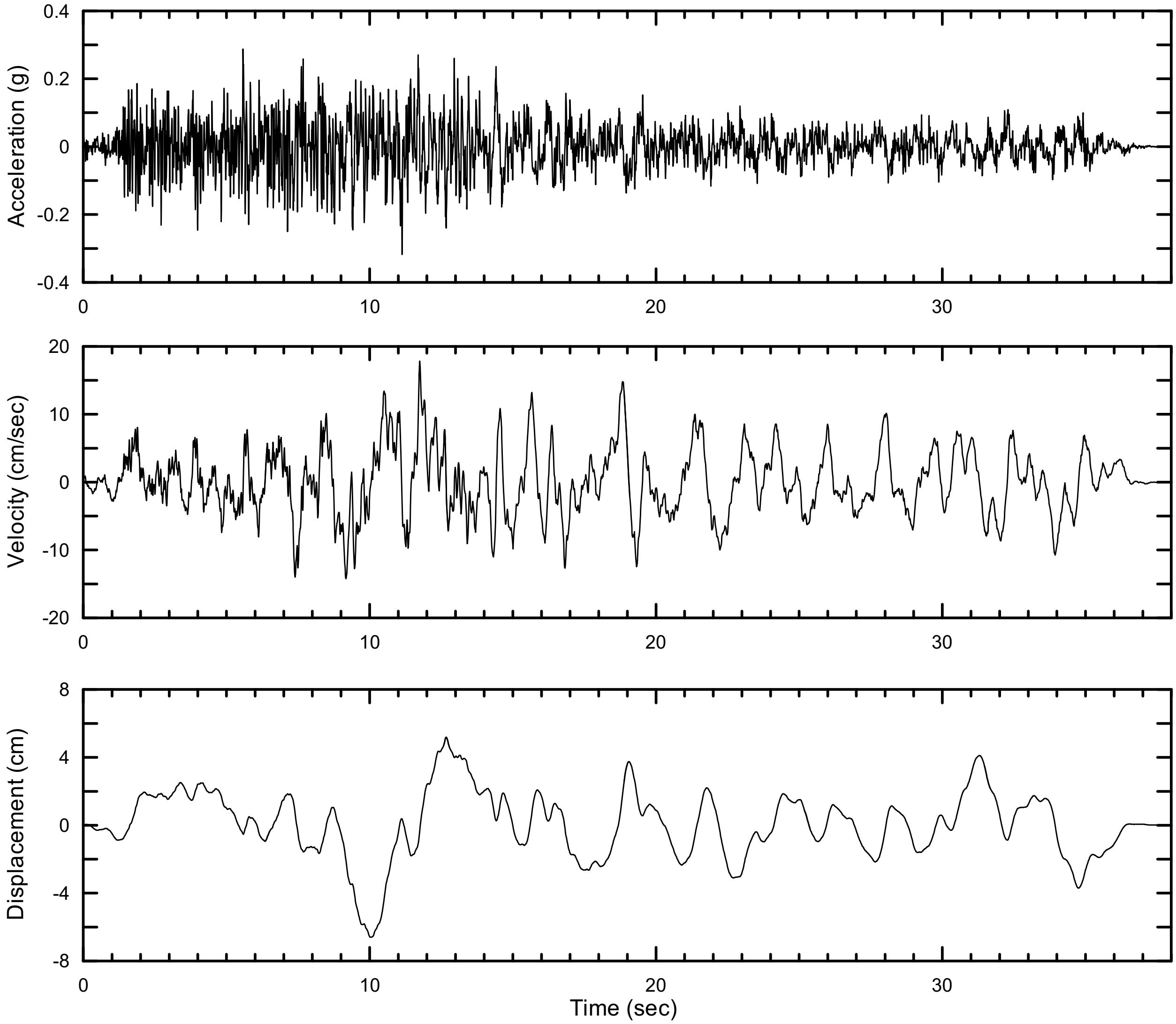
Source: Appendix D, Table D-1

Figure 6.5.2-161. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Horizontal 1, Set 3



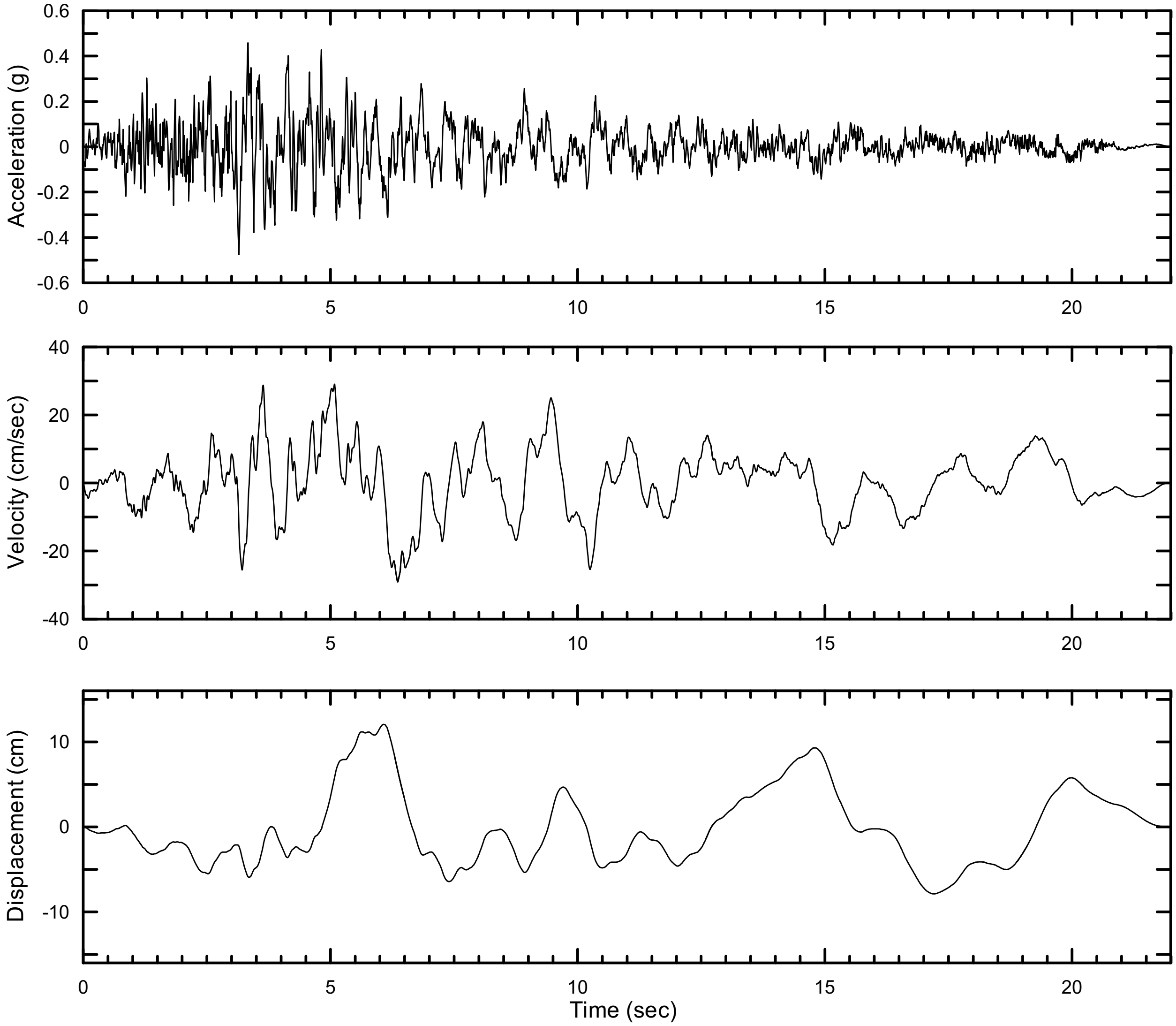
Source: Appendix D, Table D-1

Figure 6.5.2-164. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Horizontal 2, Set 3



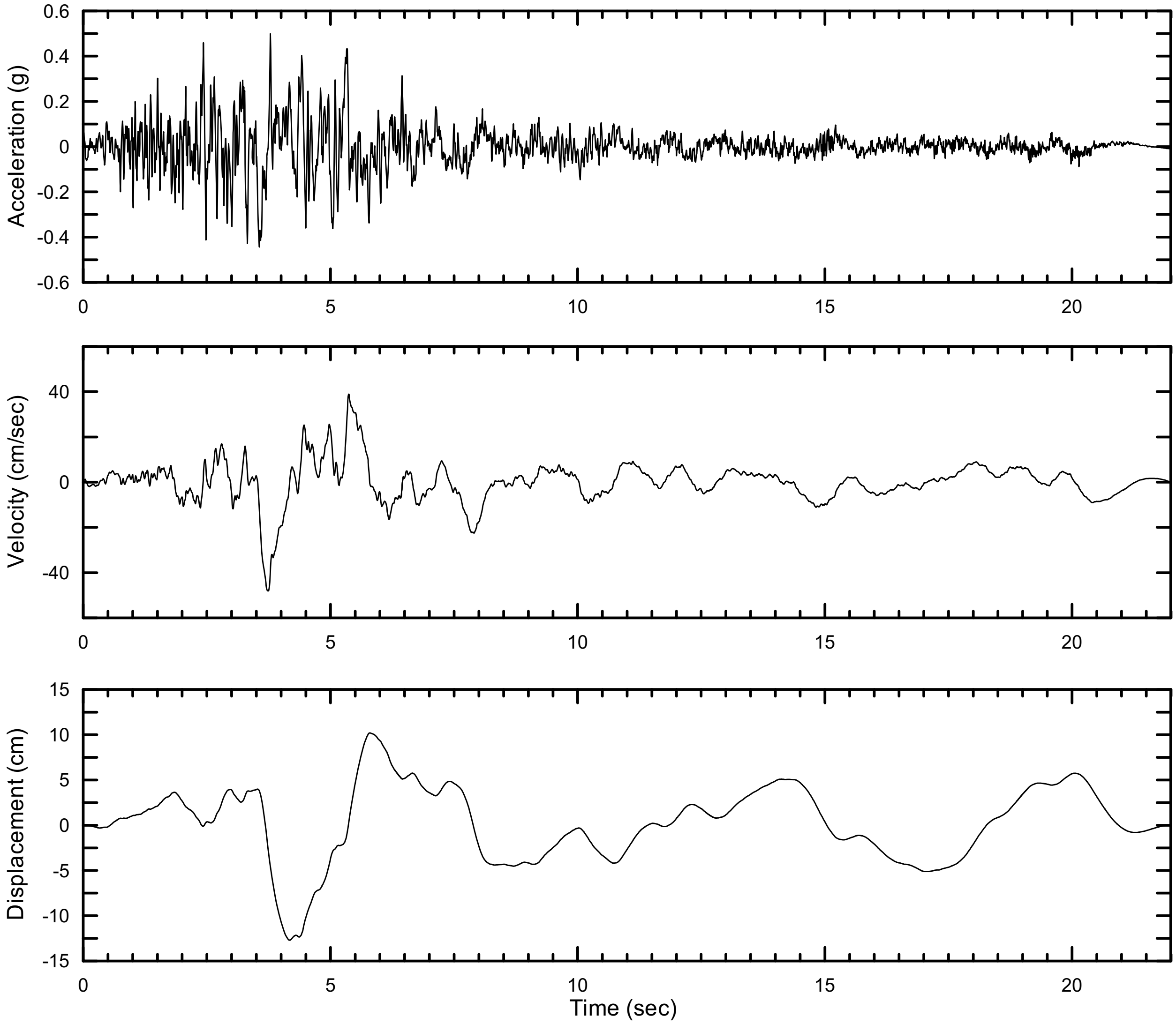
Source: Appendix D, Table D-1

Figure 6.5.2-167. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Vertical, Set 3



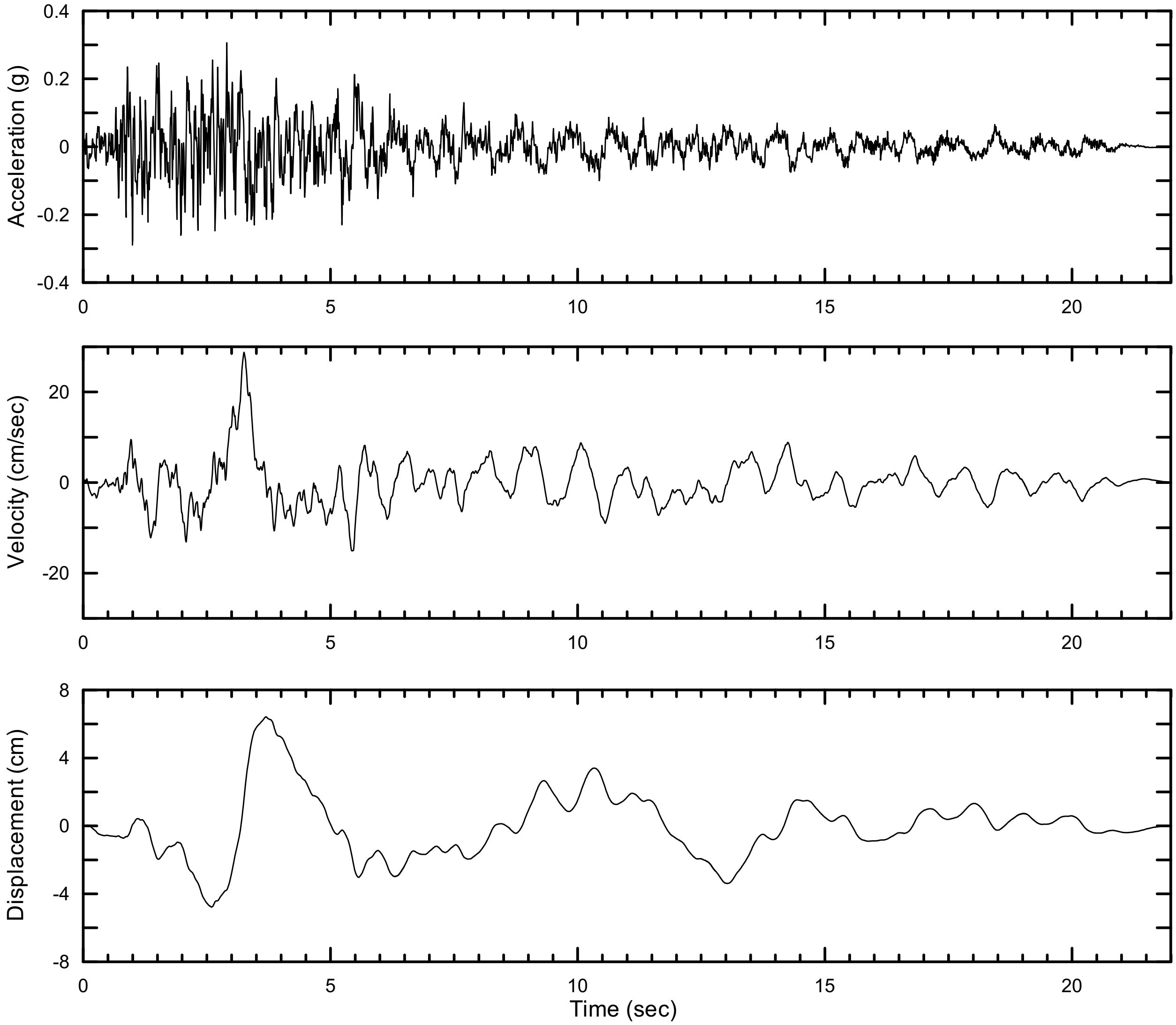
Source: Appendix D, Table D-1

Figure 6.5.2-170. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 5×10^{-4} AFE, Horizontal 1, Set 4



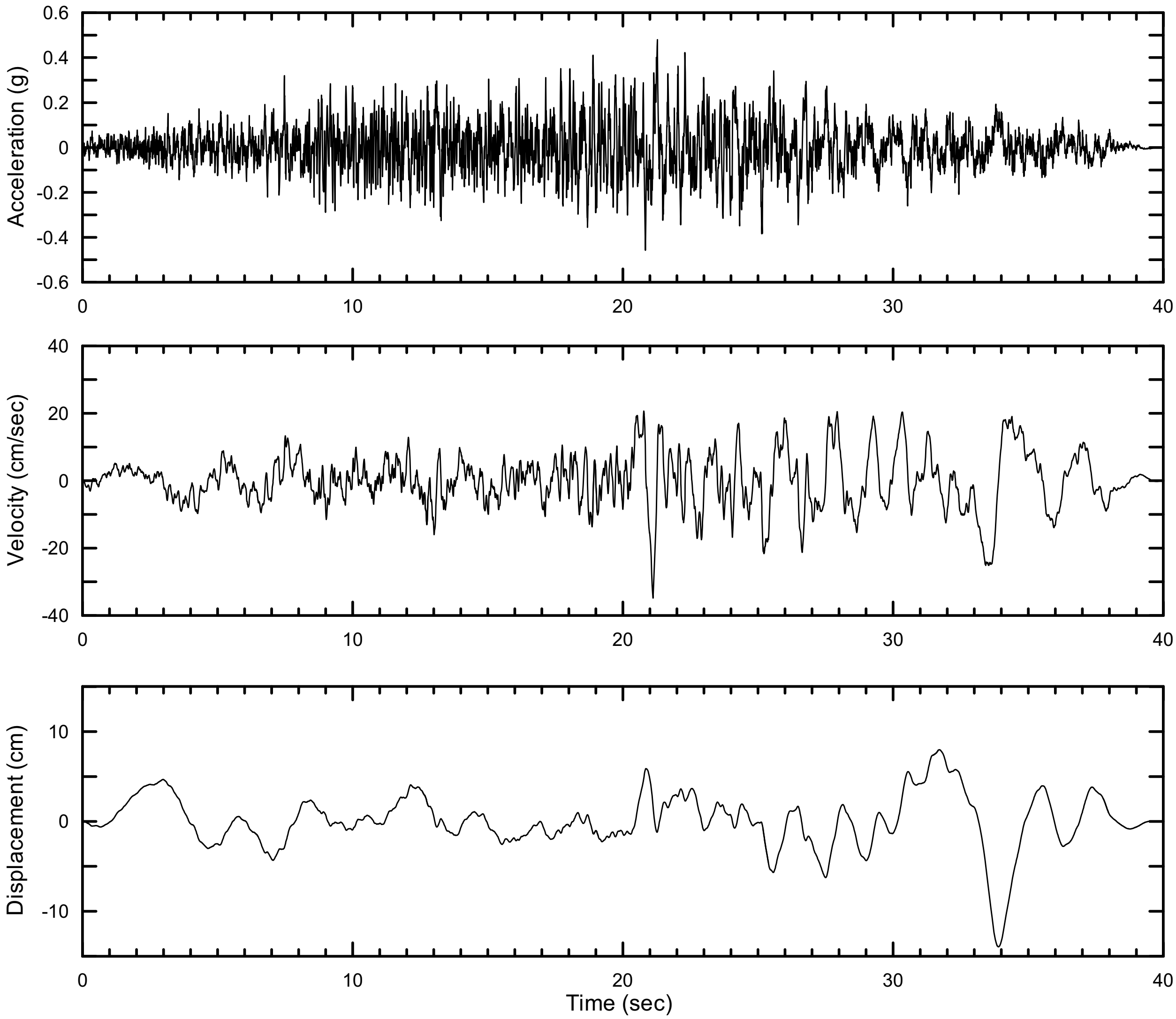
Source: Appendix D, Table D-1

Figure 6.5.2-173. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Horizontal 2, Set 4



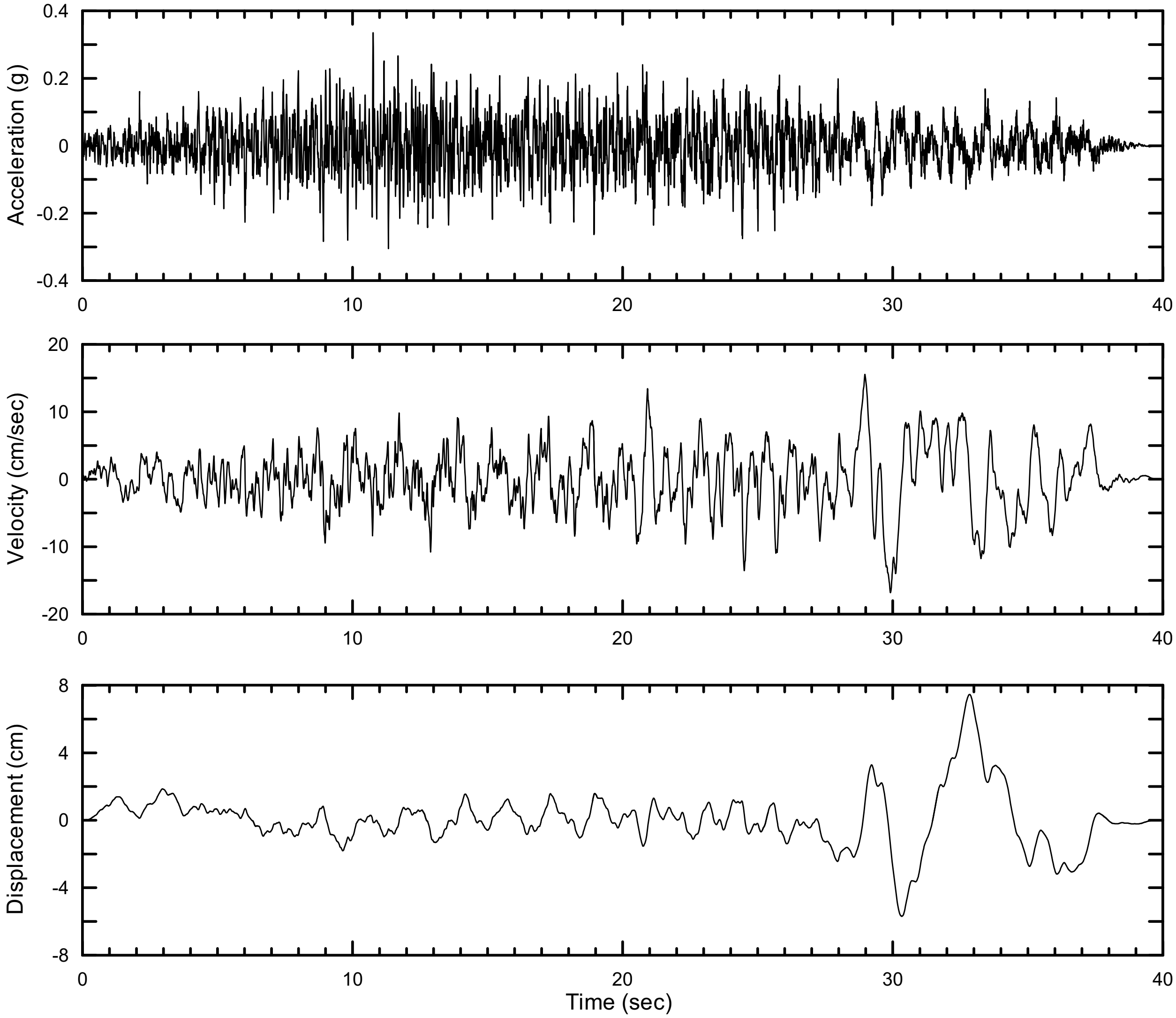
Source: Appendix D, Table D-1

Figure 6.5.2-176. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Vertical, Set 4



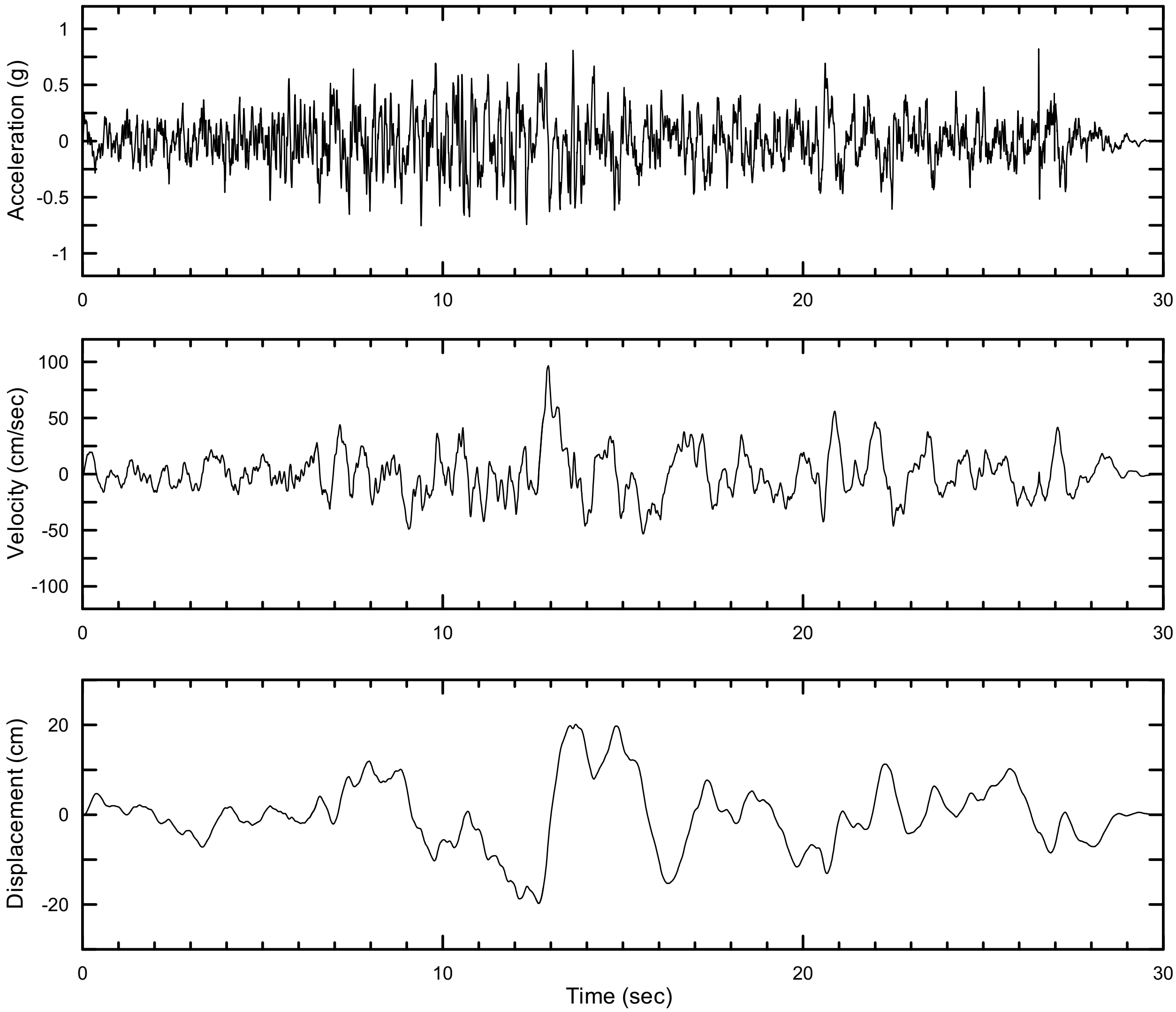
Source: Appendix D, Table D-1

Figure 6.5.2-179. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 5×10^{-4} AFE, Horizontal 1, Set 5



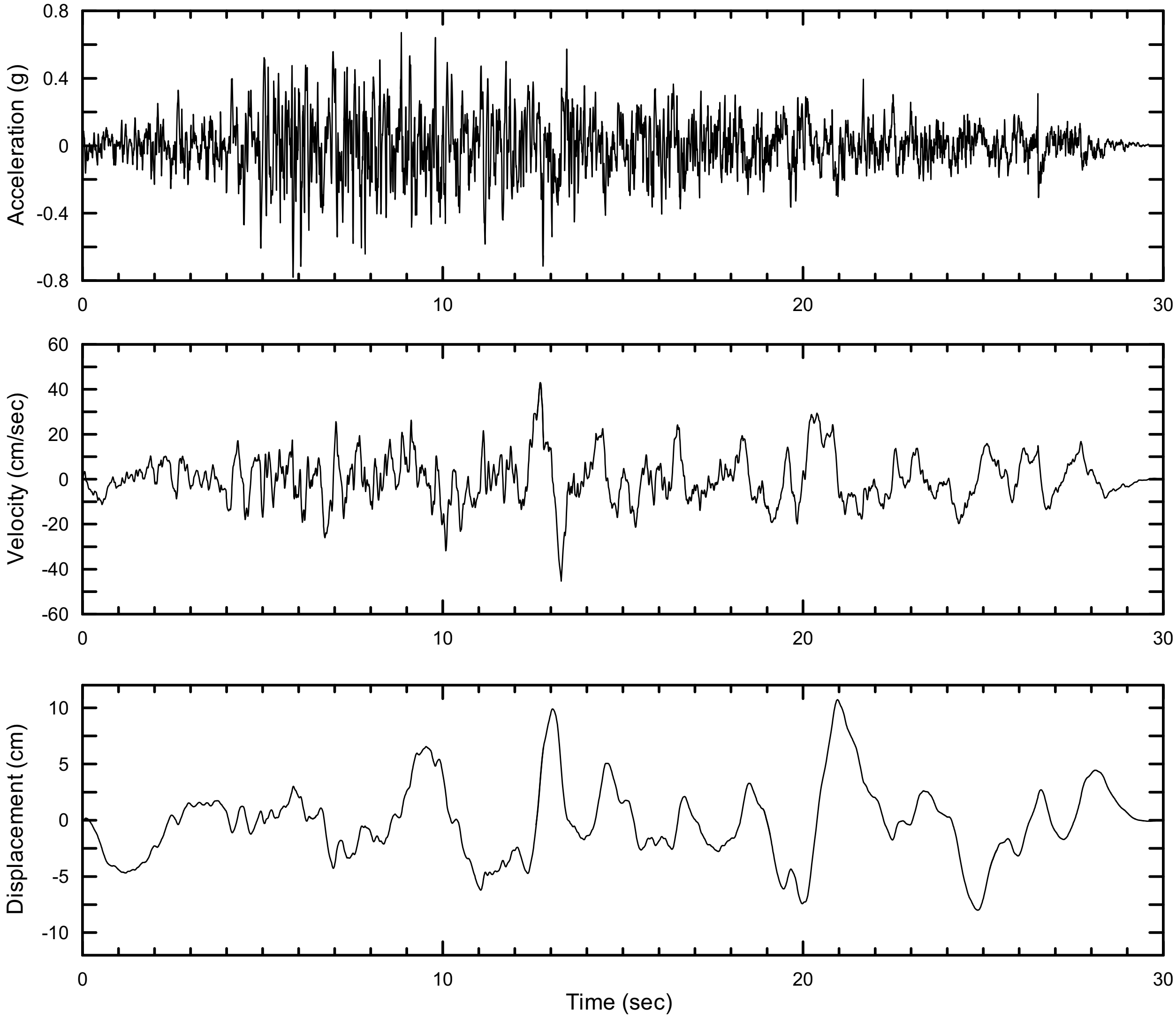
Source: Appendix D, Table D-1

Figure 6.5.2-185. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, $5x10^{-4}$ AFE, Vertical, Set 5



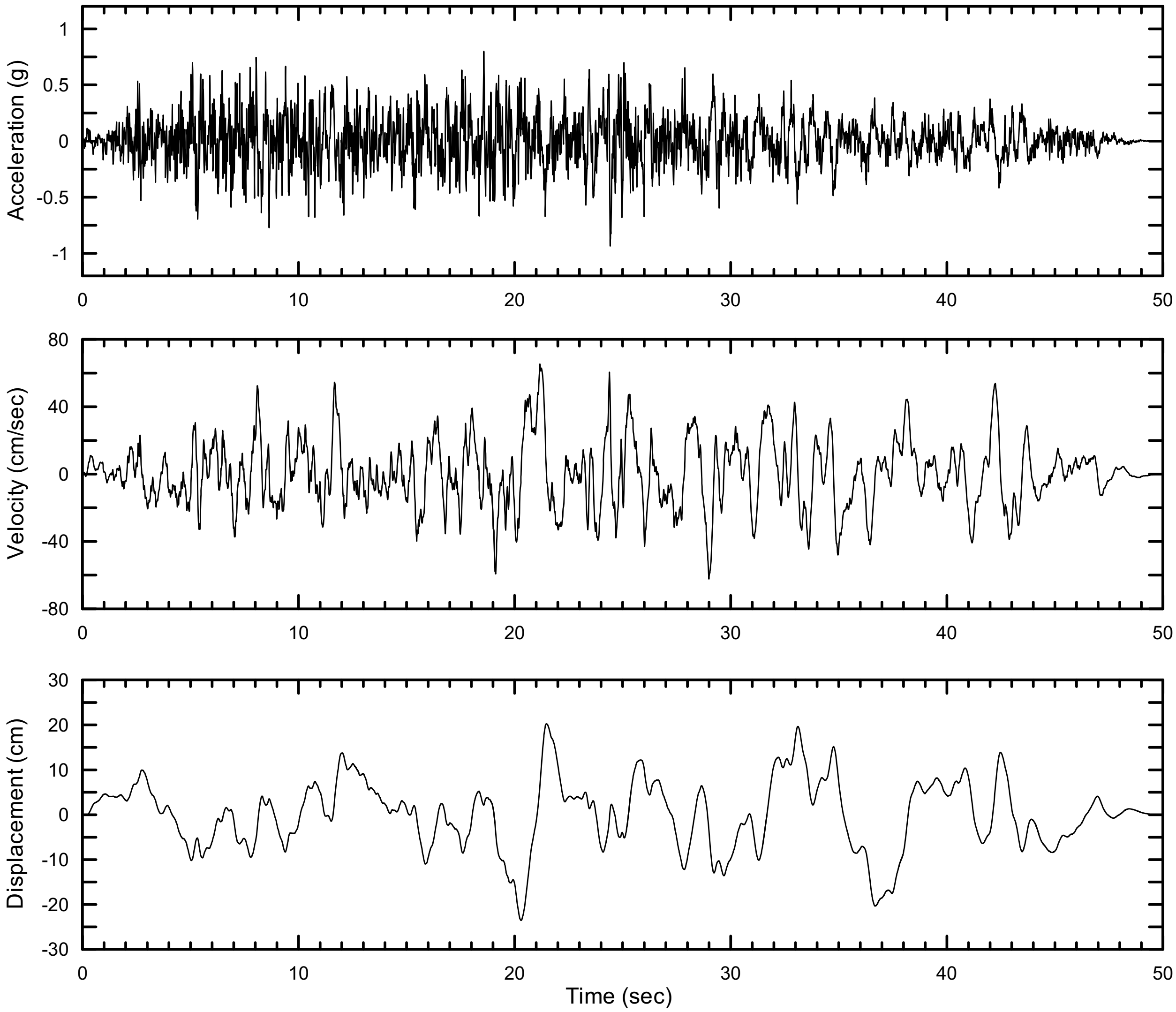
Source: Appendix D, Table D-1

Figure 6.5.2-191. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Horizontal 2, Set 1



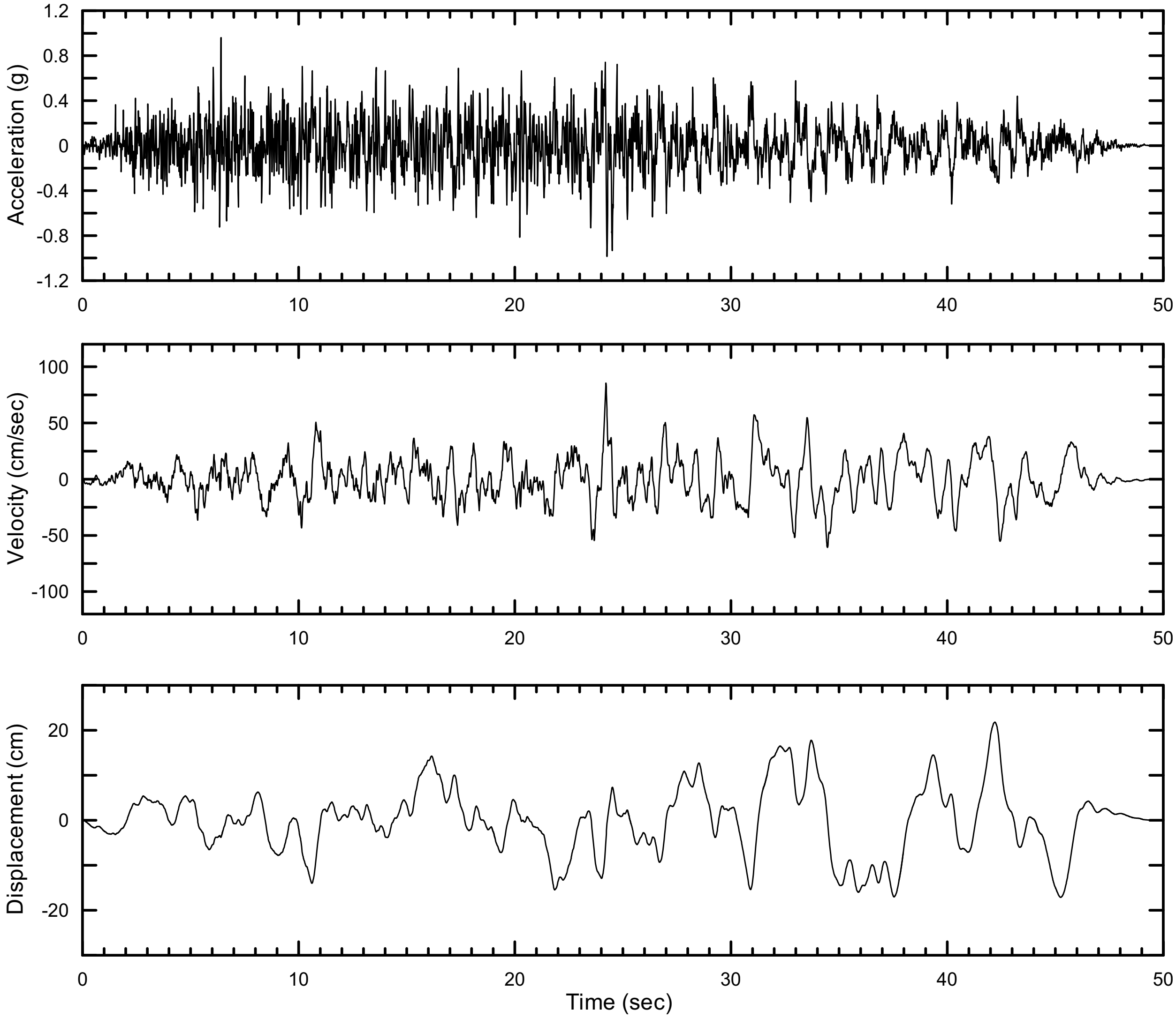
Source: Appendix D, Table D-1

Figure 6.5.2-194. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Vertical, Set 1



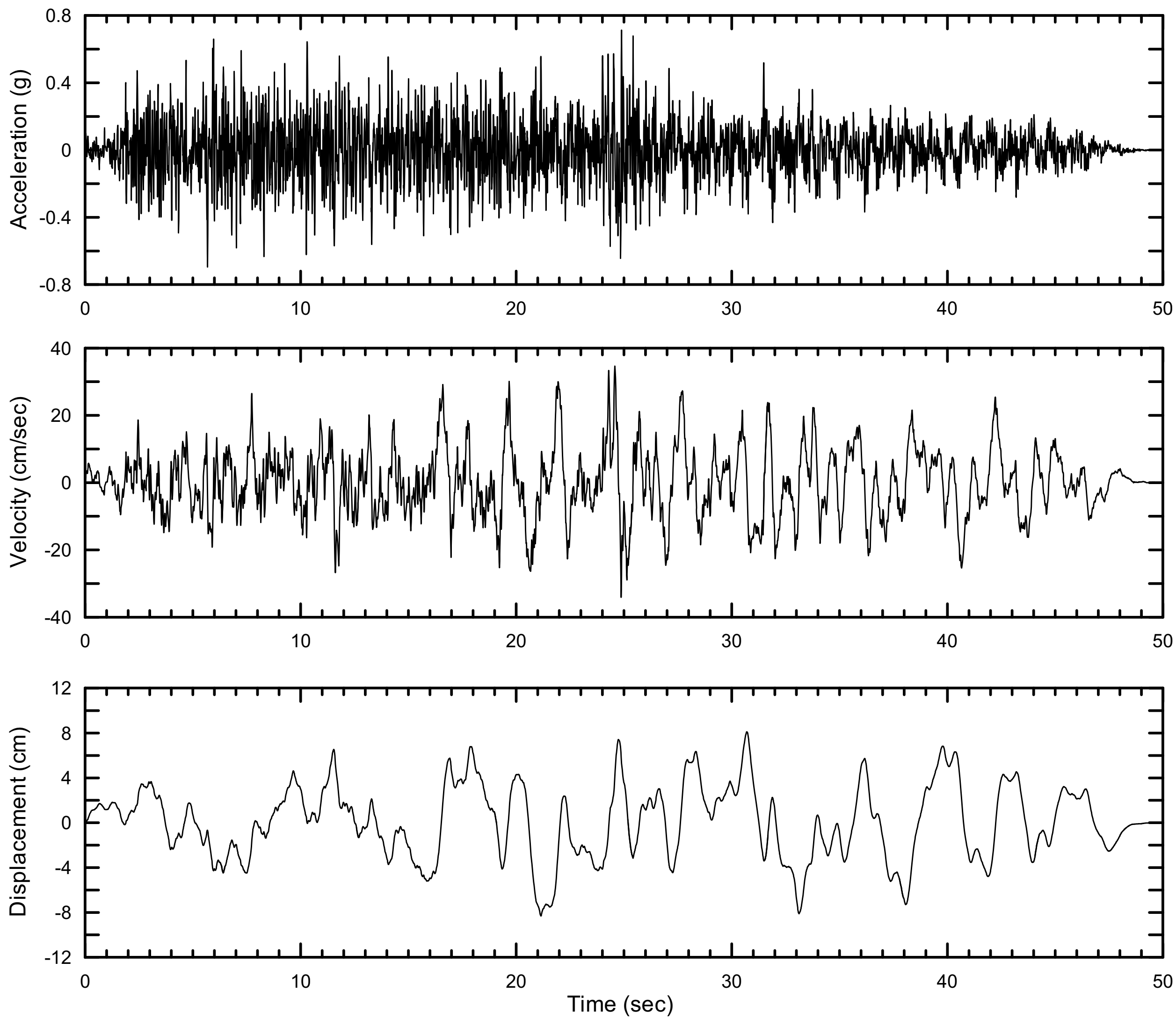
Source: Appendix D, Table D-1

Figure 6.5.2-197. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Horizontal 1, Set 2



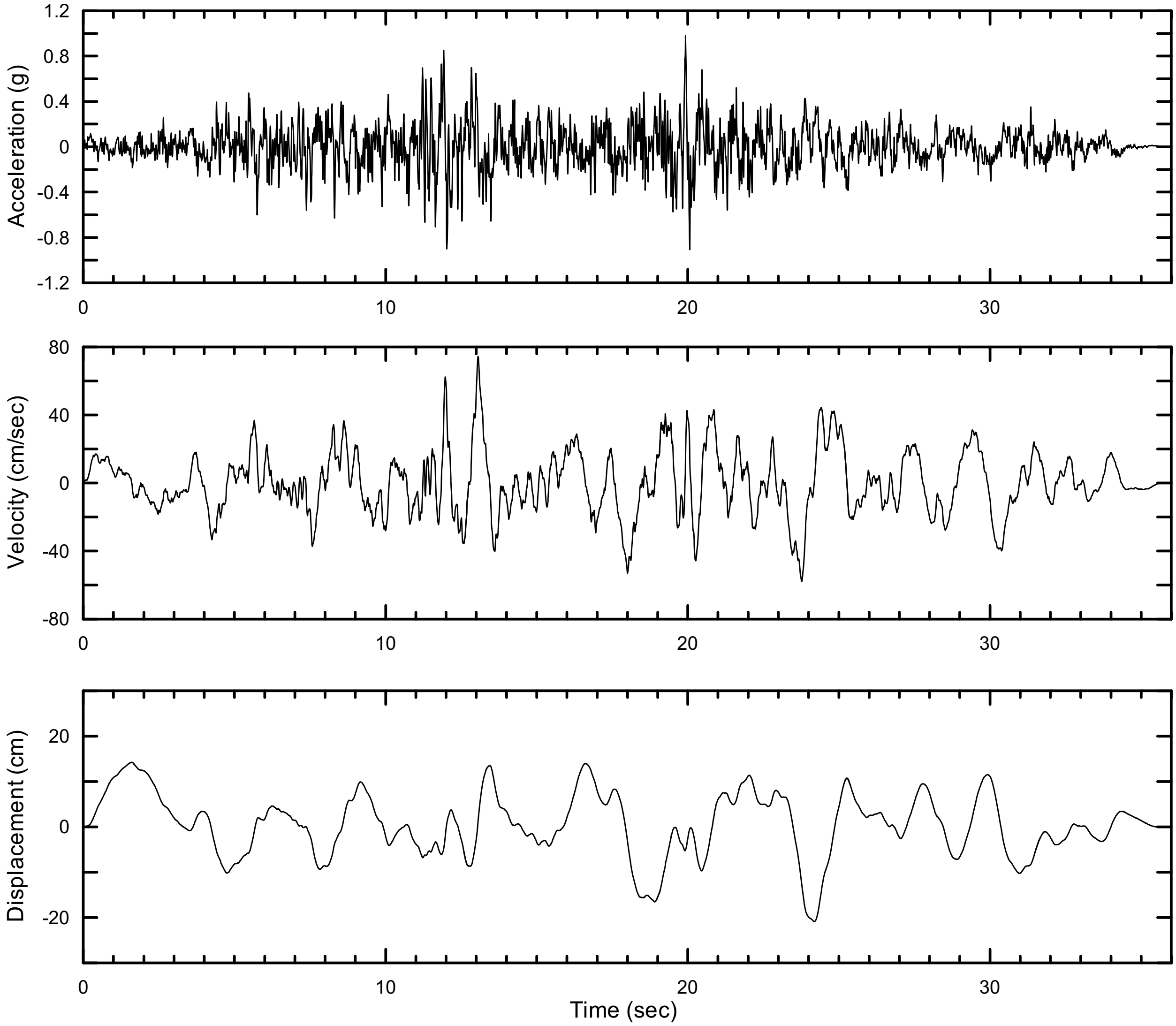
Source: Appendix D, Table D-1

Figure 6.5.2-200. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Horizontal 2, Set 2



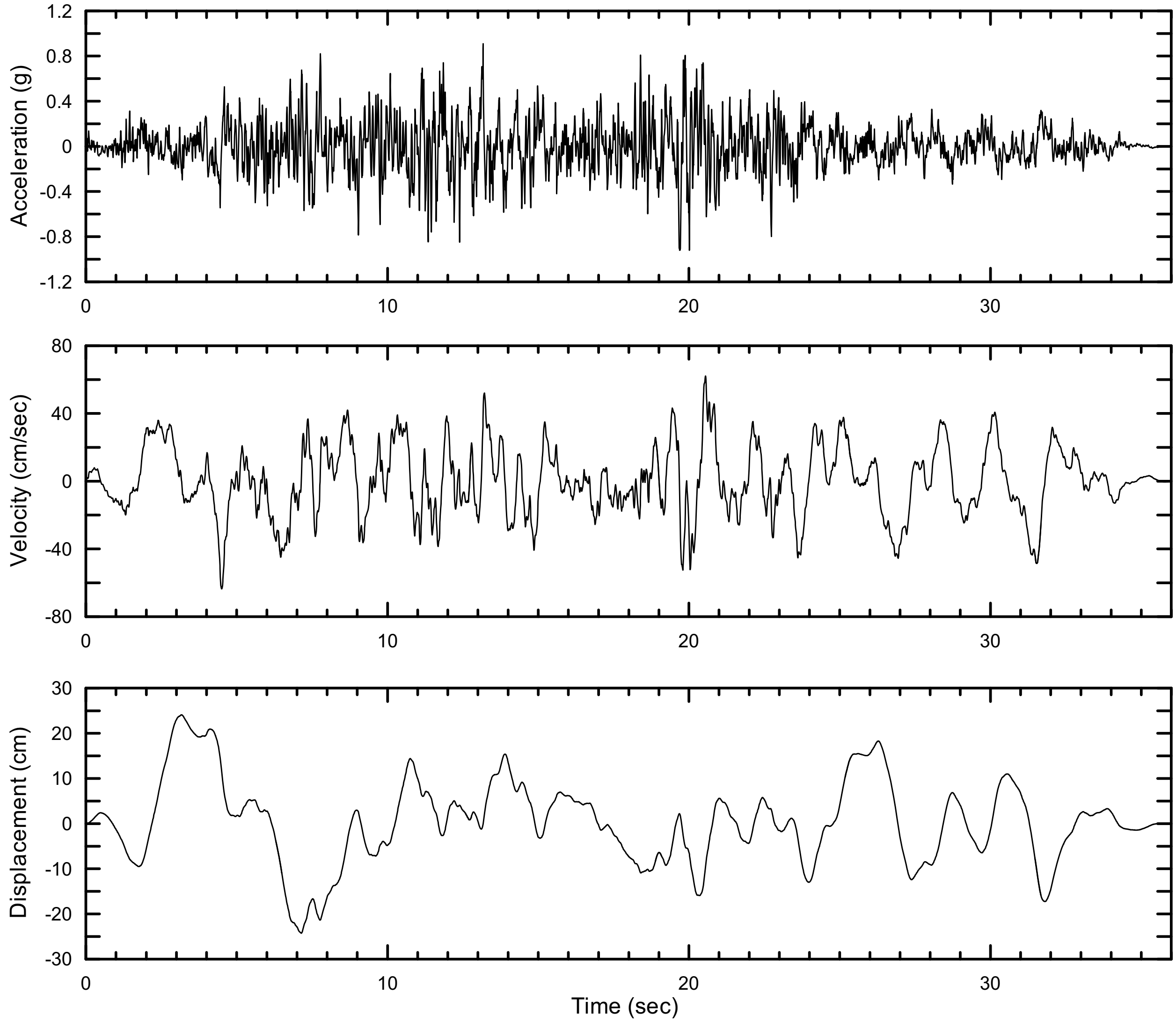
Source: Appendix D, Table D-1

Figure 6.5.2-203. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Vertical, Set 2



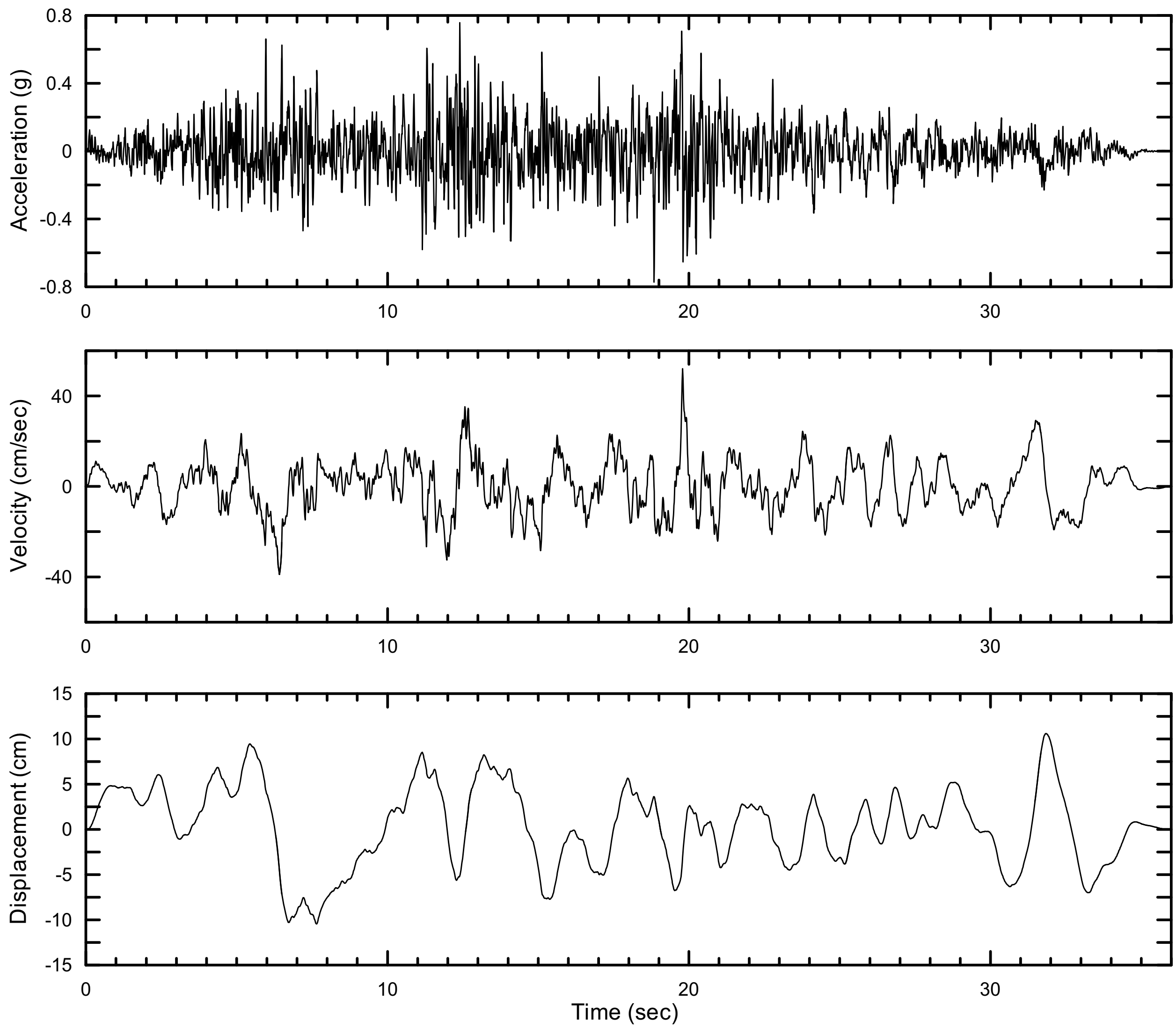
Source: Appendix D, Table D-1

Figure 6.5.2-206. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Horizontal 1, Set 3



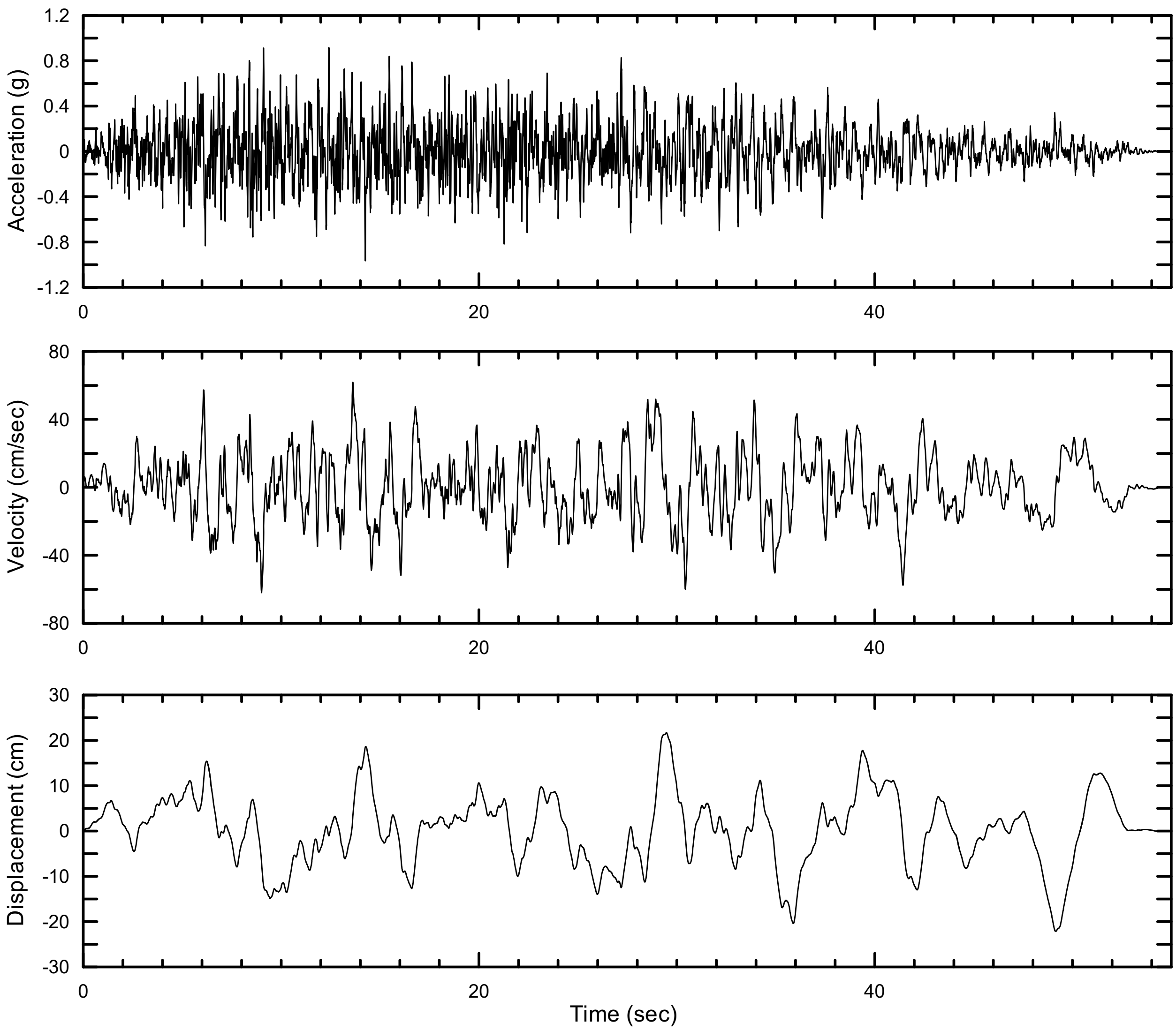
Source: Appendix D, Table D-1

Figure 6.5.2-209. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA 10^{-4} AFE, Horizontal 2, Set 3



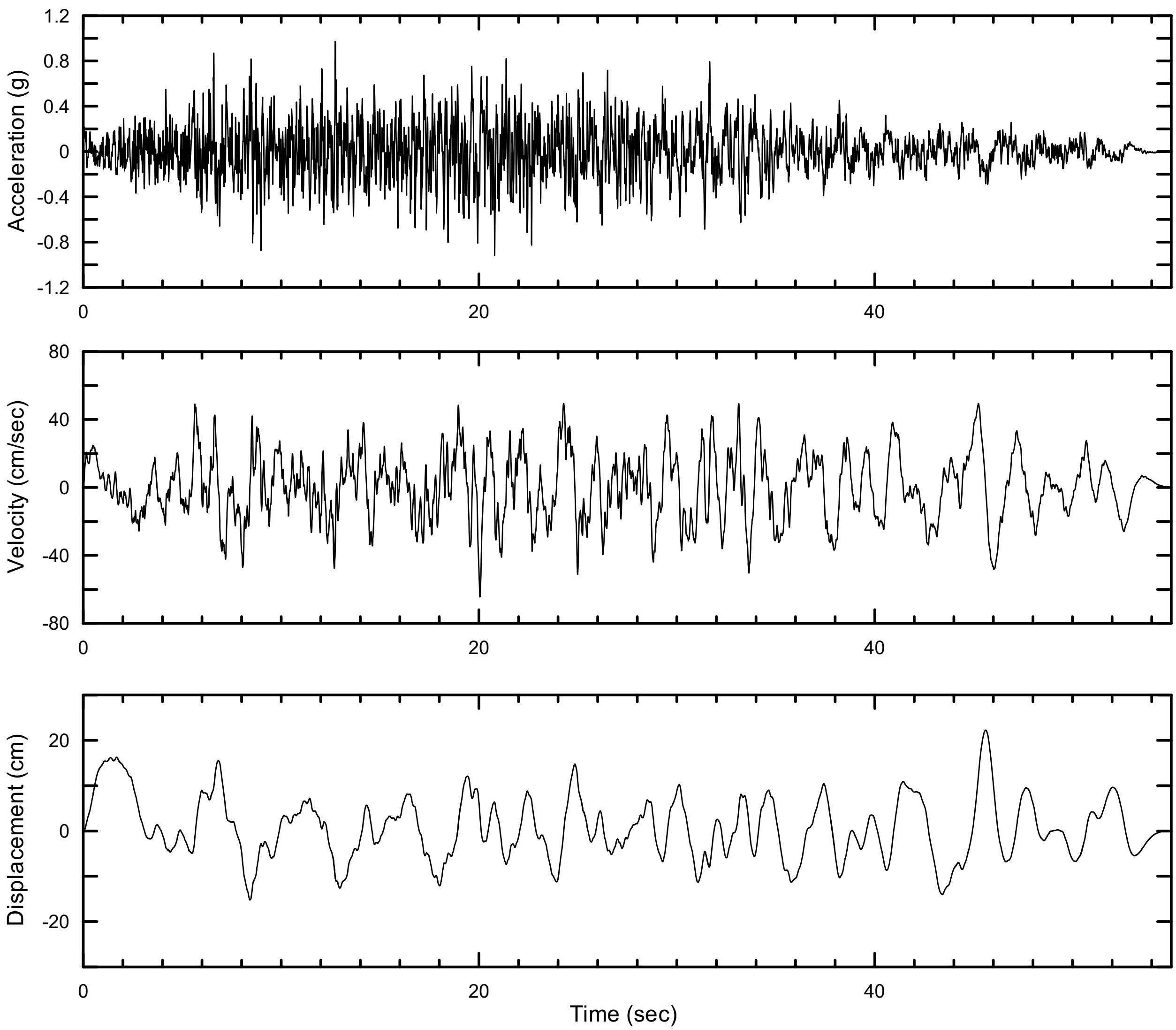
Source: Appendix D, Table D-1

Figure 6.5.2-212. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Vertical, Set 3



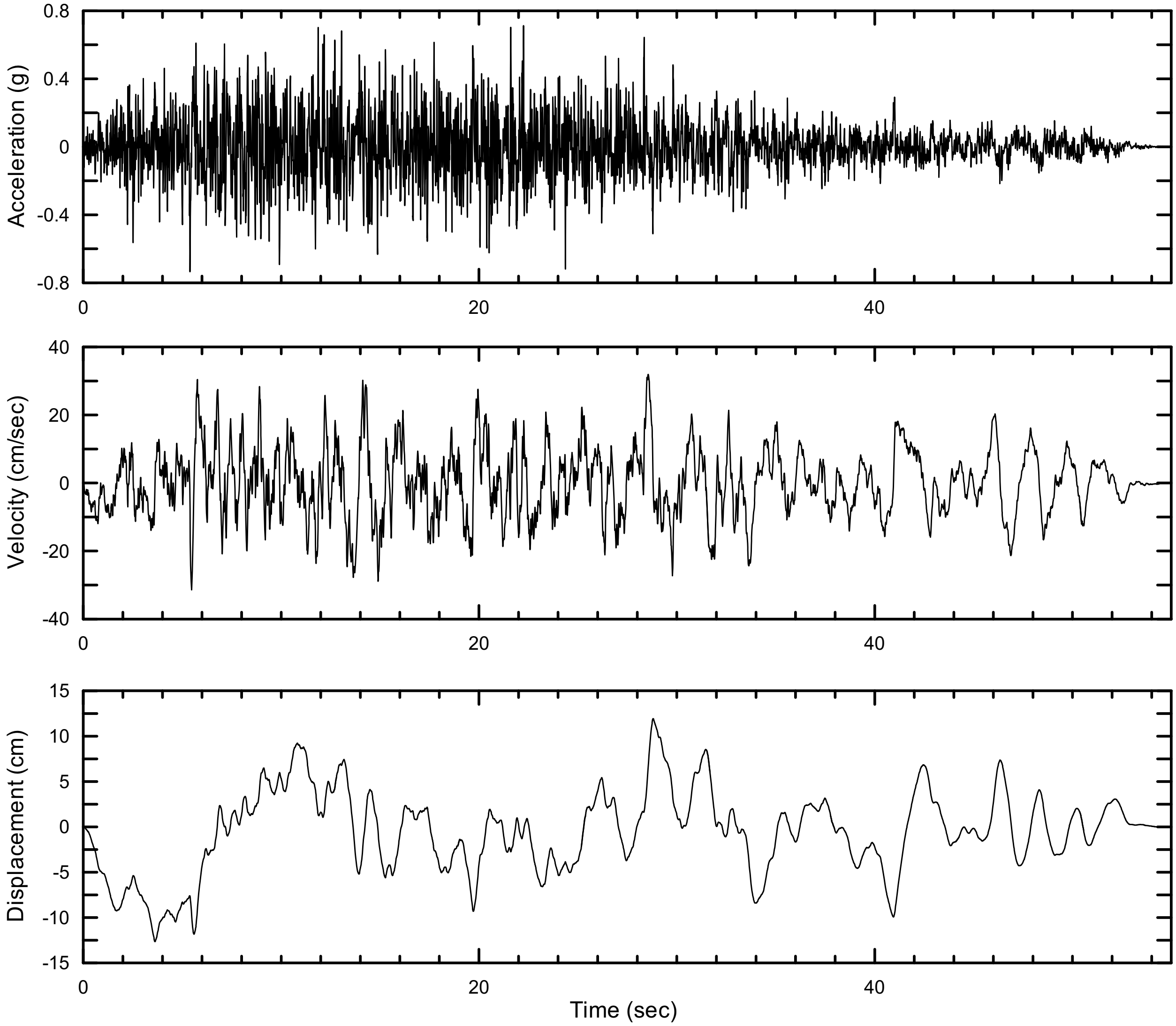
Source: Appendix D, Table D-1

Figure 6.5.2-215. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Horizontal 1, Set 4



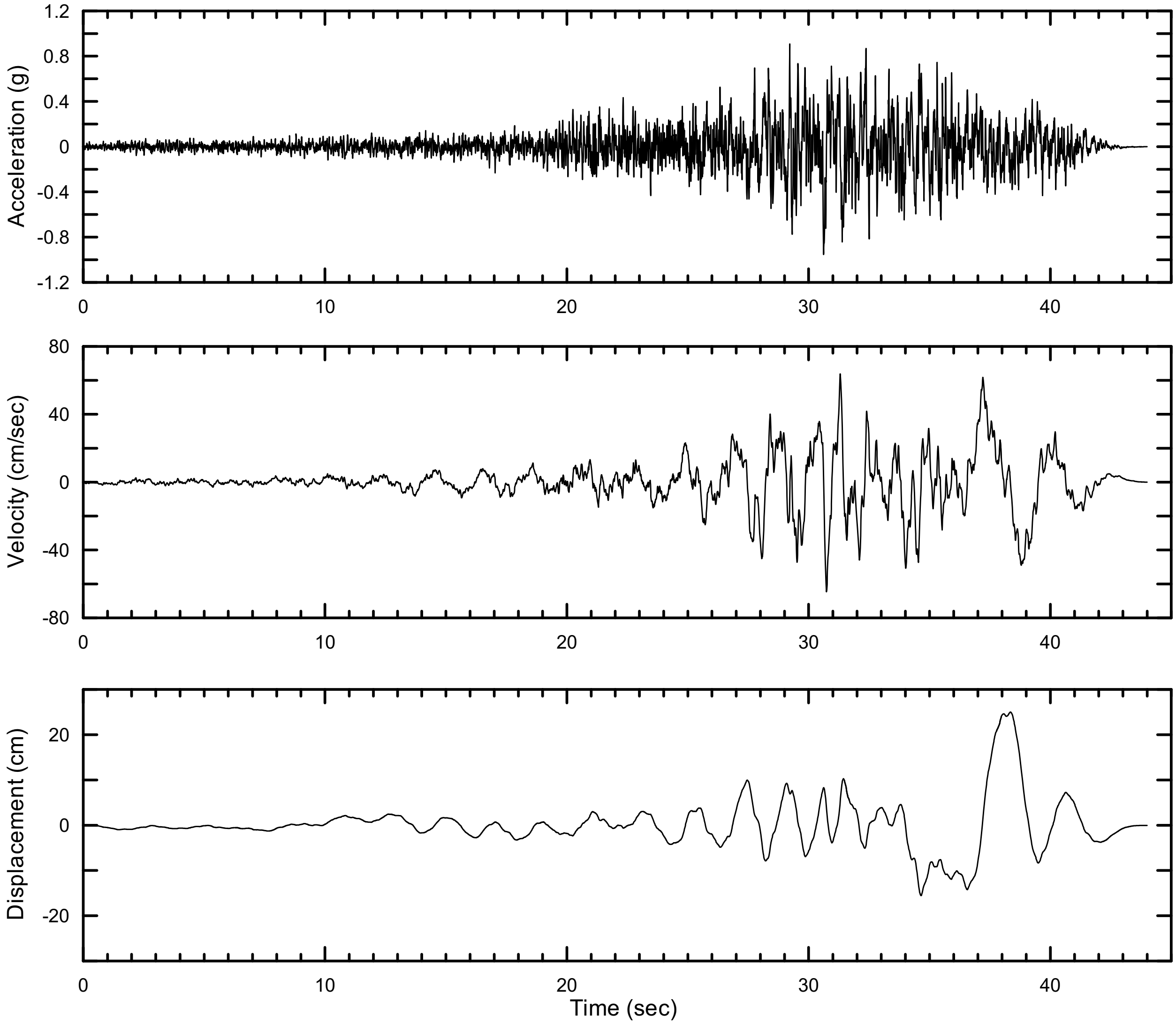
Source: Appendix D, Table D-1

Figure 6.5.2-218. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Horizontal 2, Set 4



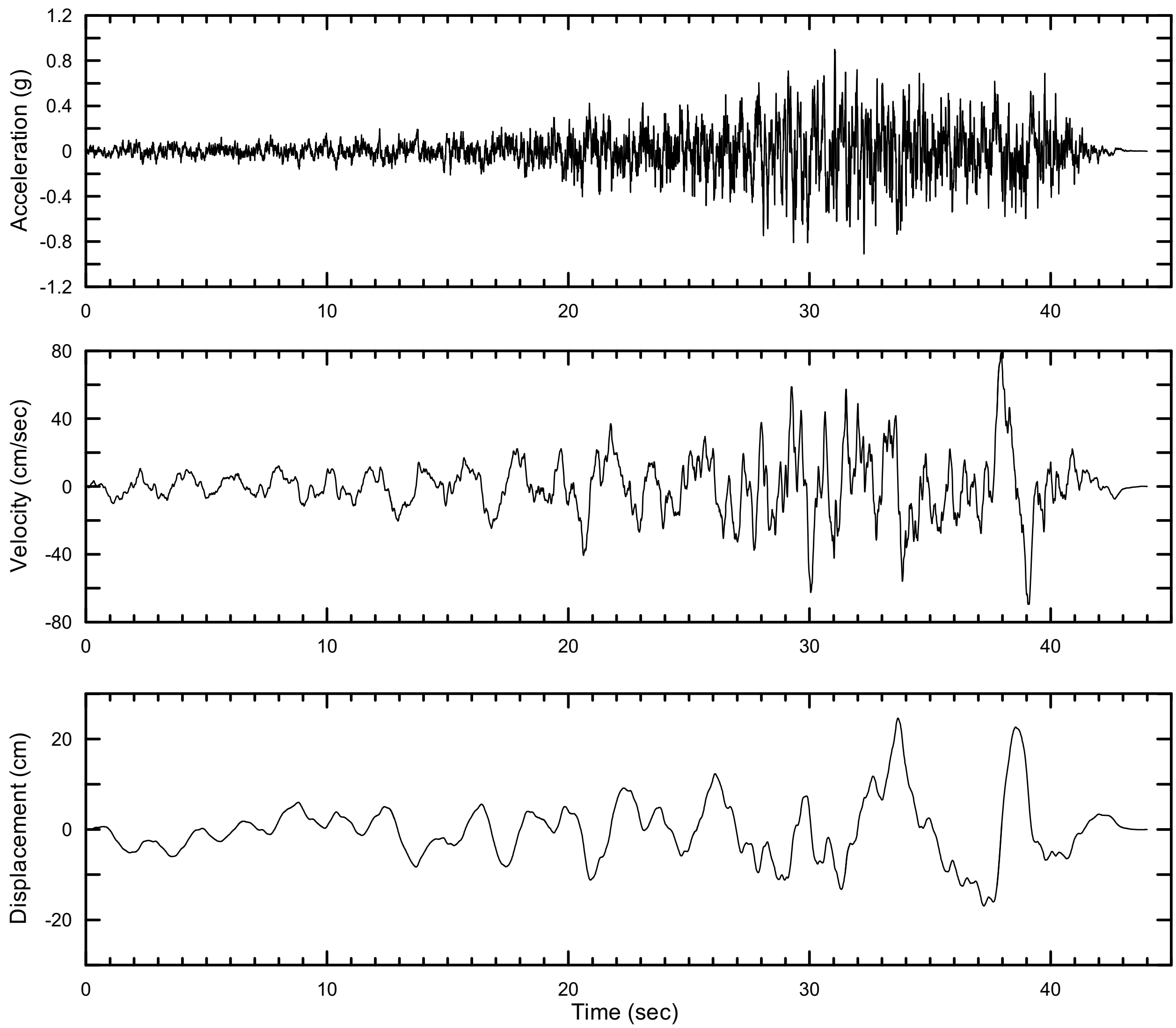
Source: Appendix D, Table D-1

Figure 6.5.2-221. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Vertical, Set 4



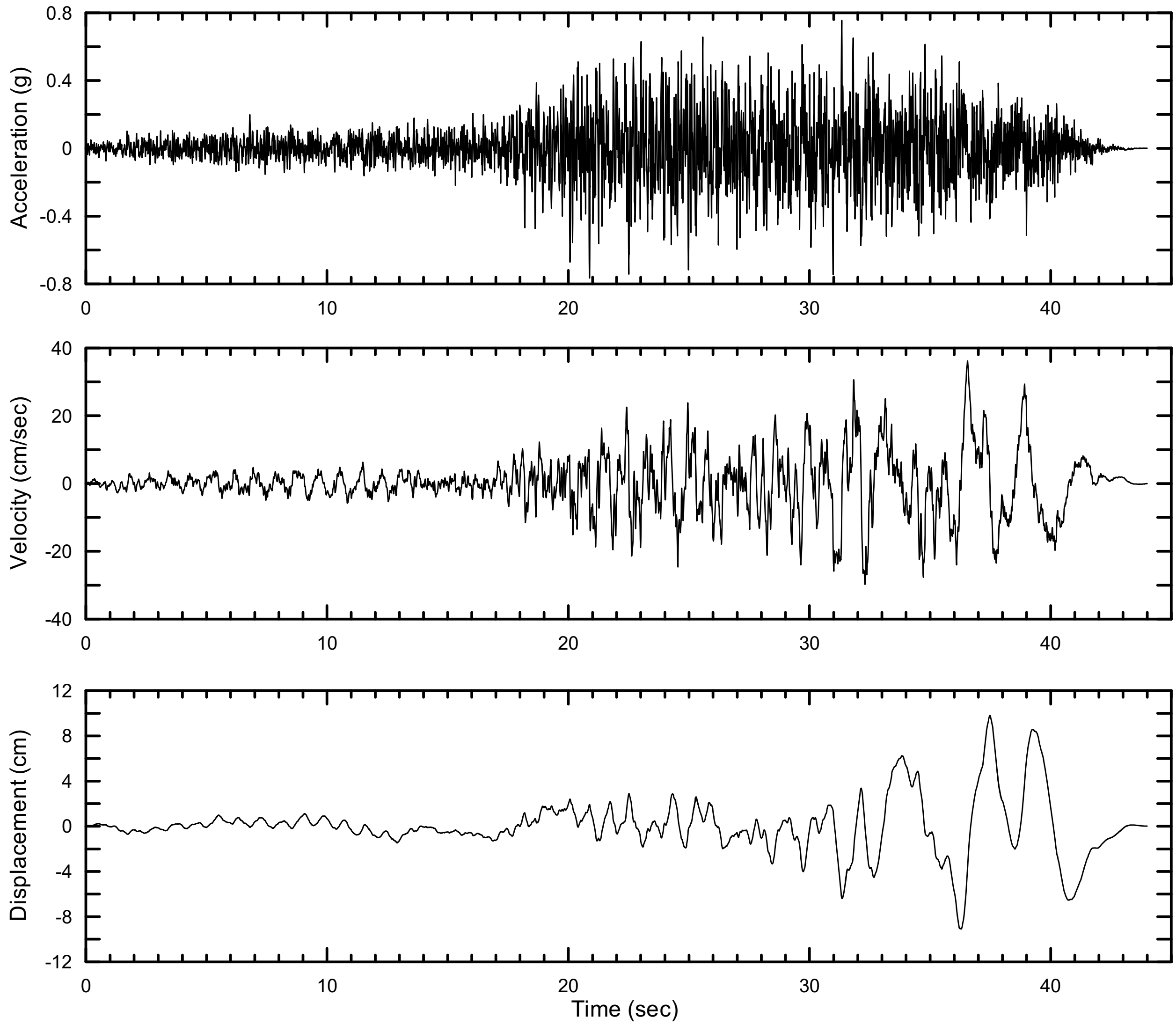
Source: Appendix D, Table D-1

Figure 6.5.2-224. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Horizontal 1, Set 5



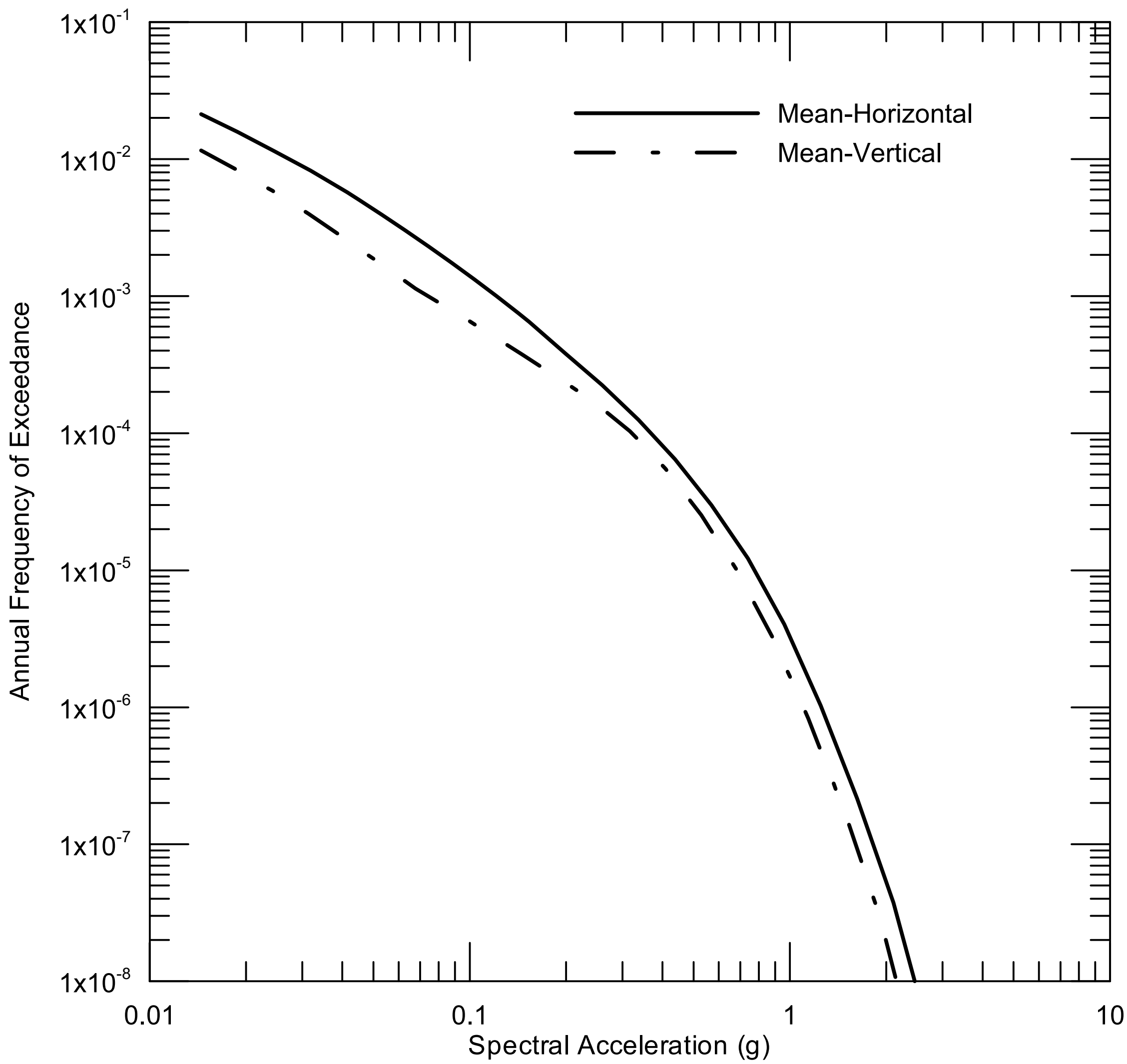
Source: Appendix D, Table D-1

Figure 6.5.2-227. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Horizontal 2, Set 5



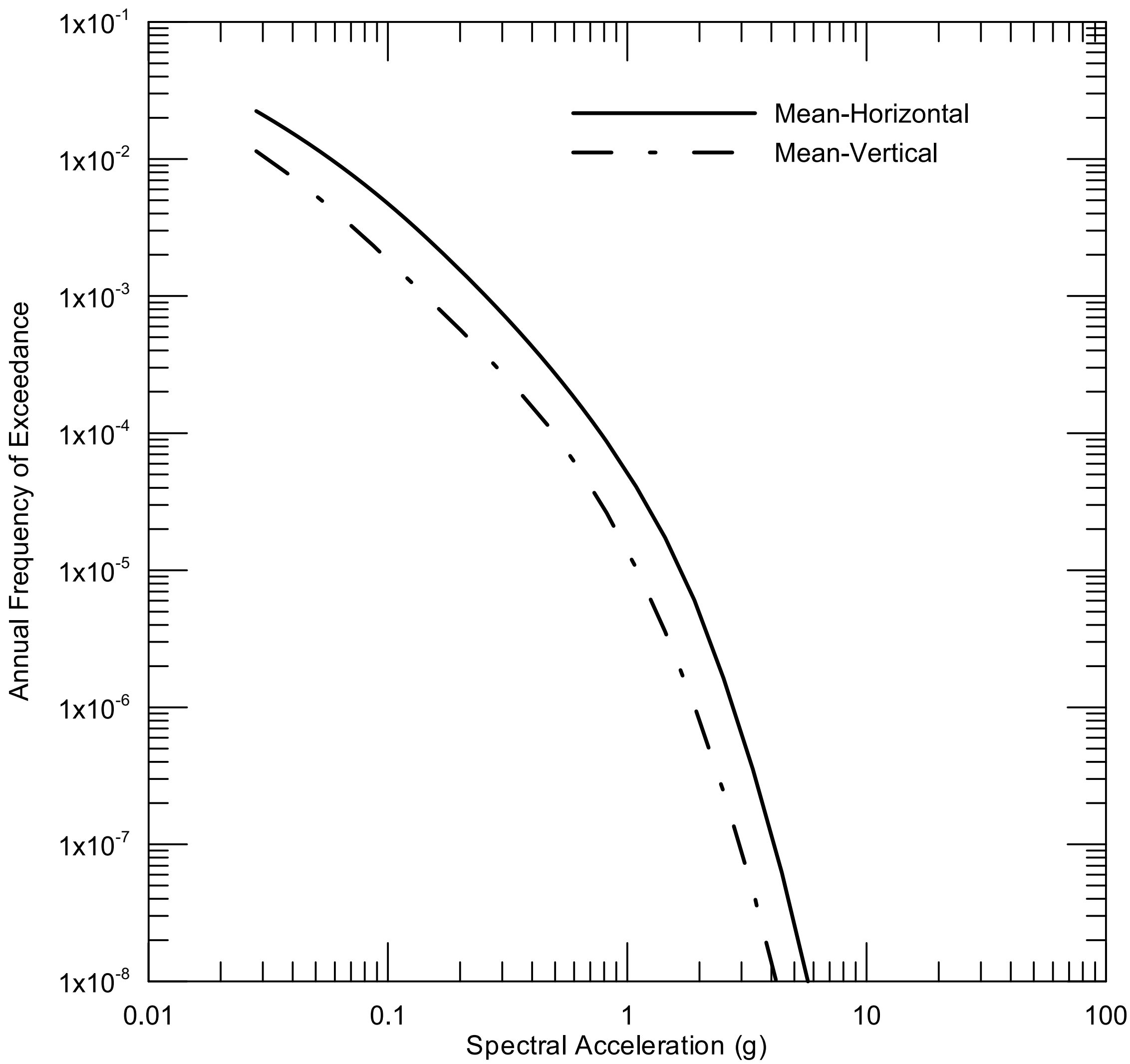
Source: Appendix D, Table D-1

Figure 6.5.2-230. Spectrally Matched Acceleration, Velocity, and Displacement Time Histories for the SFA, 10^{-4} AFE, Vertical, Set 5



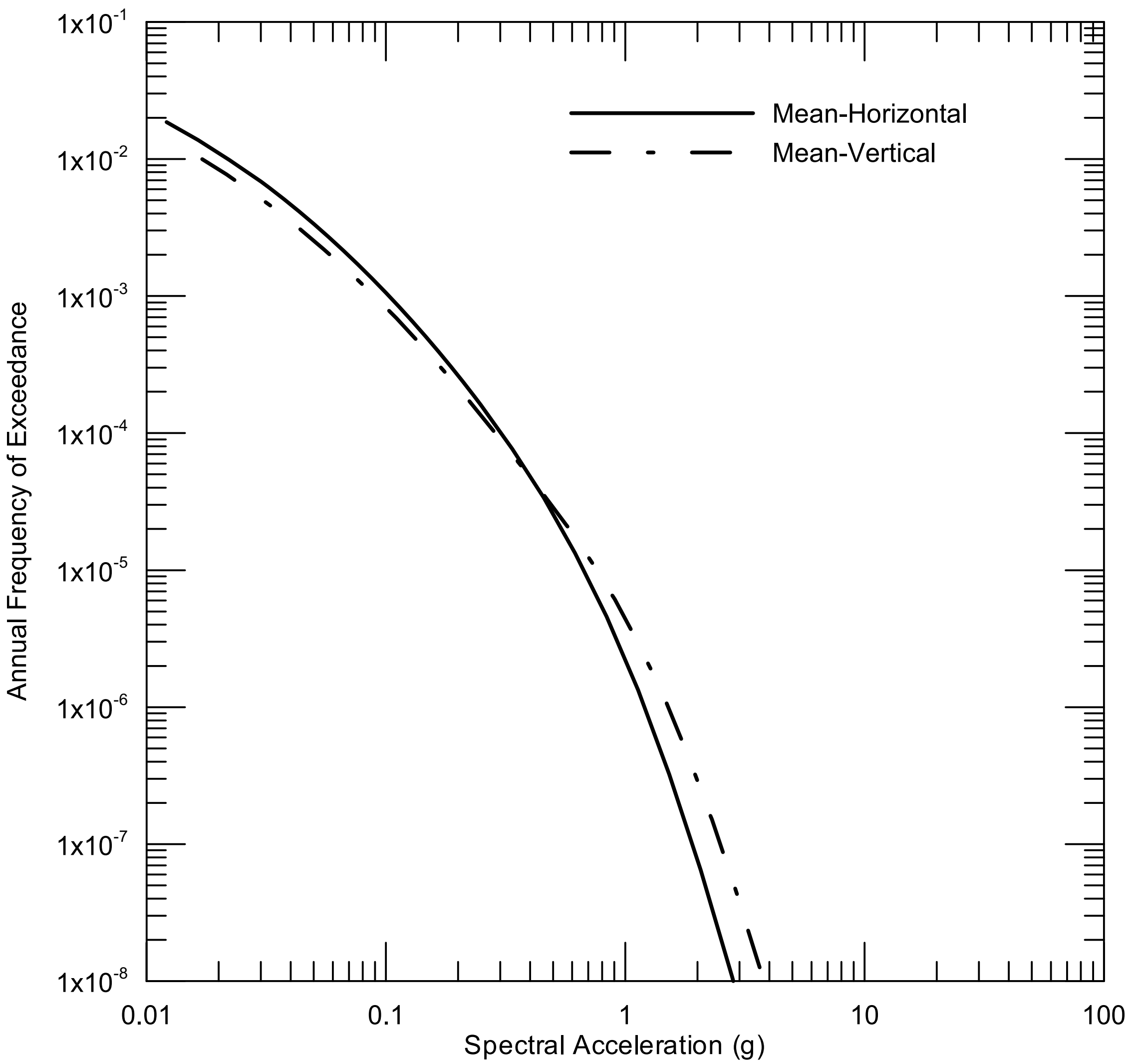
Source: Appendix D, Table D-1

Figure 6.5.3-3. Mean Horizontal and Vertical Seismic Hazard Curves for Tuff, “Soft” Sites, for PGA at the RB



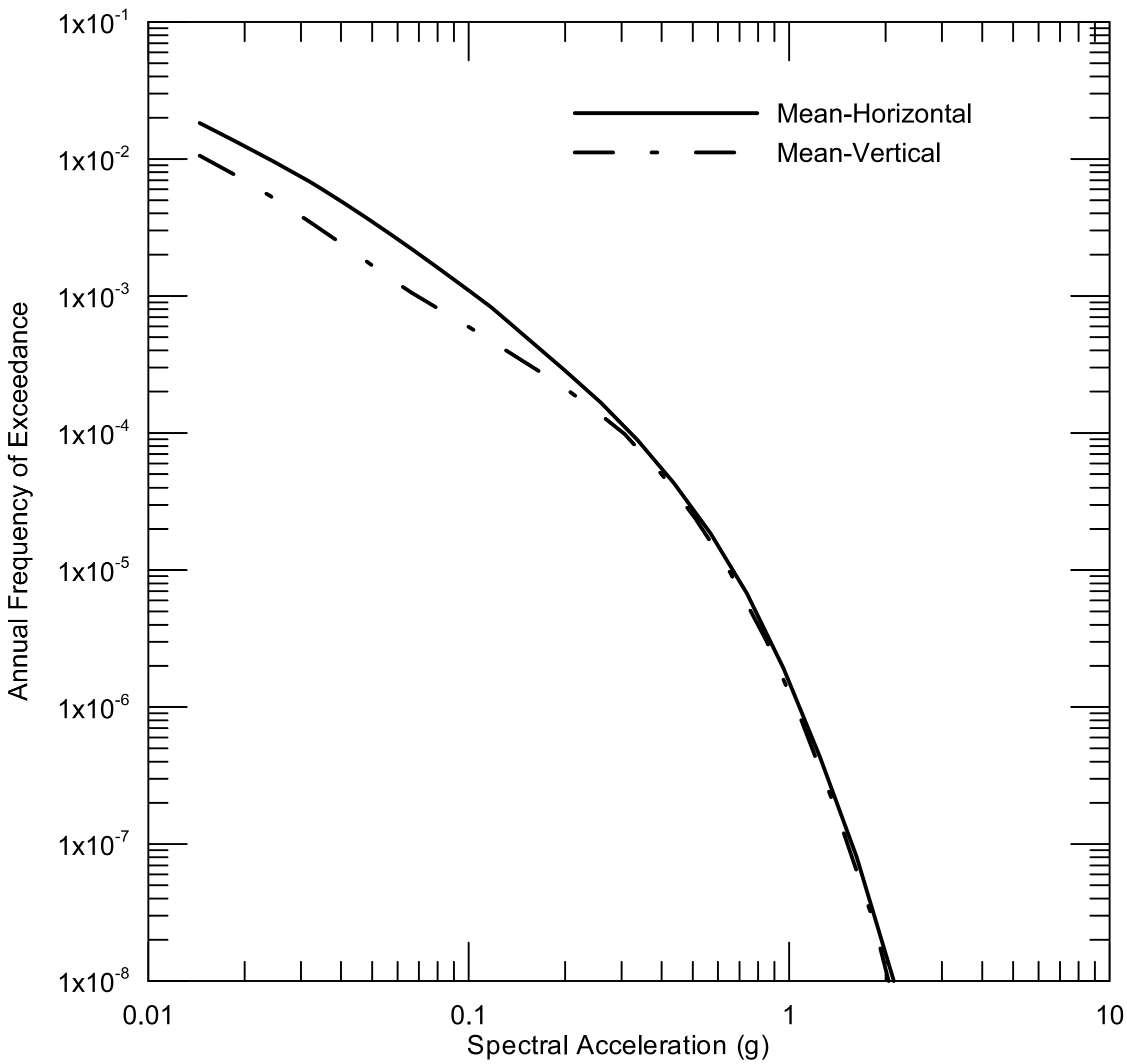
Source: Appendix D, Table D-1

Figure 6.5.3-4. Mean Horizontal and Vertical Seismic Hazard Curves for Tuff, “Soft” Sites, for 0.2 Sec SA at the RB



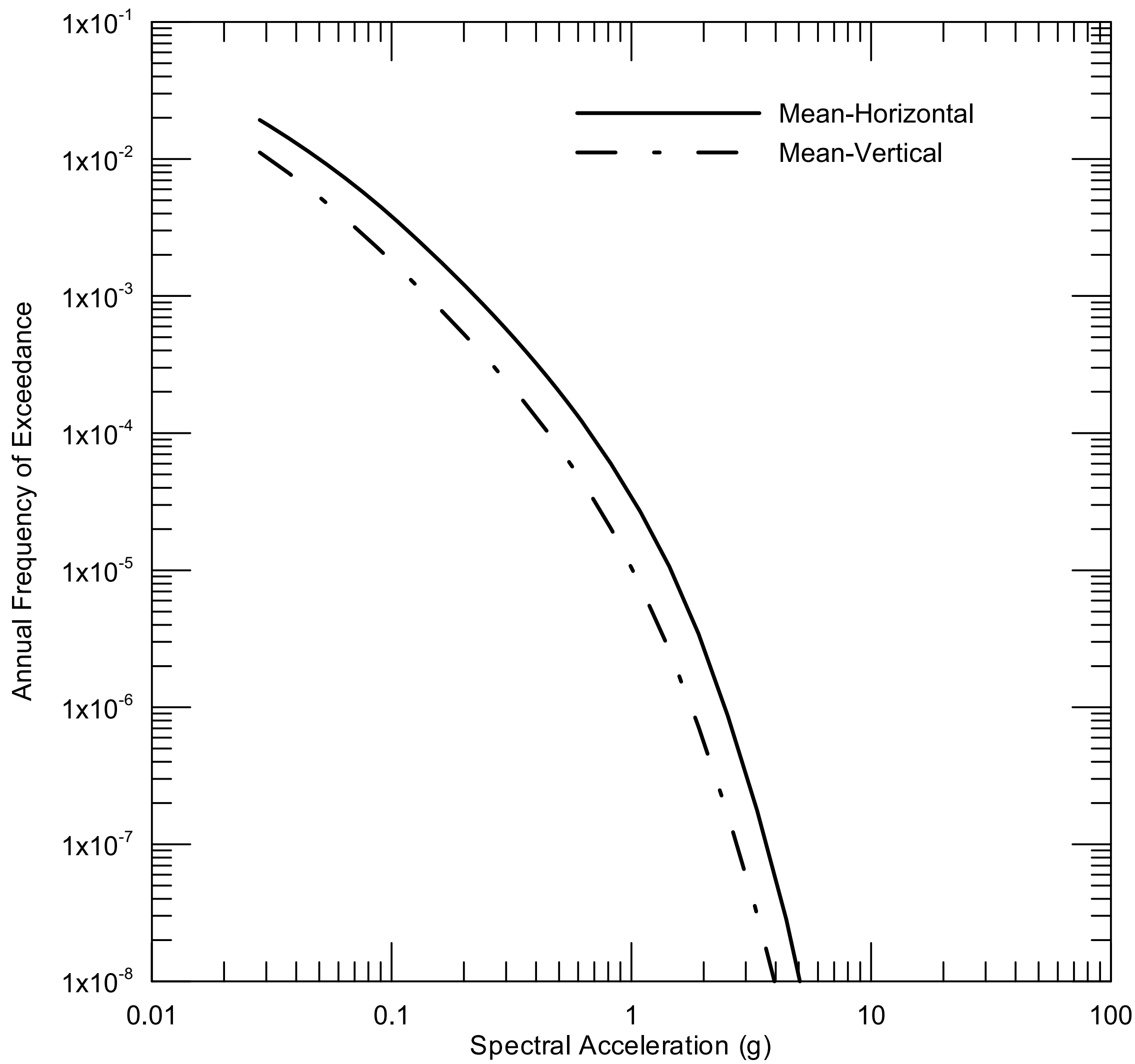
Source: Appendix D, Table D-1

Figure 6.5.3-5. Mean Horizontal and Vertical Seismic Hazard Curves for Tuff, “Soft” Sites, for 1.0 Sec SA at the RB



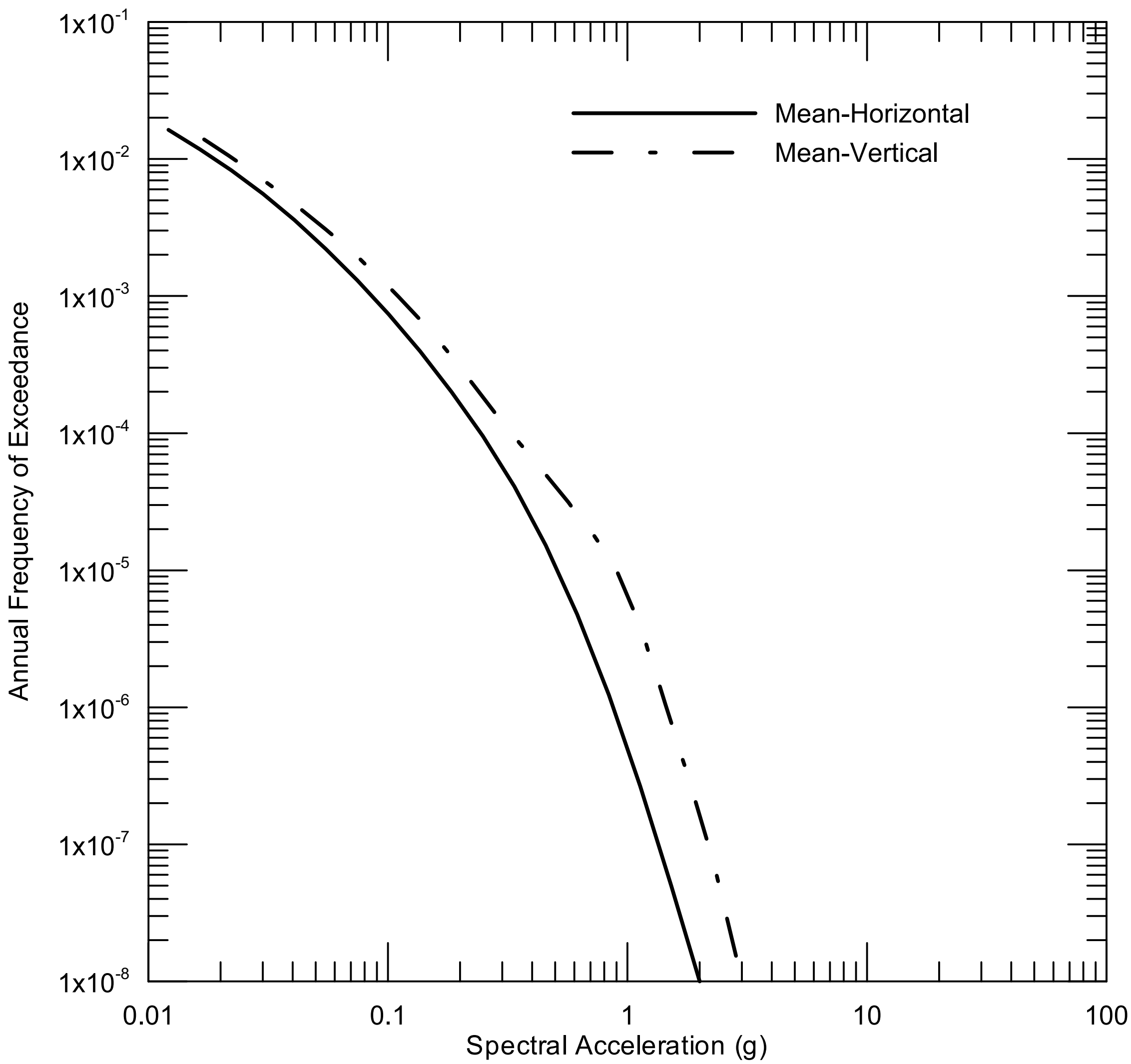
Source: Appendix D, Table D-1

Figure 6.5.3-6. Mean Horizontal and Vertical Seismic Hazard Curves for Tuff, "Stiff" Sites, for PGA at the RB



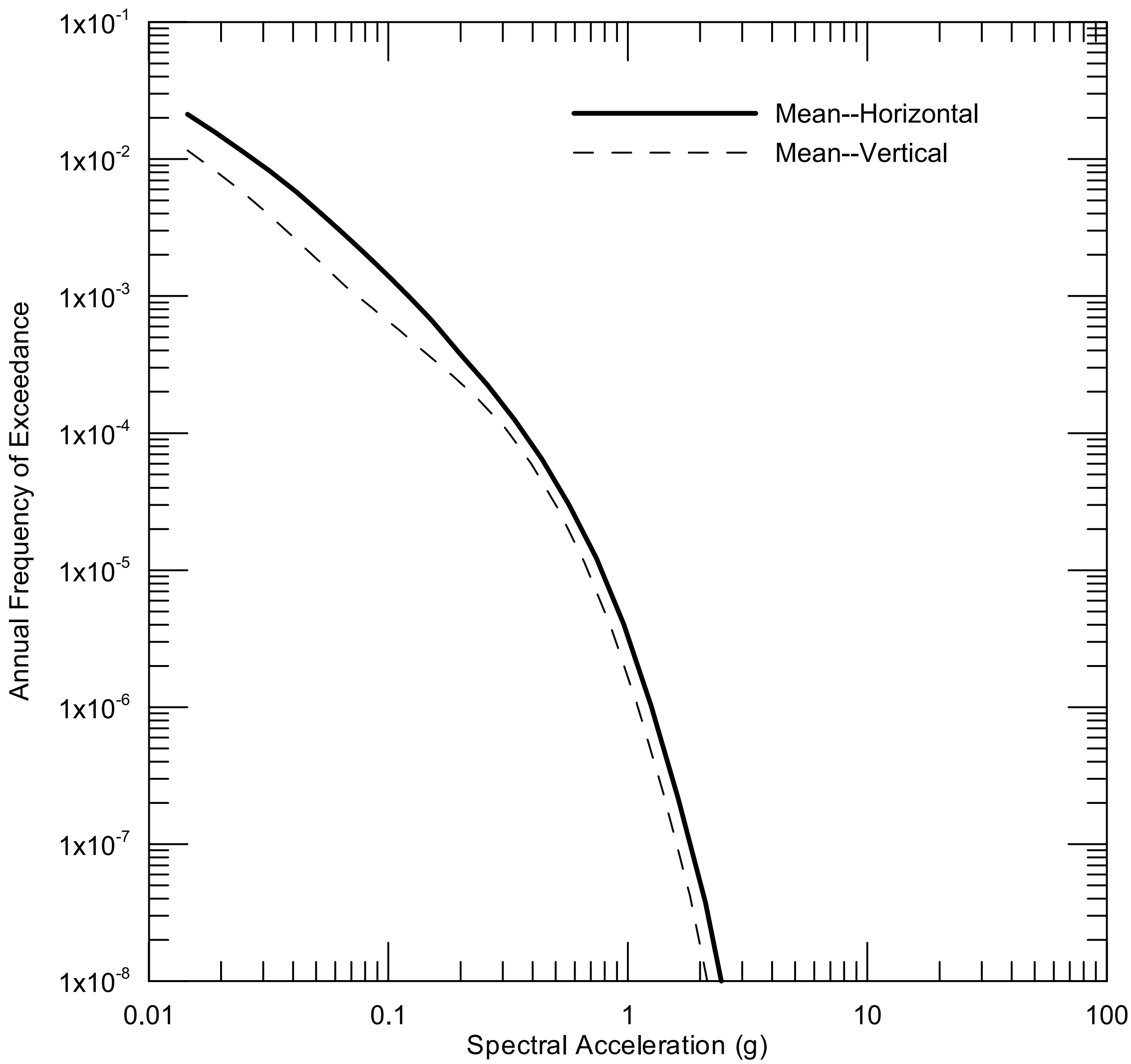
Source: Appendix D, Table D-1

Figure 6.5.3-7. Mean Horizontal and Vertical Seismic Hazard Curves for Tuff, “Stiff” Sites, for 0.2 Sec SA at the RB



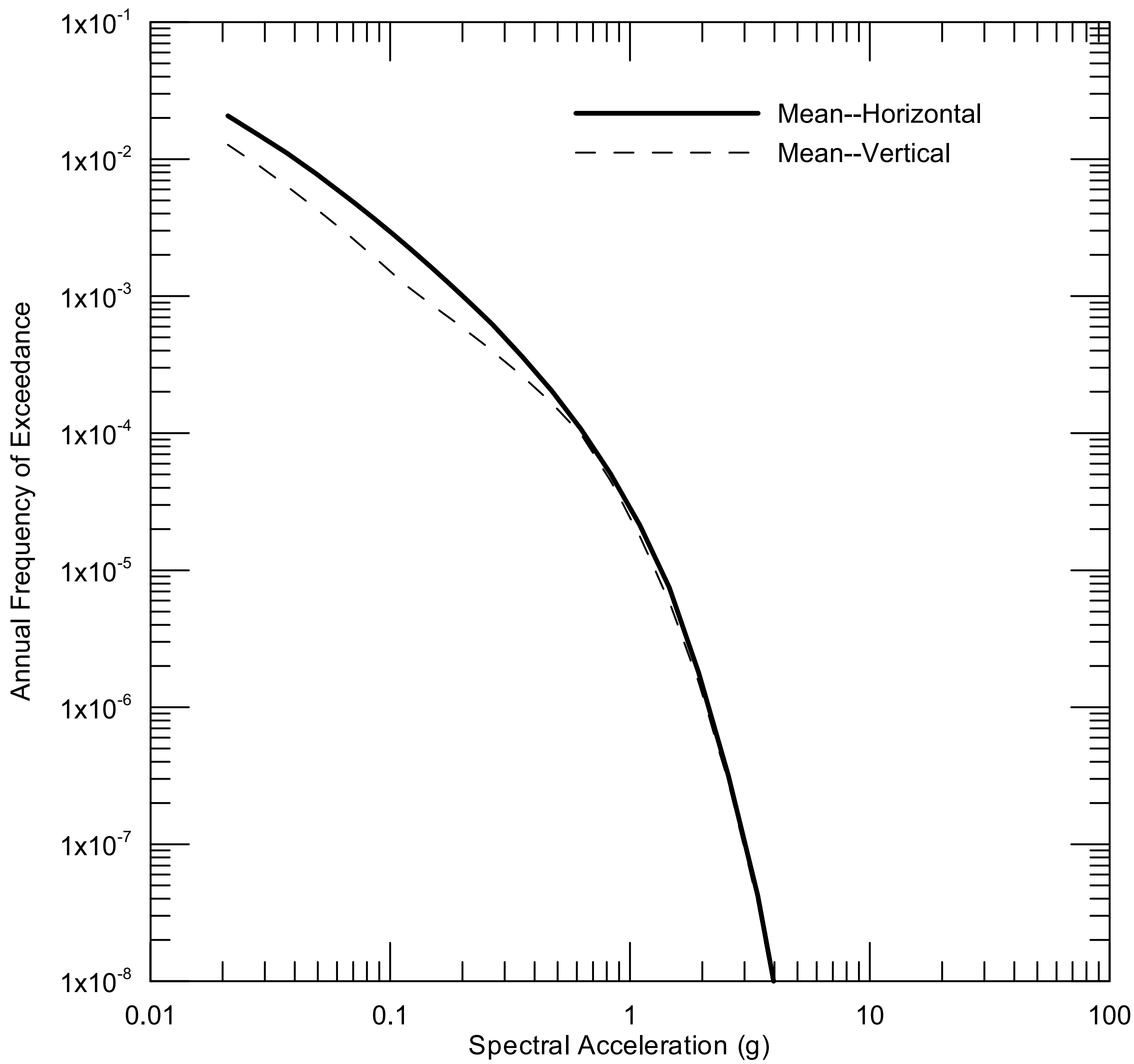
Source: Appendix D, Table D-1

Figure 6.5.3-8. Mean Horizontal and Vertical Seismic Hazard Curves for Tuff, “Stiff” Sites, for 1.0 Sec SA at the RB



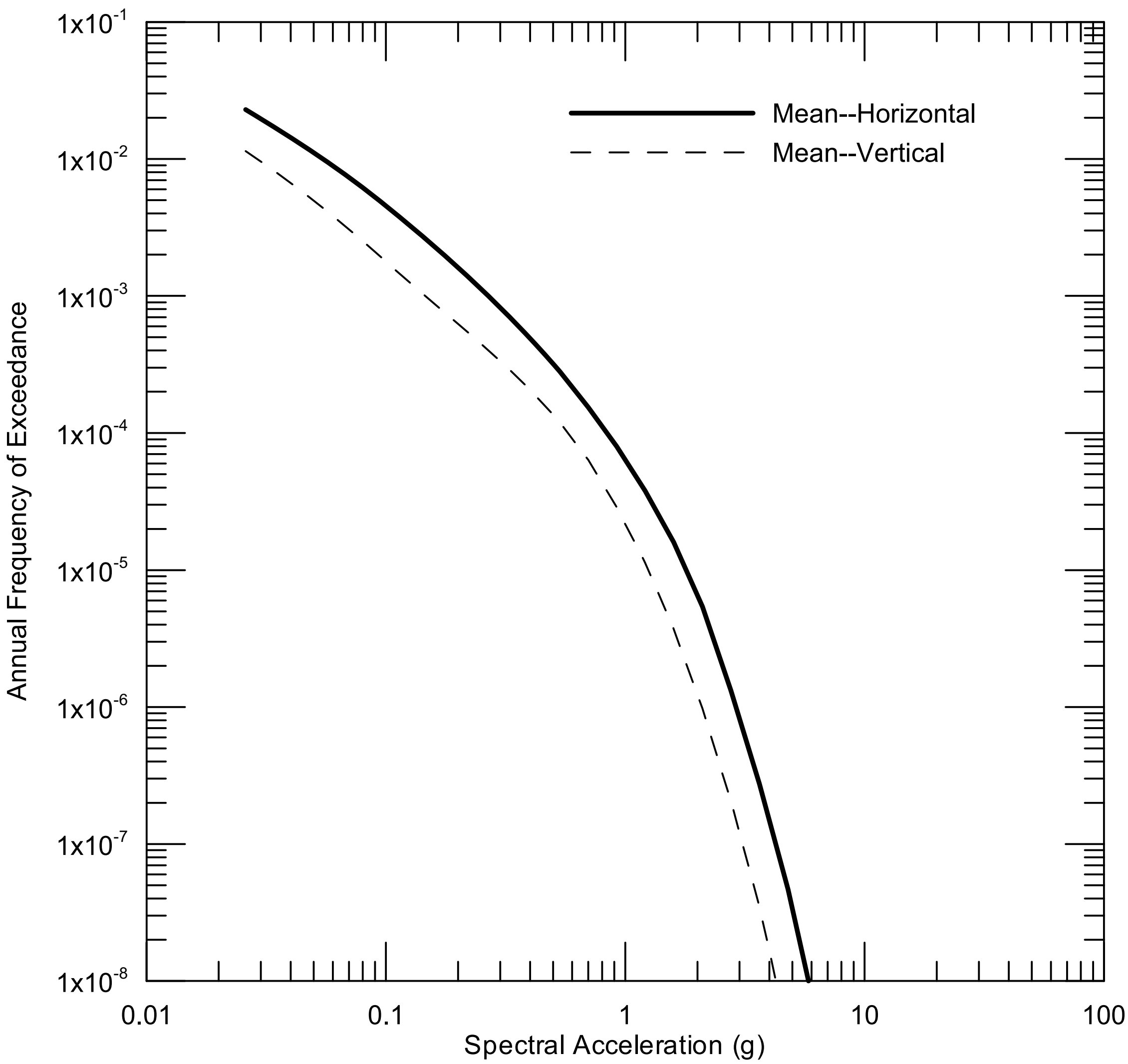
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-9. Mean Horizontal and Vertical Seismic Hazard Curves for PGA at the RB



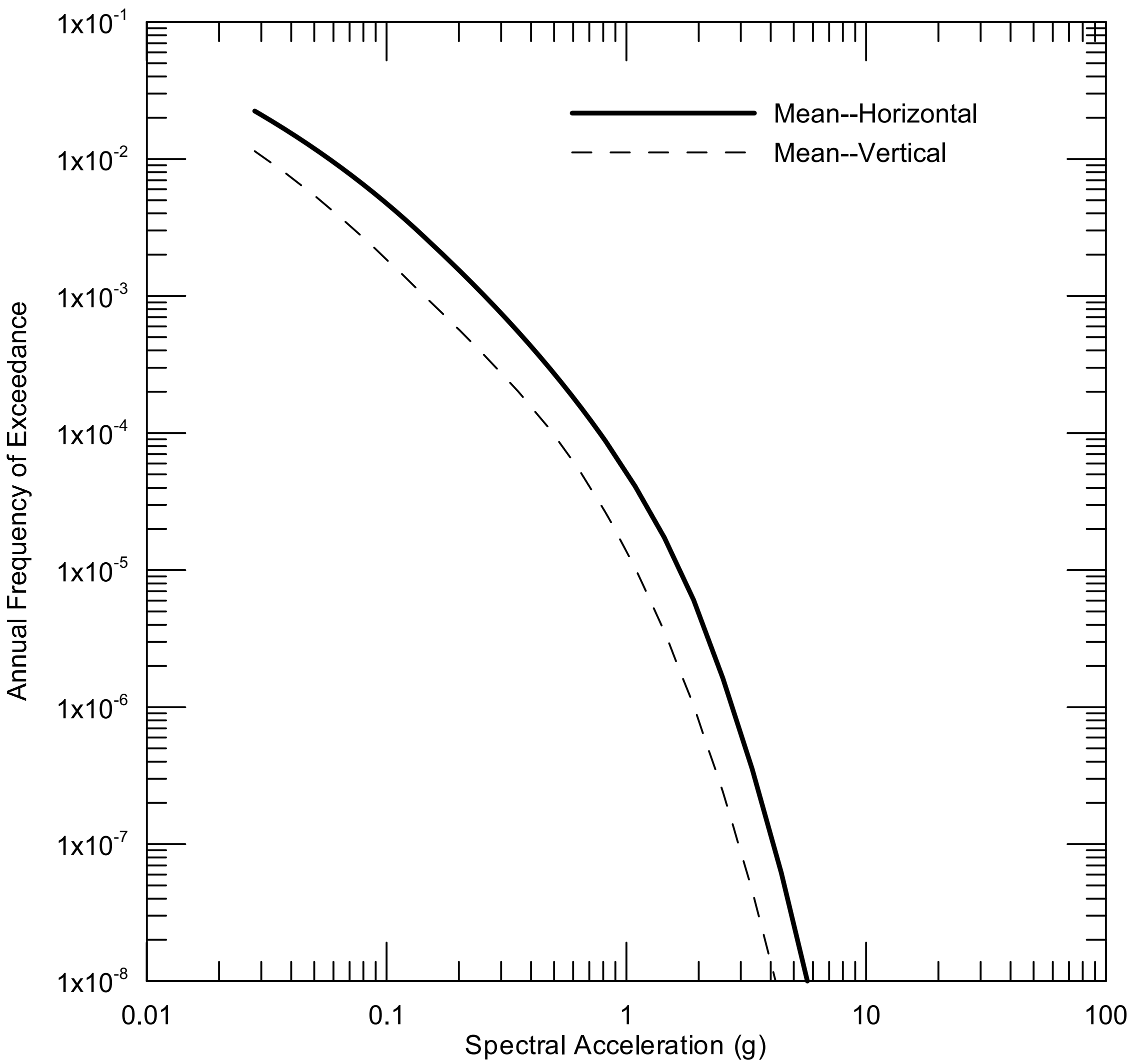
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-10. Mean Horizontal and Vertical Seismic Hazard Curves for 0.05 Sec SA at the RB



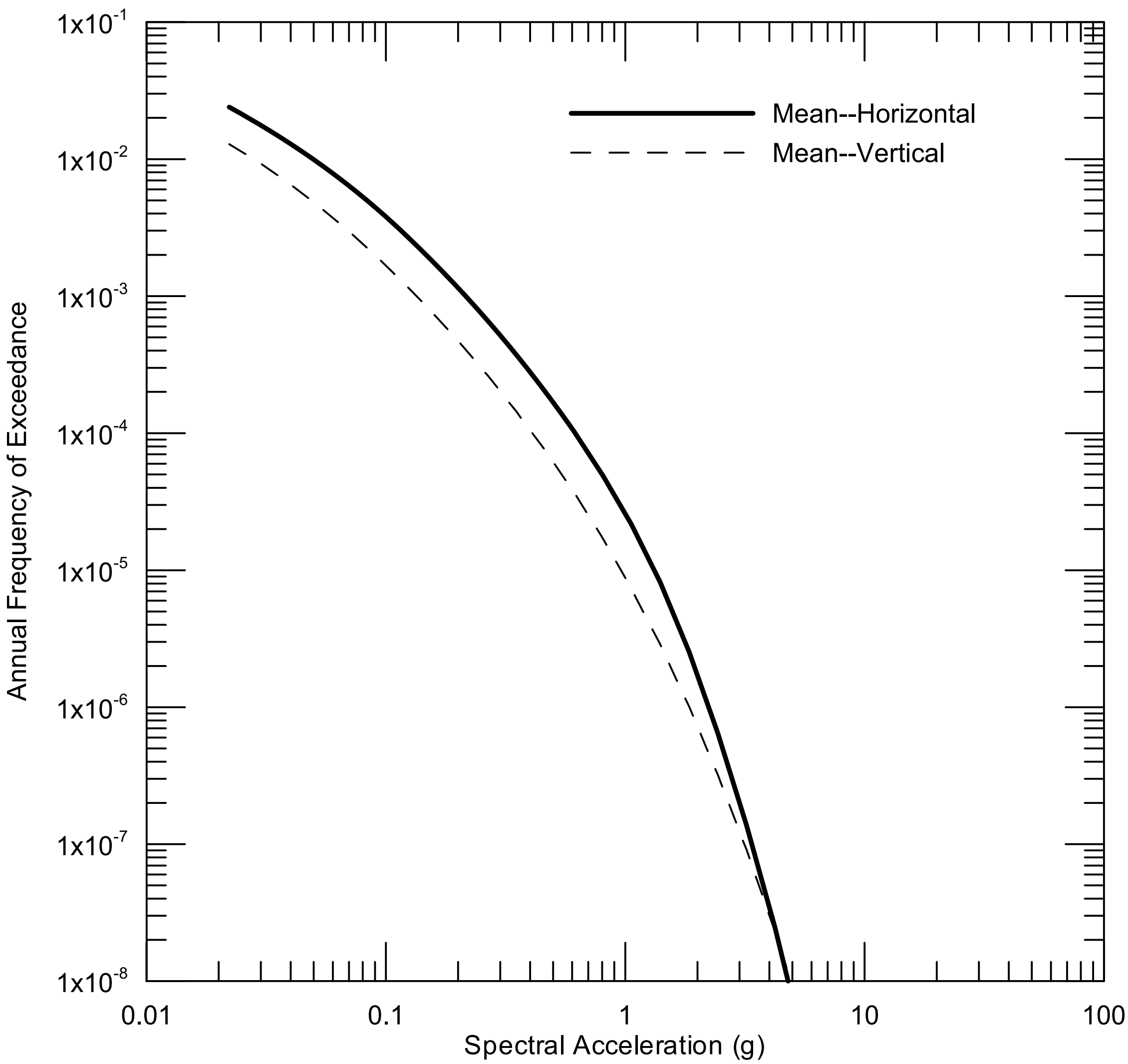
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-11. Mean Horizontal and Vertical Seismic Hazard Curves for 0.1 Sec SA at the RB



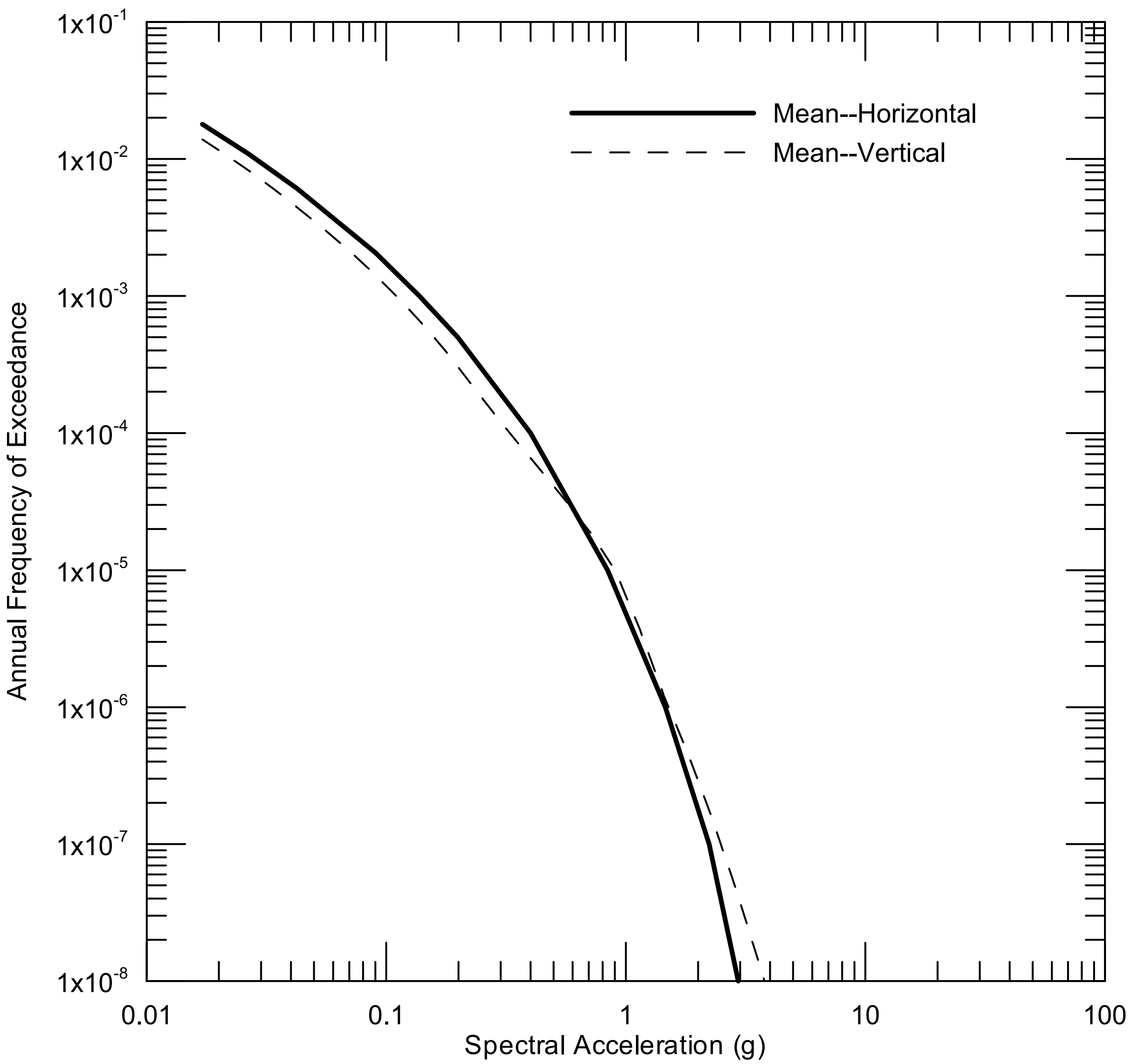
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-12. Mean Horizontal and Vertical Seismic Hazard Curves for 0.2 Sec SA at the RB



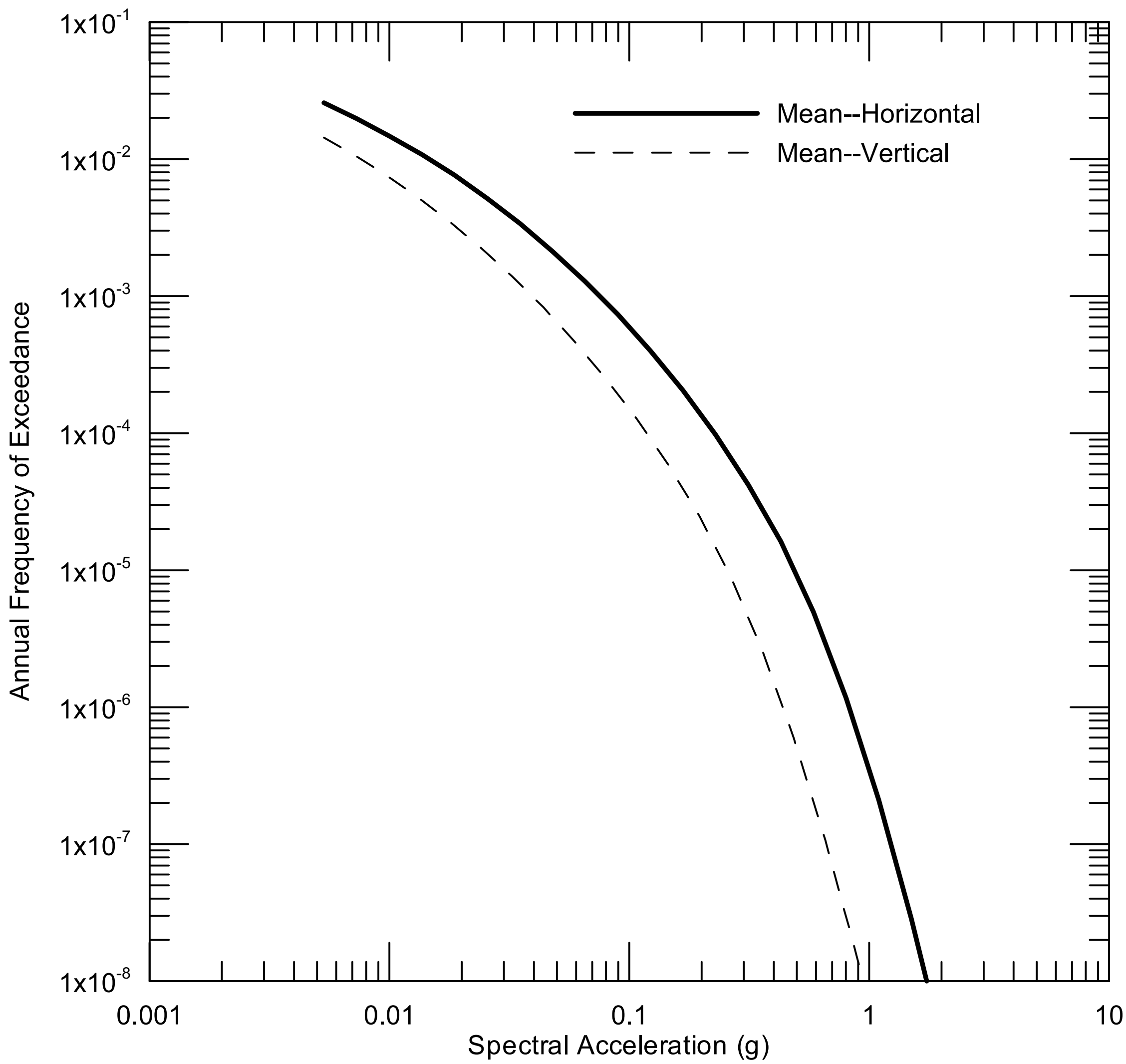
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-13. Mean Horizontal and Vertical Seismic Hazard Curves for 0.5 Sec SA at the RB



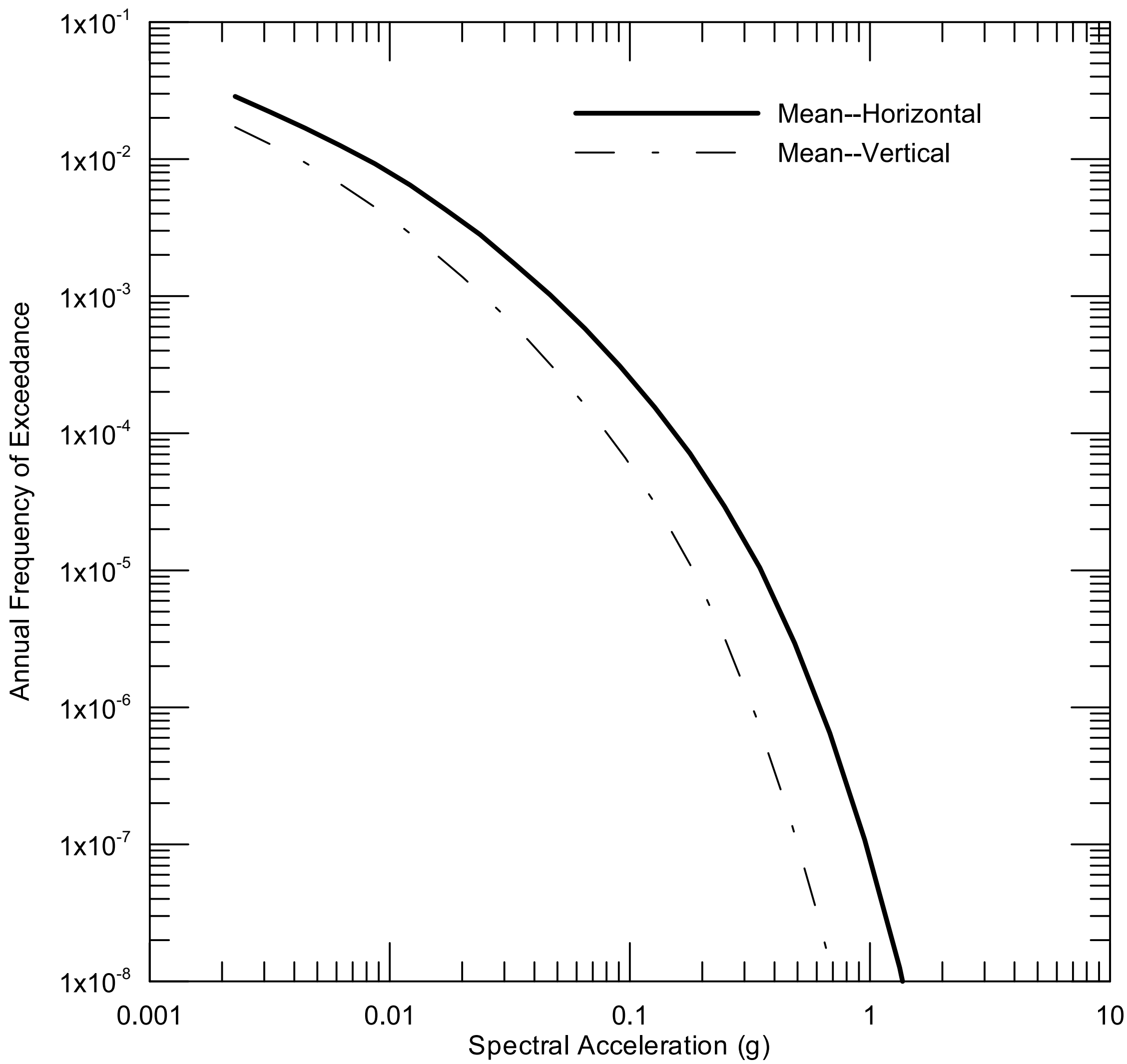
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-14. Mean Horizontal and Vertical Seismic Hazard Curves for 1.0 Sec SA at the RB



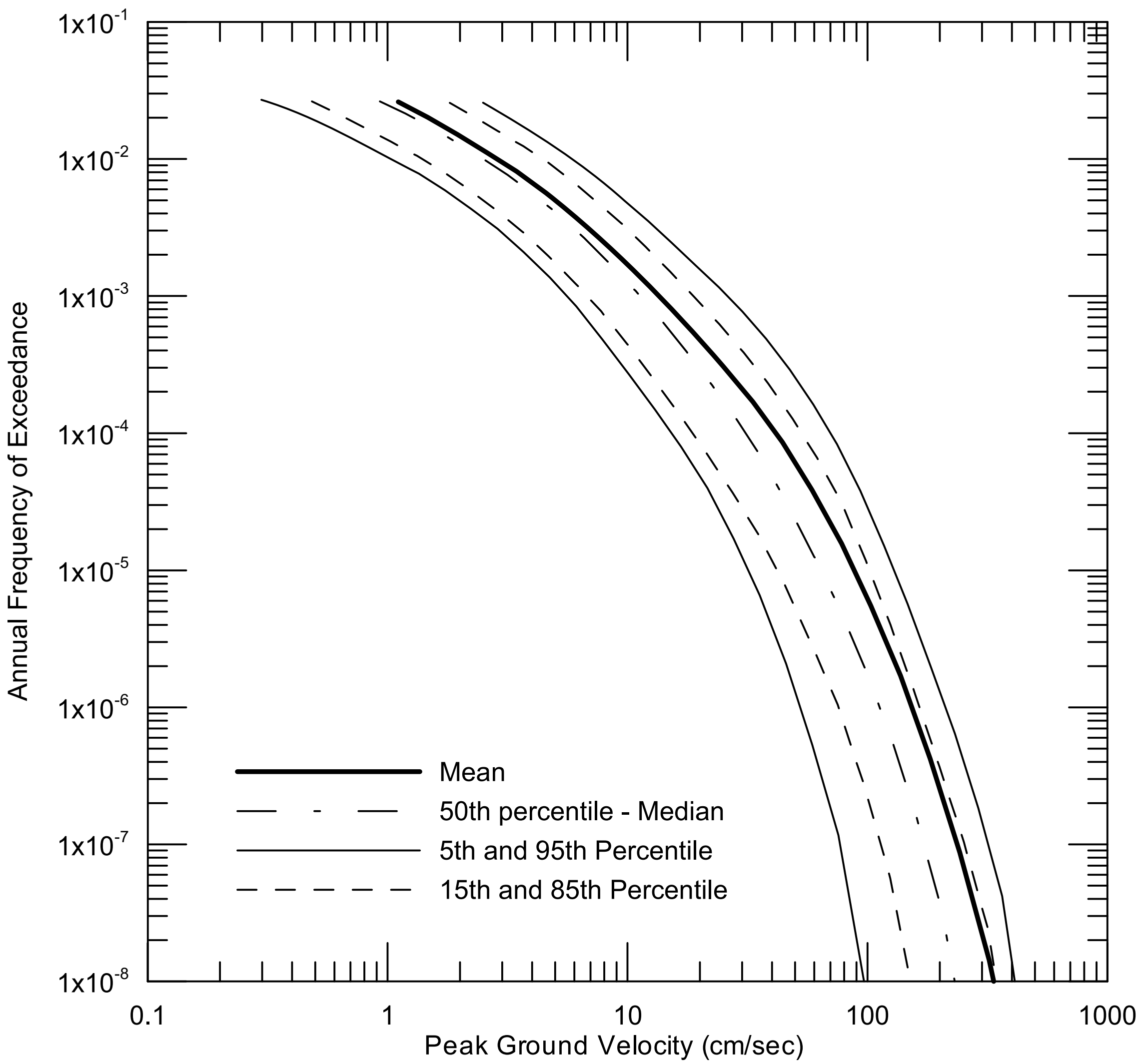
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-15. Mean Horizontal and Vertical Seismic Hazard Curves for 2.0 Sec SA at the RB



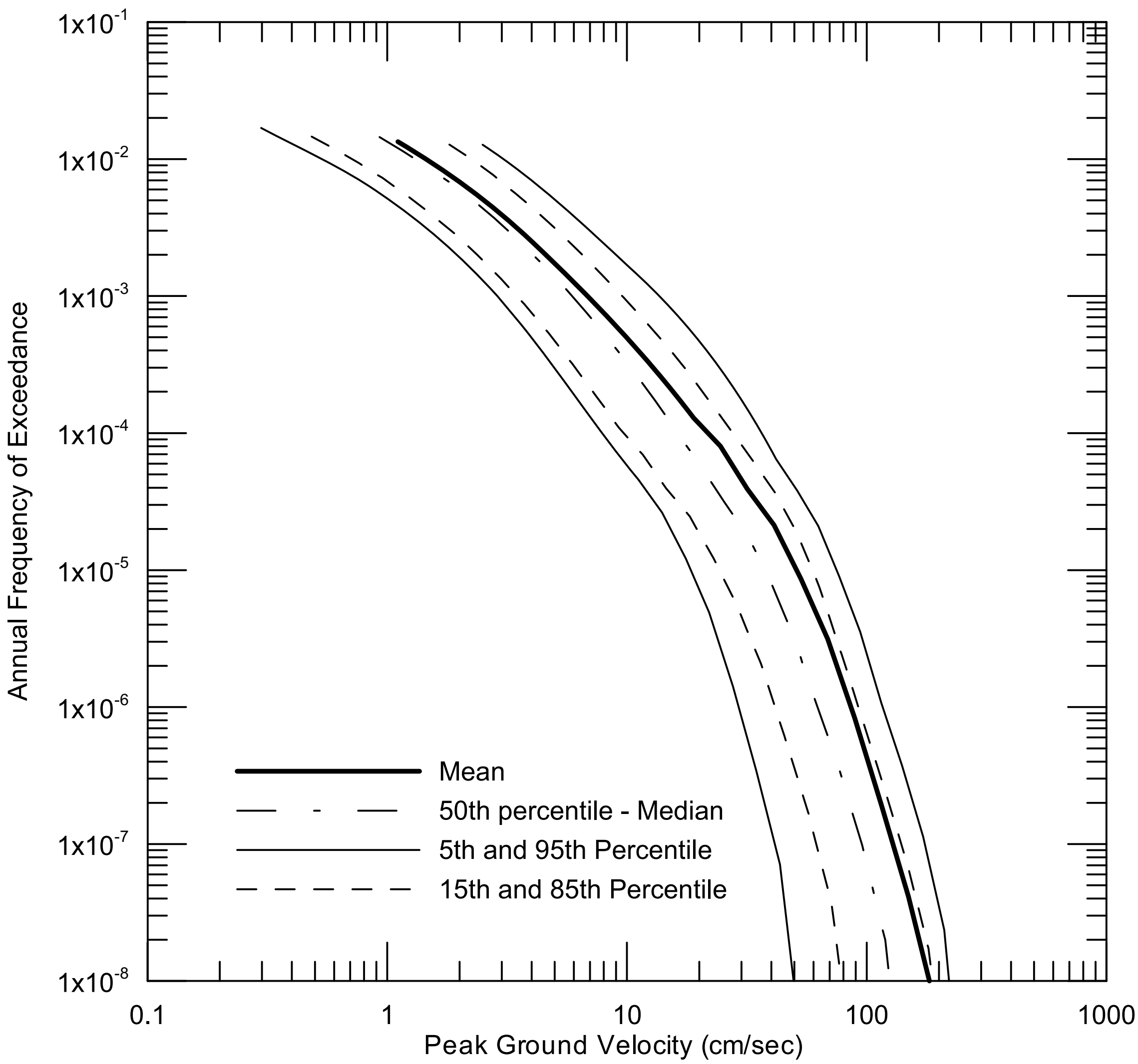
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-16. Mean Horizontal and Vertical Seismic Hazard Curves for 3.3 Sec SA at the RB



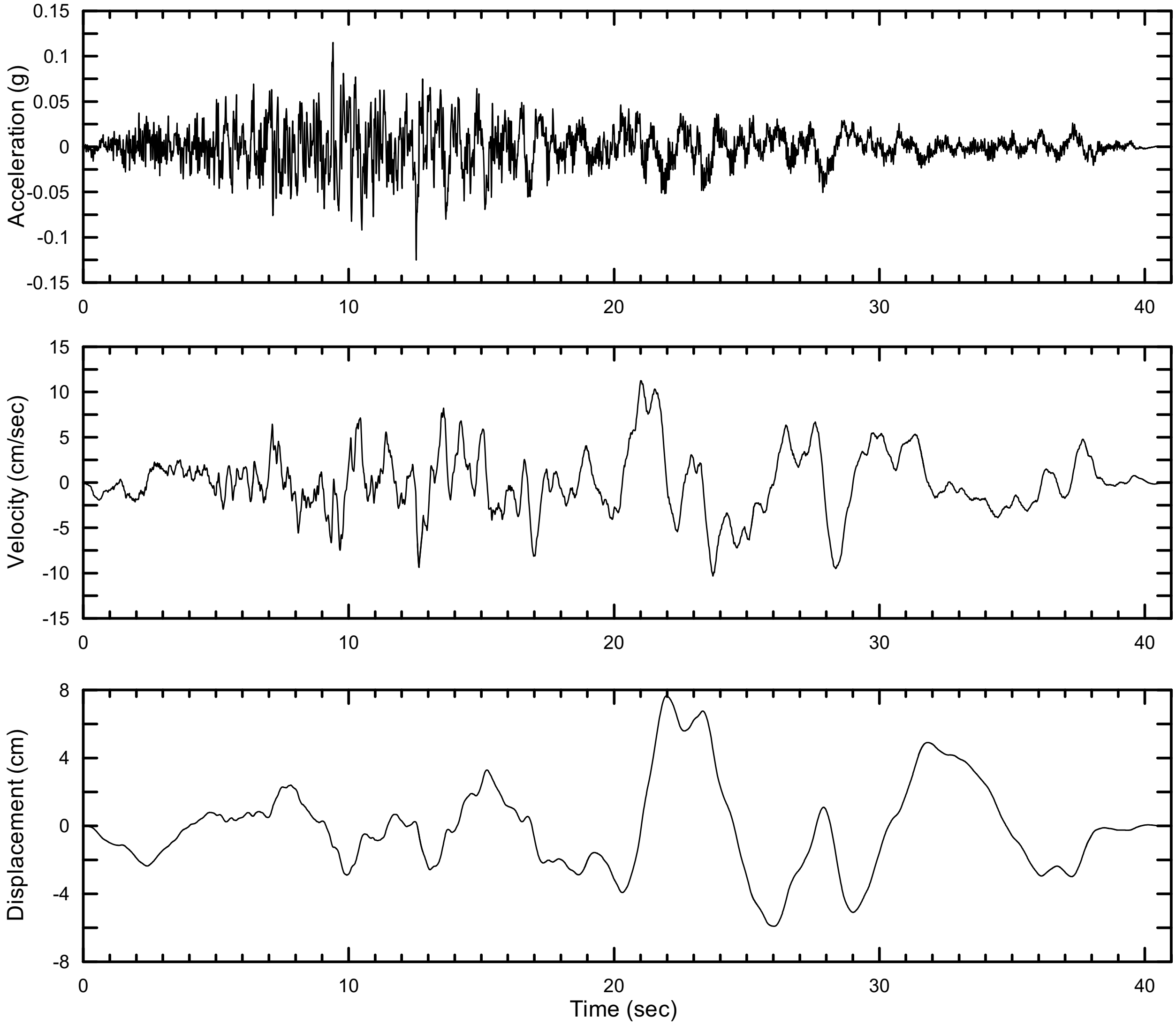
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-17a. Mean and Fractile Horizontal Seismic Hazard Curves for PGV at the RB



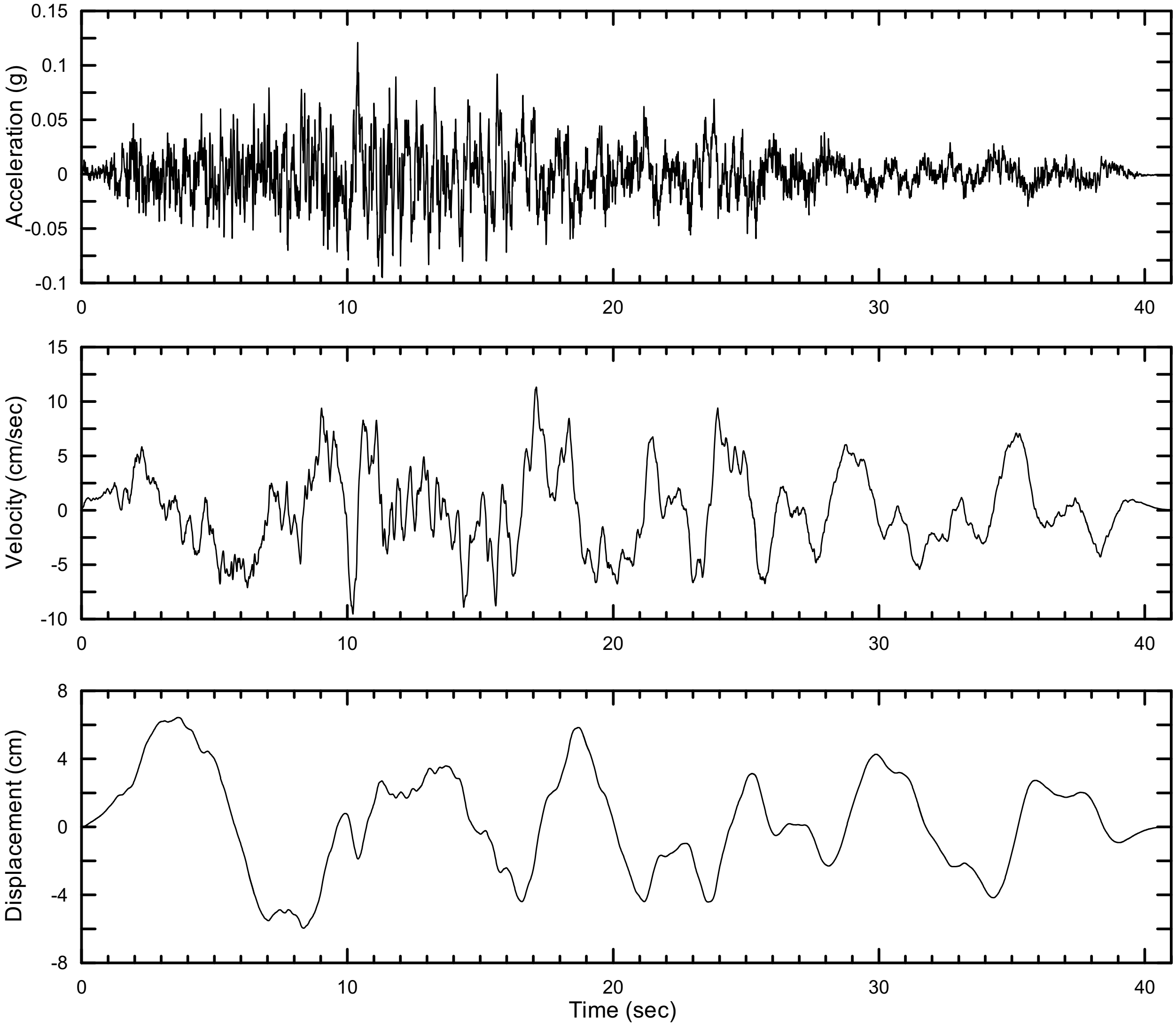
Source: Appendix D, Table D-1, DTN MO0801HCUHSREB.001 [DIRS 184803]

Figure 6.5.3-18. Mean and Fractile Vertical Seismic Hazard Curves for PGV at the RB



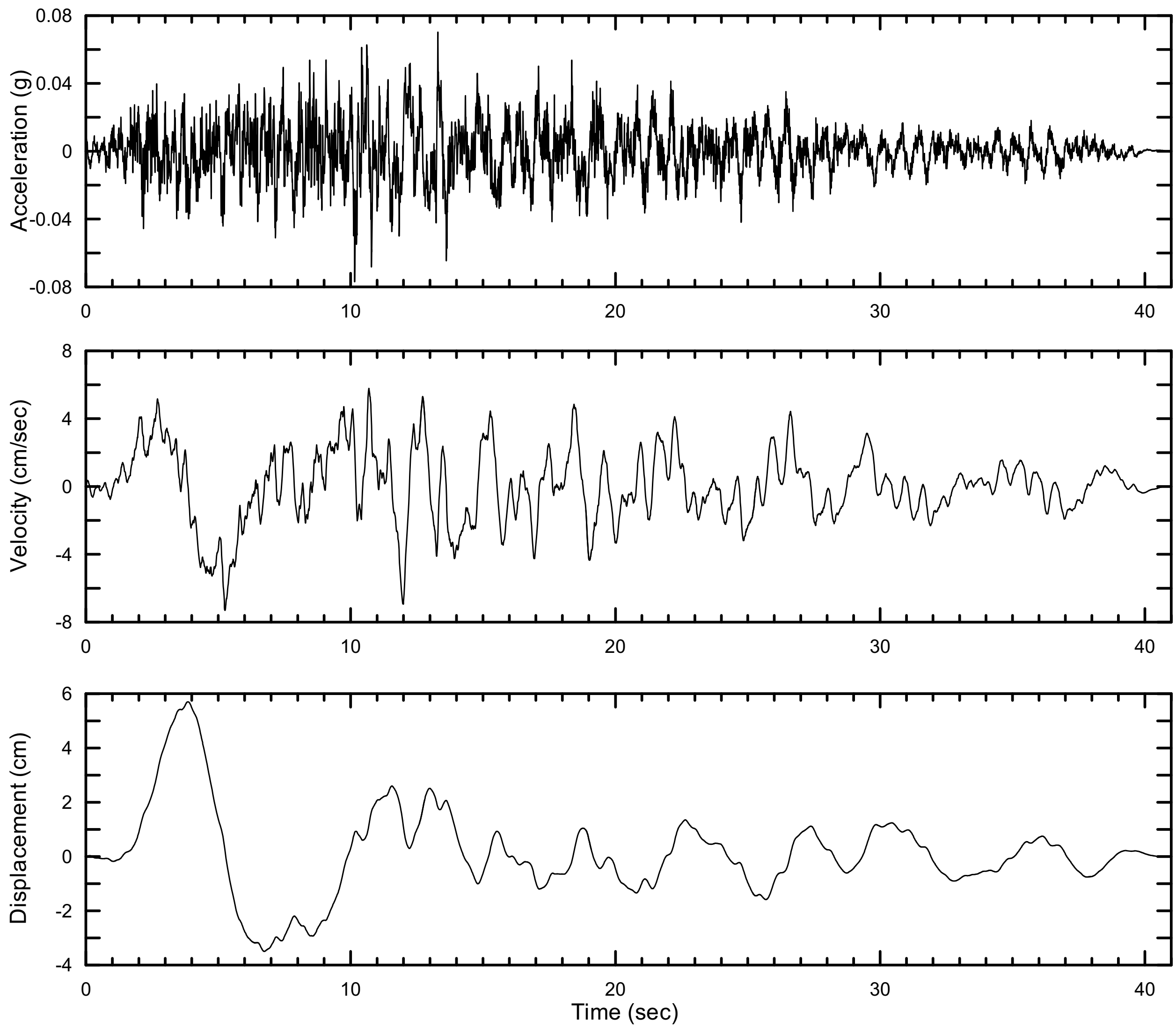
Source: Appendix D, Table D-1

Figure 6.5.3-53. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, 10^3 AFE, Horizontal 1, Set 1



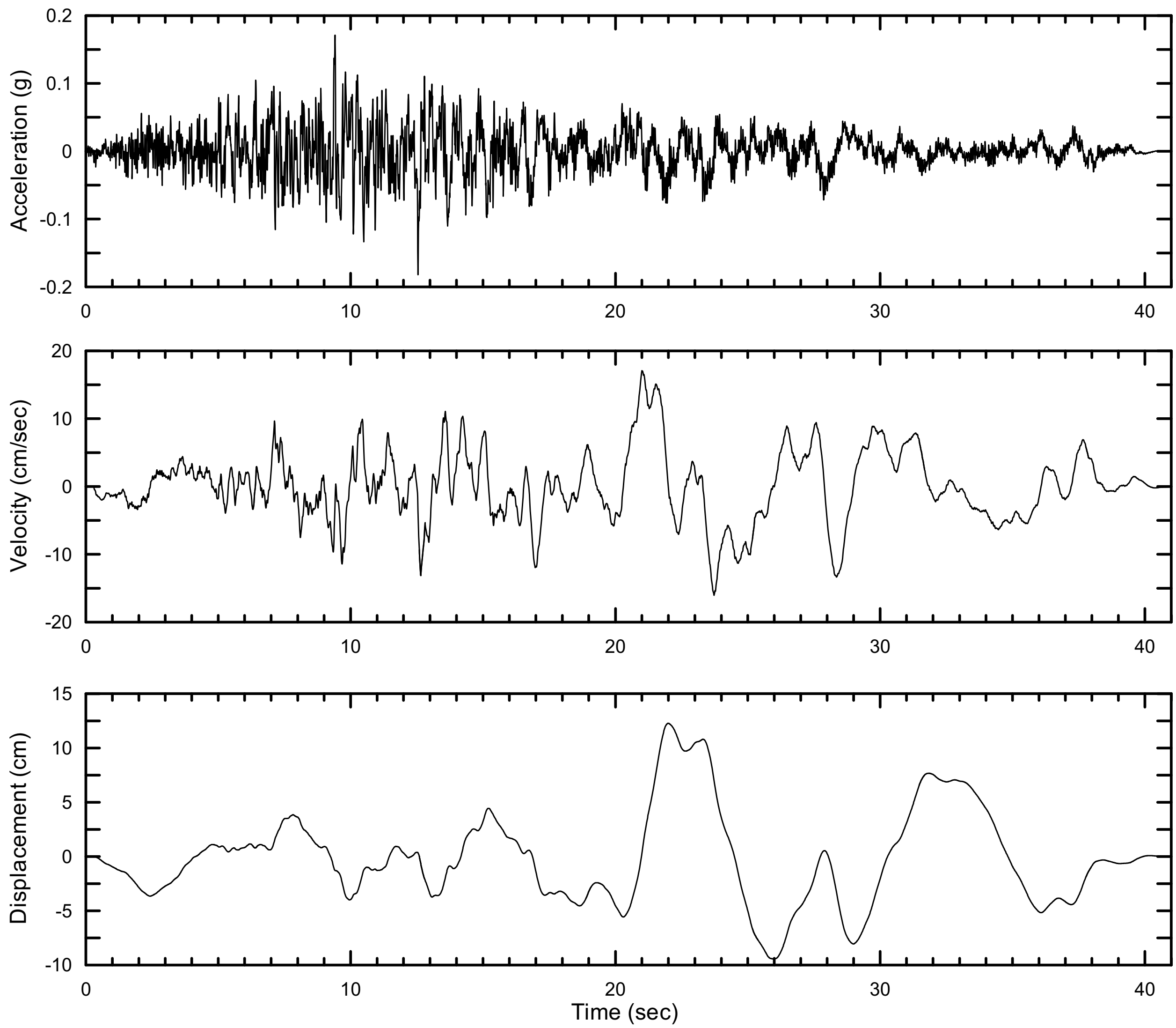
Source: Appendix D, Table D-1

Figure 6.5.3-56. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, 10^3 AFE, Horizontal 2, Set 1



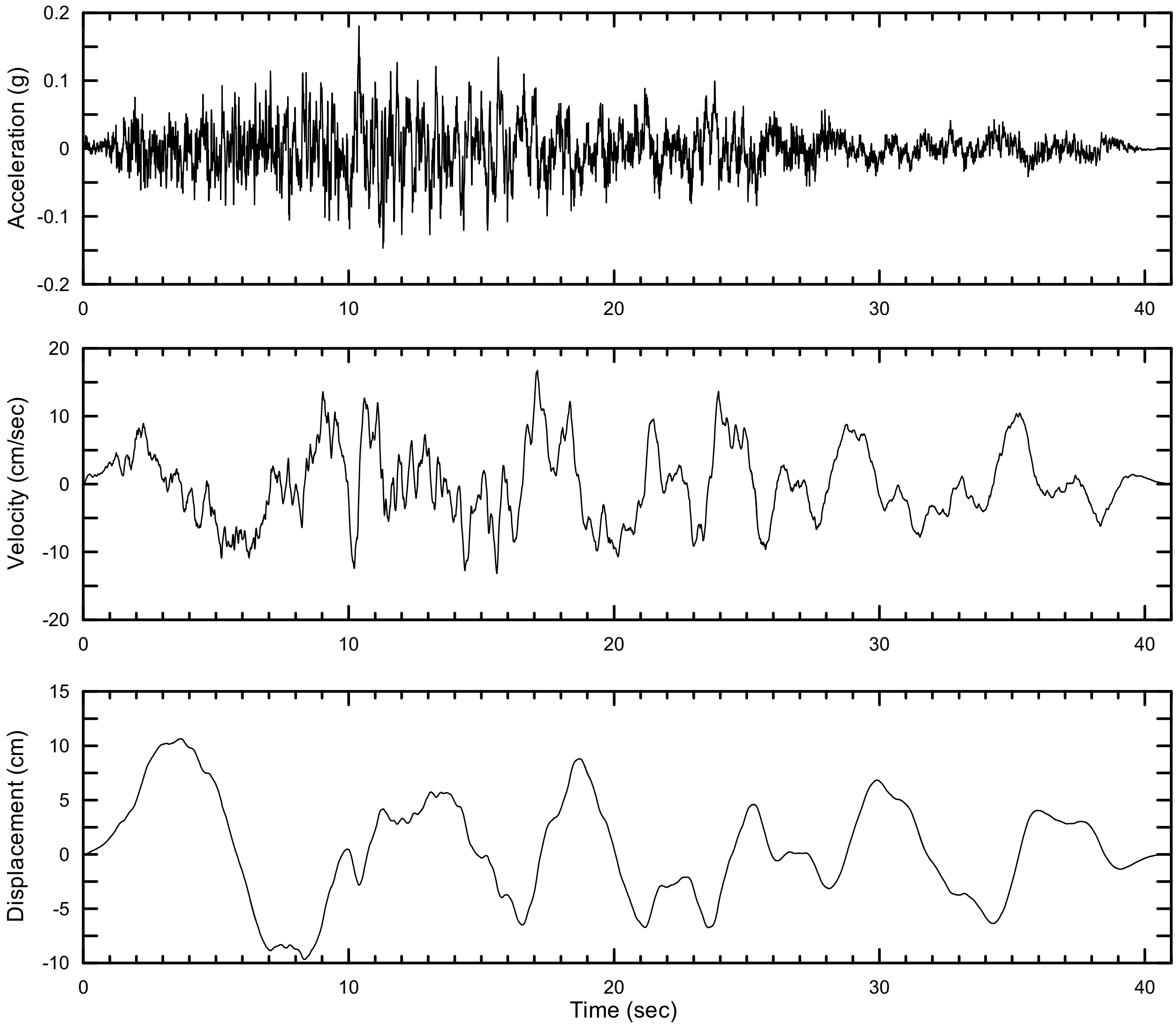
Source: Appendix D, Table D-1

Figure 6.5.3-59. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, 10^3 AFE, Vertical, Set 1



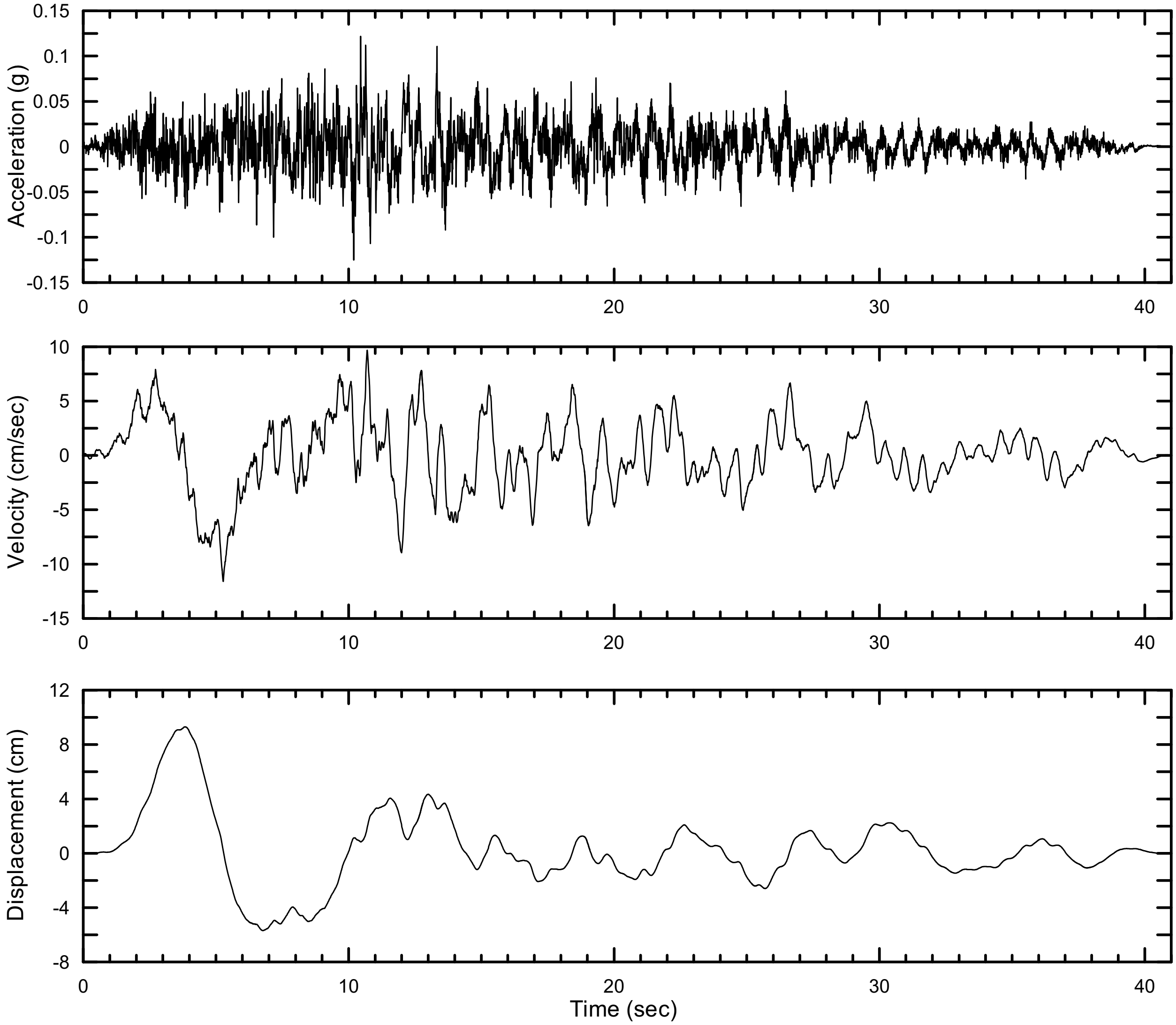
Source: Appendix D, Table D-1

Figure 6.5.3-62. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, $5x10^{-4}$ AFE, Horizontal 1, Set 1



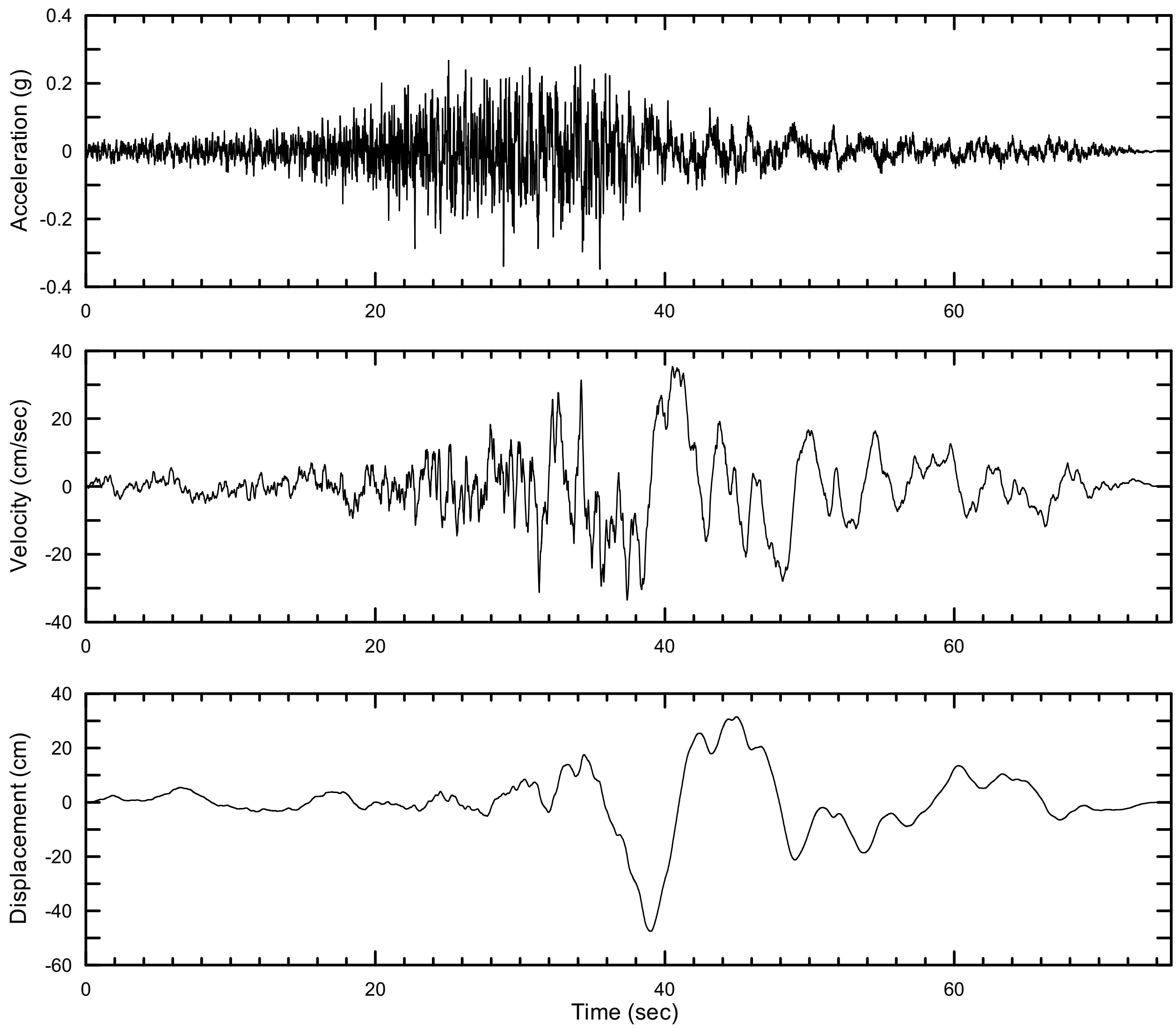
Source: Appendix D, Table D-1

Figure 6.5.3-65. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, $5x10^{-4}$ AFE, Horizontal 2, Set 1



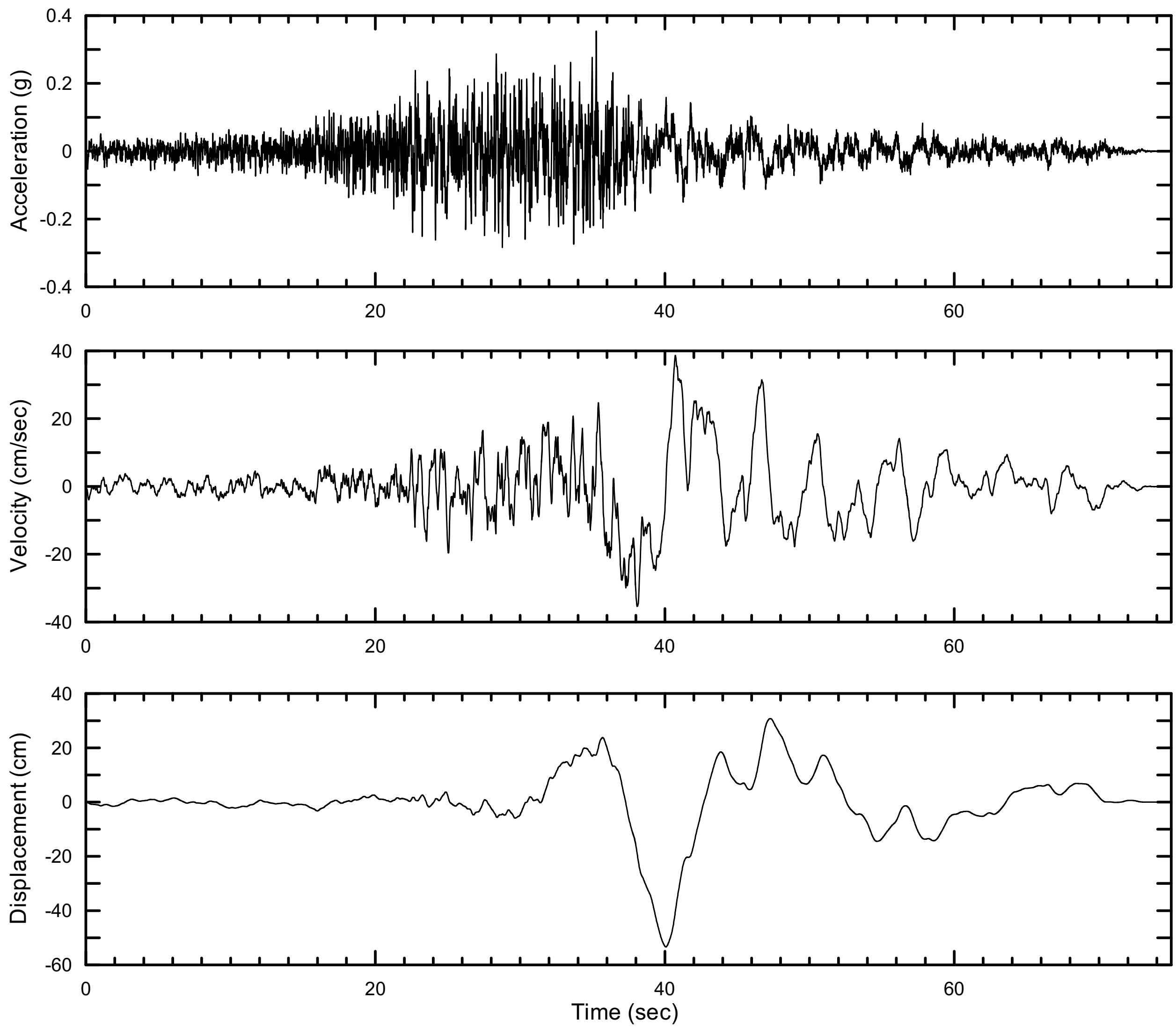
Source: Appendix D, Table D-1

Figure 6.5.3-68. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, $5x10^{-4}$ AFE, Vertical, Set 1



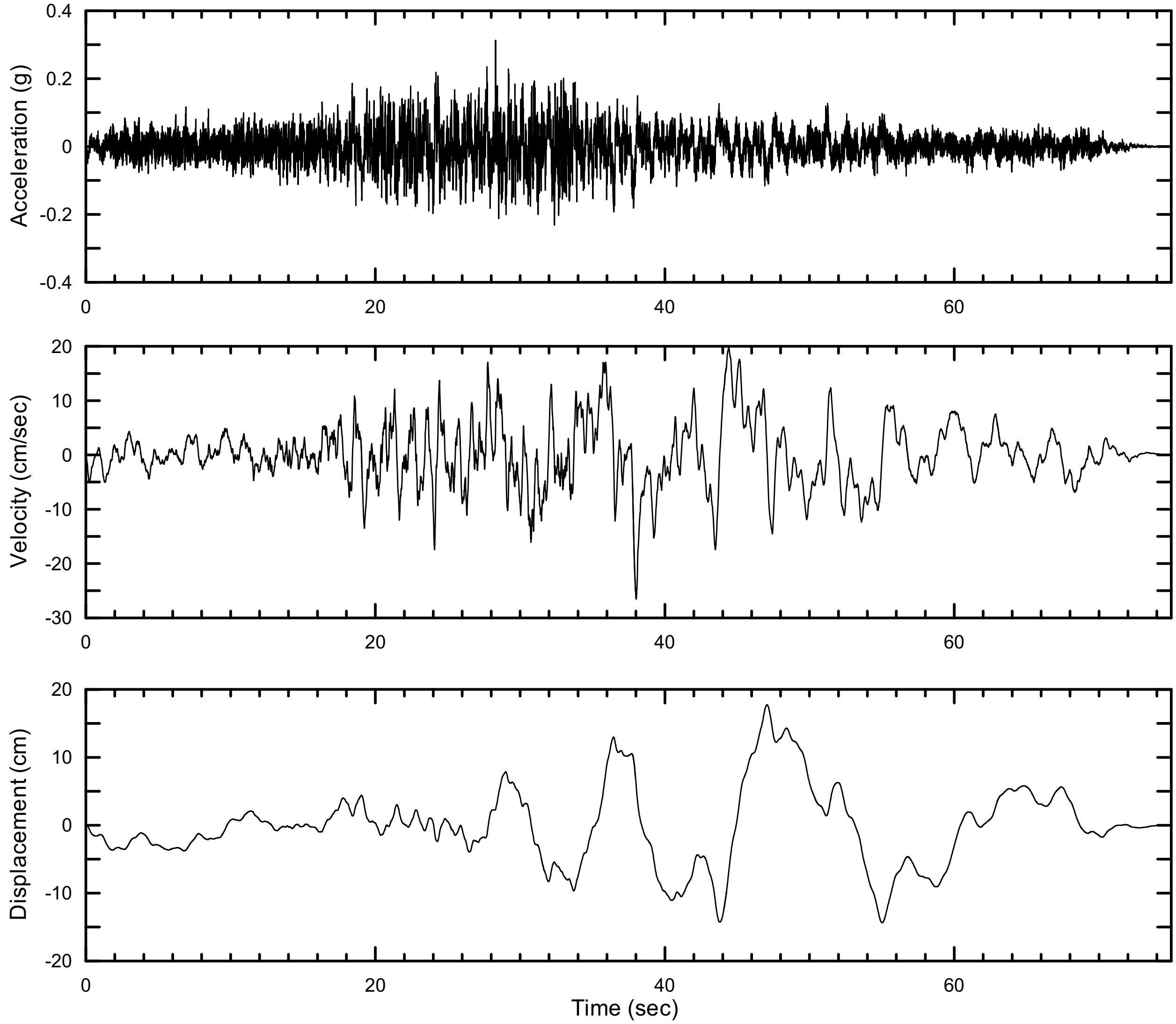
Source: Appendix D, Table D-1

Figure 6.5.3-71. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, 10^4 AFE, Horizontal 1, Set 1



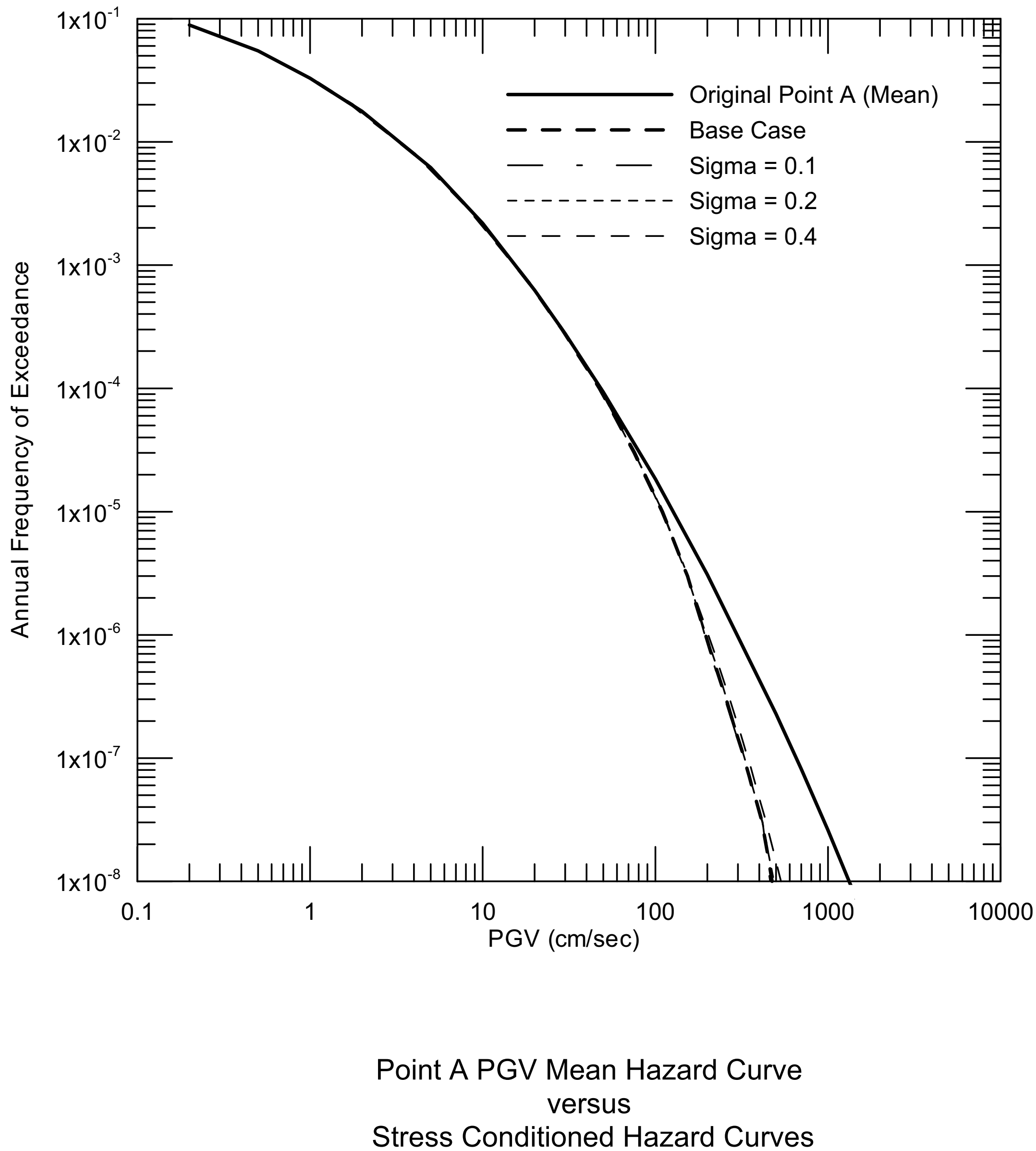
Source: Appendix D, Table D-1

Figure 6.5.3-74. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, 10^4 AFE, Horizontal 2, Set 1



Source: Appendix D, Table D-1

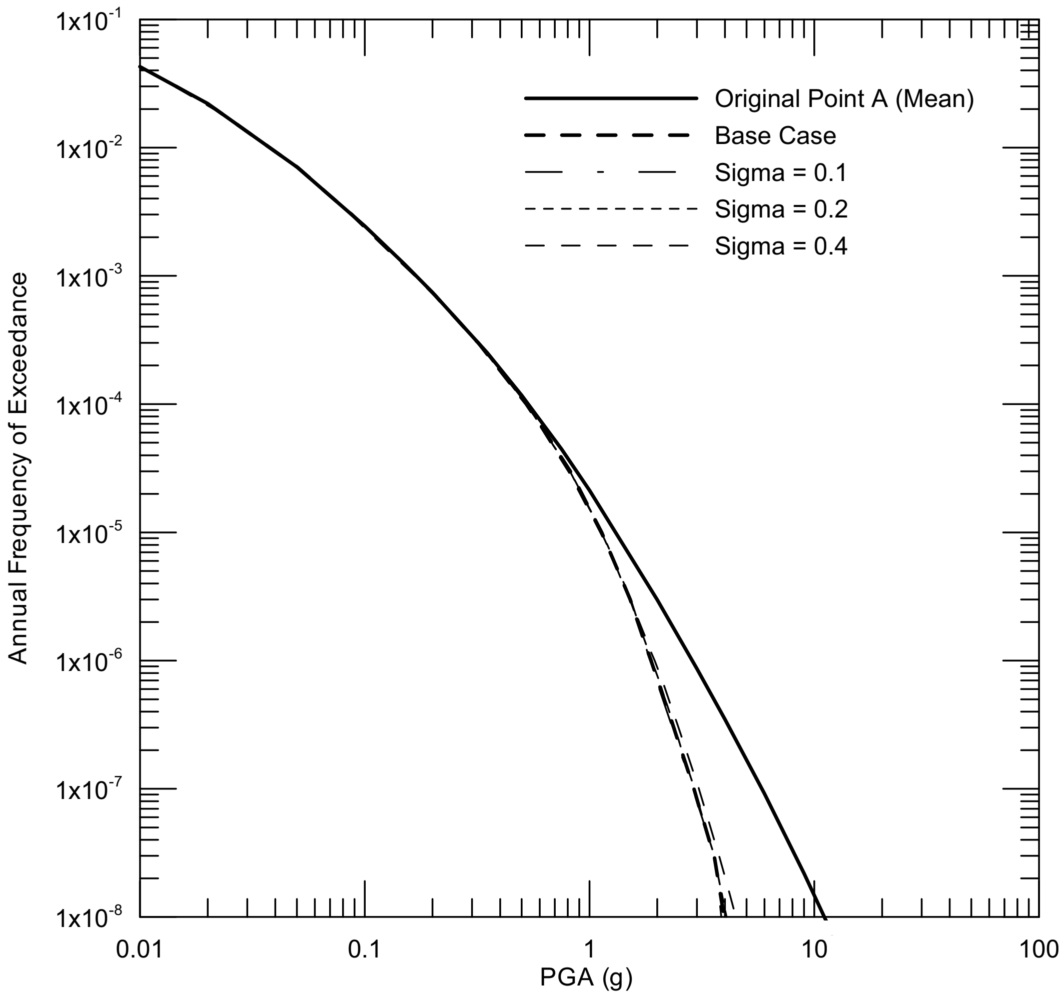
Figure 6.5.3-77. Spectrally Matched RB Acceleration, Velocity, and Displacement Time Histories, 10^4 AFE, Vertical, Set 1



Source: Appendix D, Table D-1

NOTE: Base case sigma is 0.15.

Figure A8(a). PSHA Reference Rock Outcrop extreme-stress-drop conditioned and unconditioned PGV hazard for a suite of ground motion sigma ranging from 0.1-0.4.

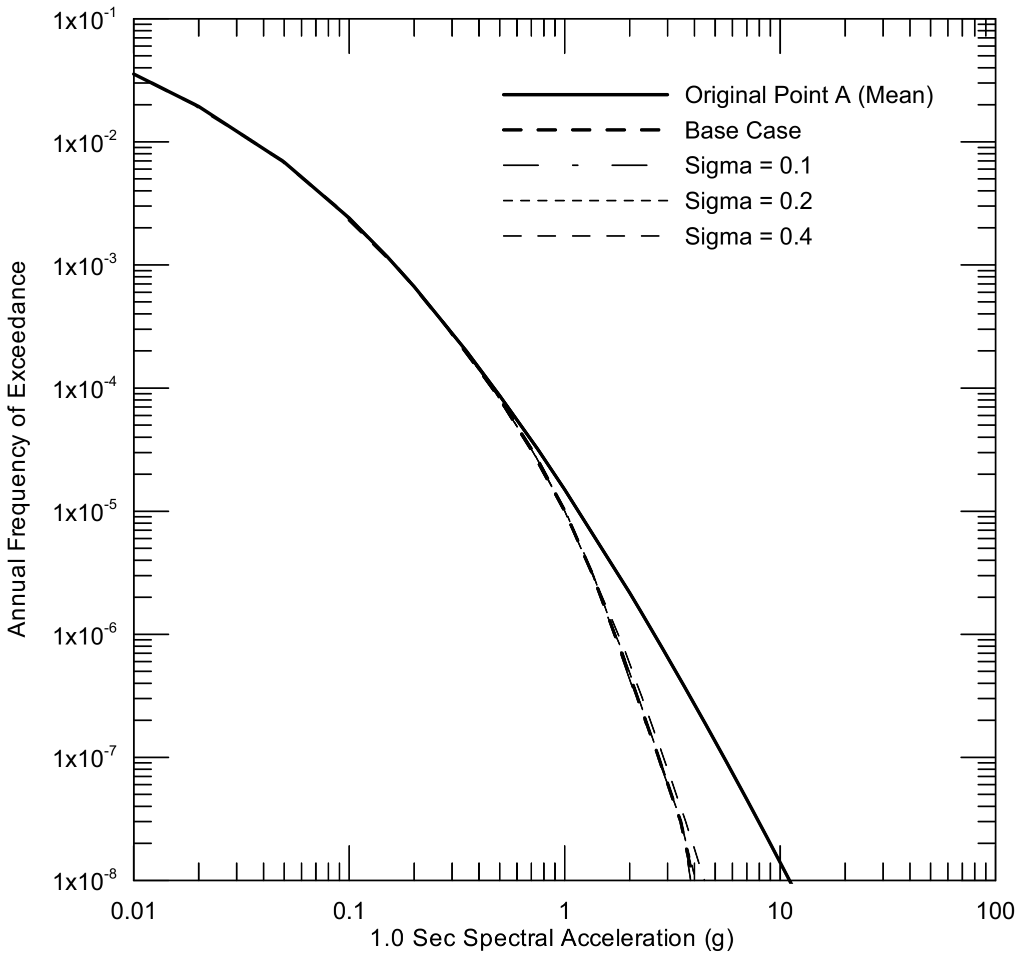


Point A PGA Mean Hazard Curve
versus
Stress Conditioned Hazard Curves

Source: Appendix D, Table D-1

NOTE: Base case sigma is 0.15.

Figure A8(b). PSHA Reference Rock Outcrop extreme-stress-drop conditioned and unconditioned PGA hazard for a suite of ground motion sigma ranging from 0.1-0.4.

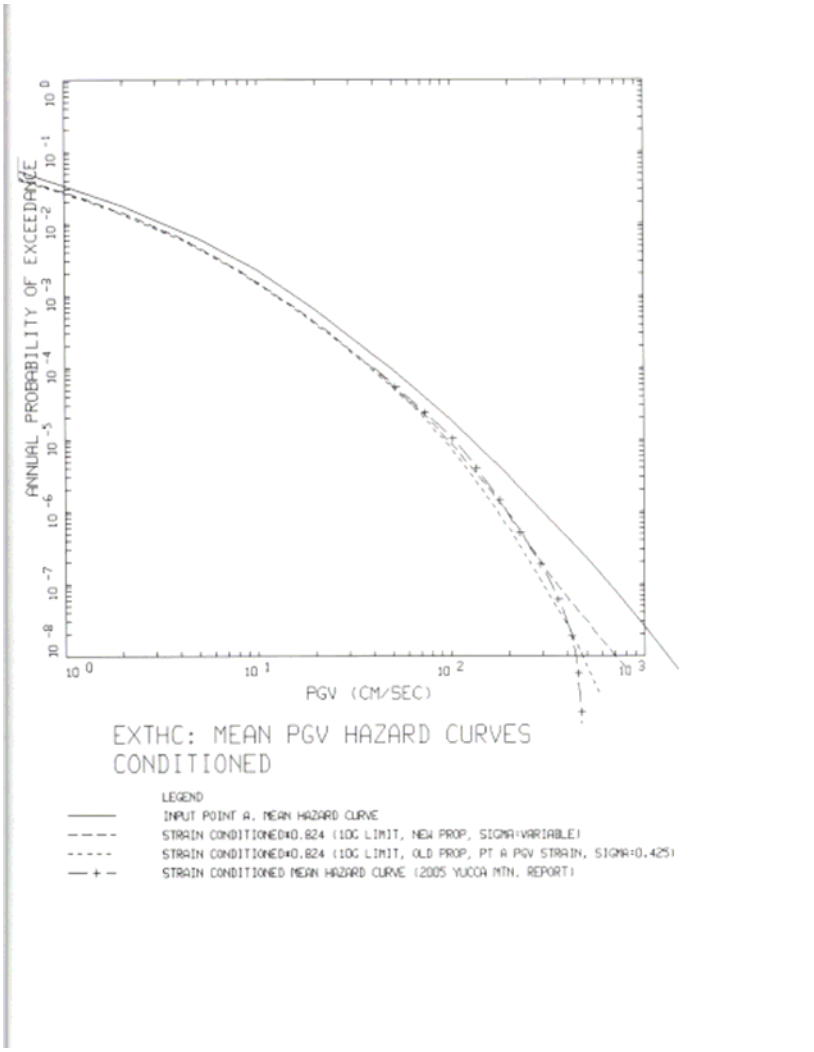


Point A 1.0 Second SA Mean Hazard Curve
versus
Stress Conditioned Hazard Curves

Source: Appendix D, Table D-1

NOTE: Base case sigma is 0.15.

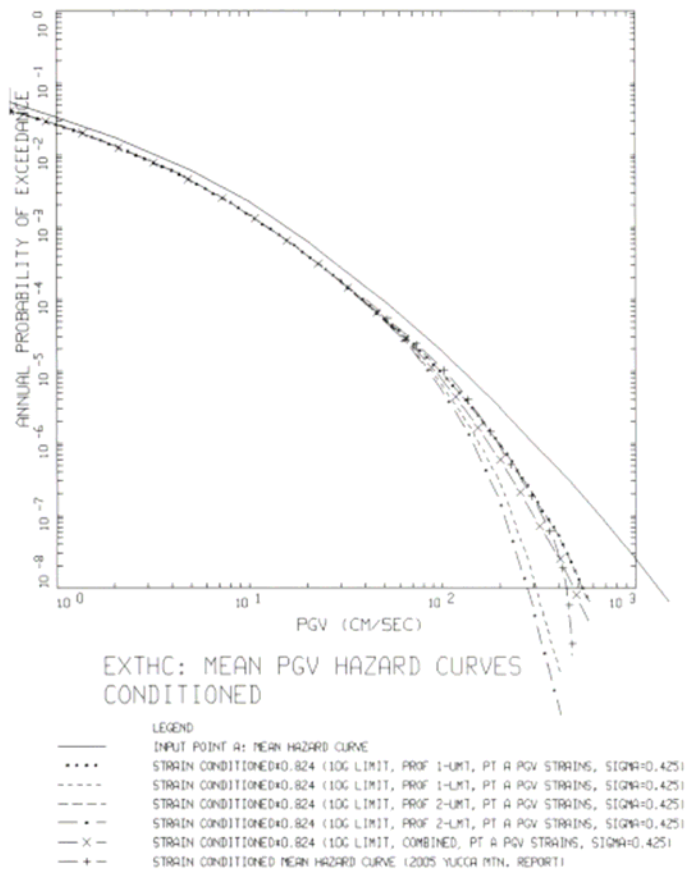
Figure A8(c). PSHA Reference Rock Outcrop extreme-stress-drop conditioned and unconditioned 1.0-Hz spectral acceleration hazard for a suite of ground motion sigma ranging from 0.1-0.4.



Source: Appendix D, Table D-1

NOTES: The short-dash line represents the conditioned hazard using shear strains and PGV from BSC (2005 [DIRS 170137]), a shear strain sigma of 0.425, and a 0.824 factor to convert hazard for the reference rock outcrop to hazard at the waste emplacement level. The long-dash line represents the same case, except shear strain values from this report are used. The solid line represents the PSHA Reference Rock Outcrop mean PGV hazard. The dash-plus line represents conditioned hazard from BSC (2005 [DIRS 170137]).

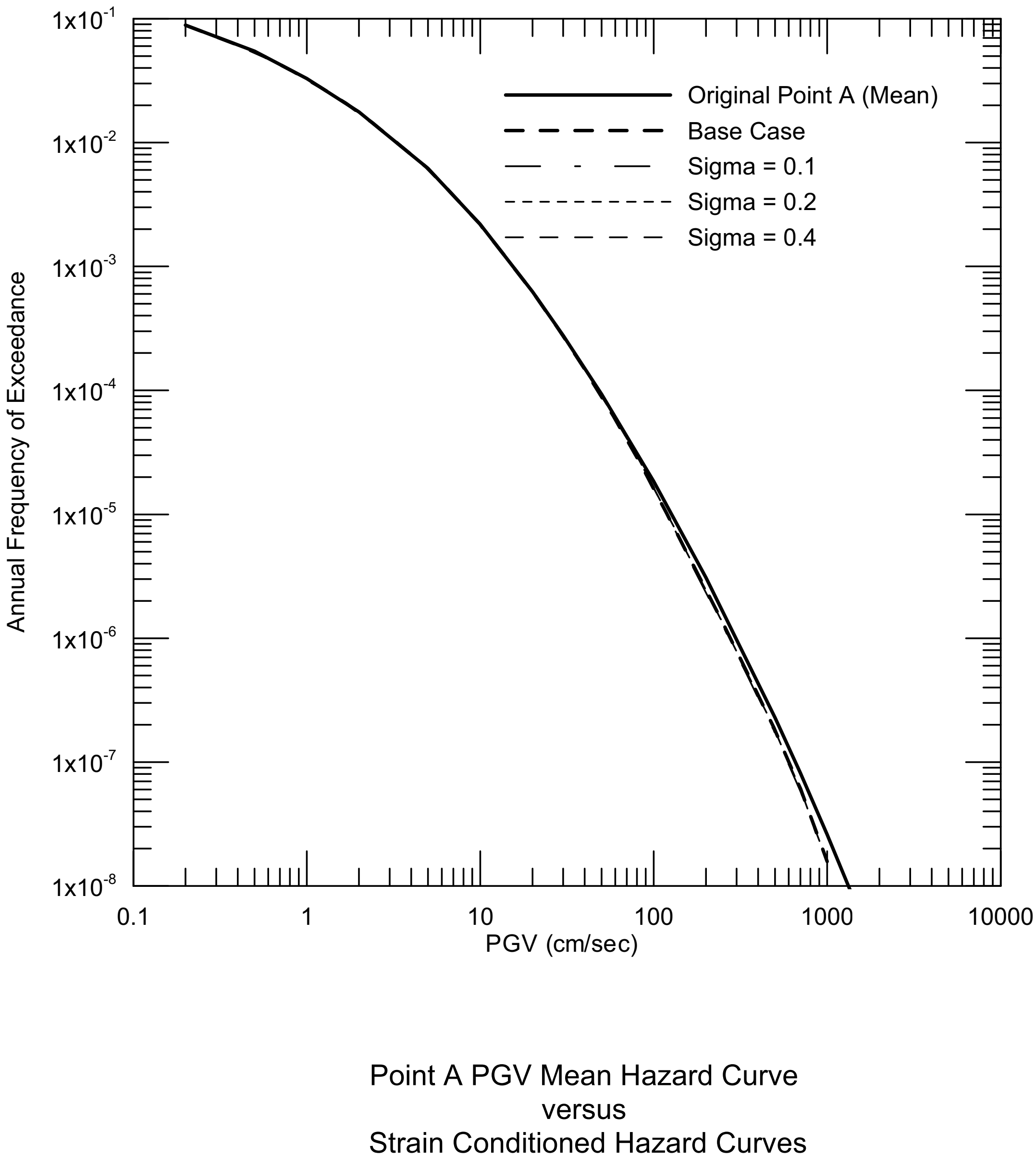
Figure A9(b). Repository waste emplacement level shear-strain-threshold conditioned mean PGV hazard using the methodology described in Section A4.2: Results using shear strains from BSC (2005 [DIRS 170137]) are compared to results using shear strains developed in this report.



Source: Appendix D, Table D-1

NOTE: The dotted, short-dash, long-dash, dash-dot, and dash-X lines represent conditioned hazard for different combinations of velocity profile and dynamic material property curves using shear strains and PGV from BSC (2005 [DIRS 170137]), a shear strain sigma of 0.425, and a 0.824 factor to convert hazard for the reference rock outcrop to hazard at the waste emplacement level. The dotted line is for base case velocity profile 1 and upper mean tuff (UMT) dynamic property curves (BSC 2004 [DIRS 170027]). The short-dash line is form profile 1 and lower mean tuff (LMT) curves. The long-dash line is for profile 2 and UMT curves. The dash-dot line is for profile 2 and LMT curves. The dash-X curve represents the mean of the four combinations using equal weighting. The solid line represents the PSHA Reference Rock Outcrop mean PGV hazard. The dash-plus line represents conditioned hazard from BSC (2005 [DIRS 170137]).

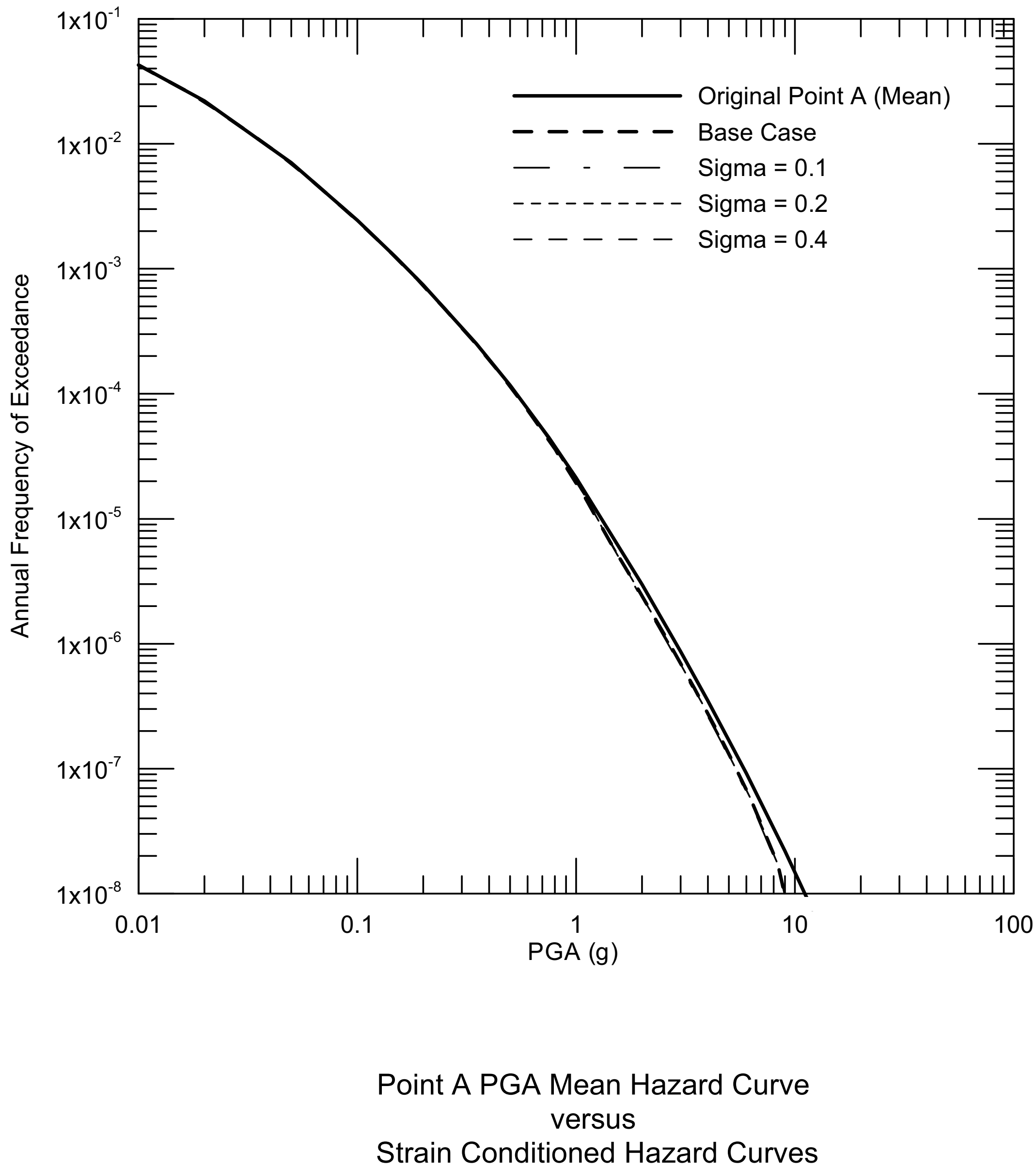
Figure A9(d). Repository waste emplacement level shear-strain-threshold conditioned mean PGV hazard using the methodology described in Section A4.2: Effects of epistemic uncertainty in material properties for properties from BSC (2004 [DIRS 170027]).



Source: Appendix D, Table D-1

NOTE: Base case shear strain sigma is determined from site-response modeling.

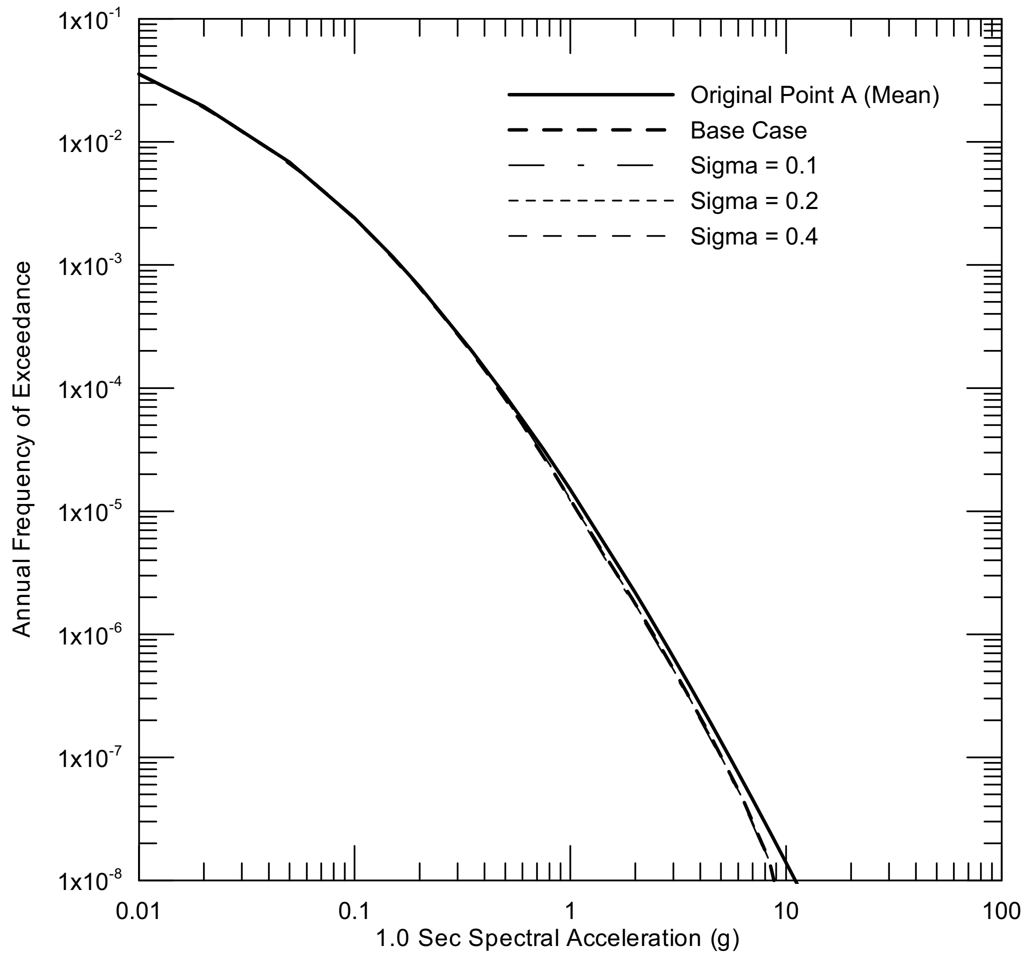
Figure A10(a). Shear-strain-threshold conditioned PSHA Reference Rock Outcrop PGV hazard using the methodology described in Section A4.2. The conditioned hazard dependence on shear strain sigma is also illustrated.



Source: Appendix D, Table D-1

NOTE: Base case shear strain sigma is determined from site-response modeling.

Figure A10(b). Strain conditioned PSHA Reference Rock Outcrop PGA hazard using the methodology described in Section A4.2. The conditioned hazard dependence on shear strain sigma is also illustrated.

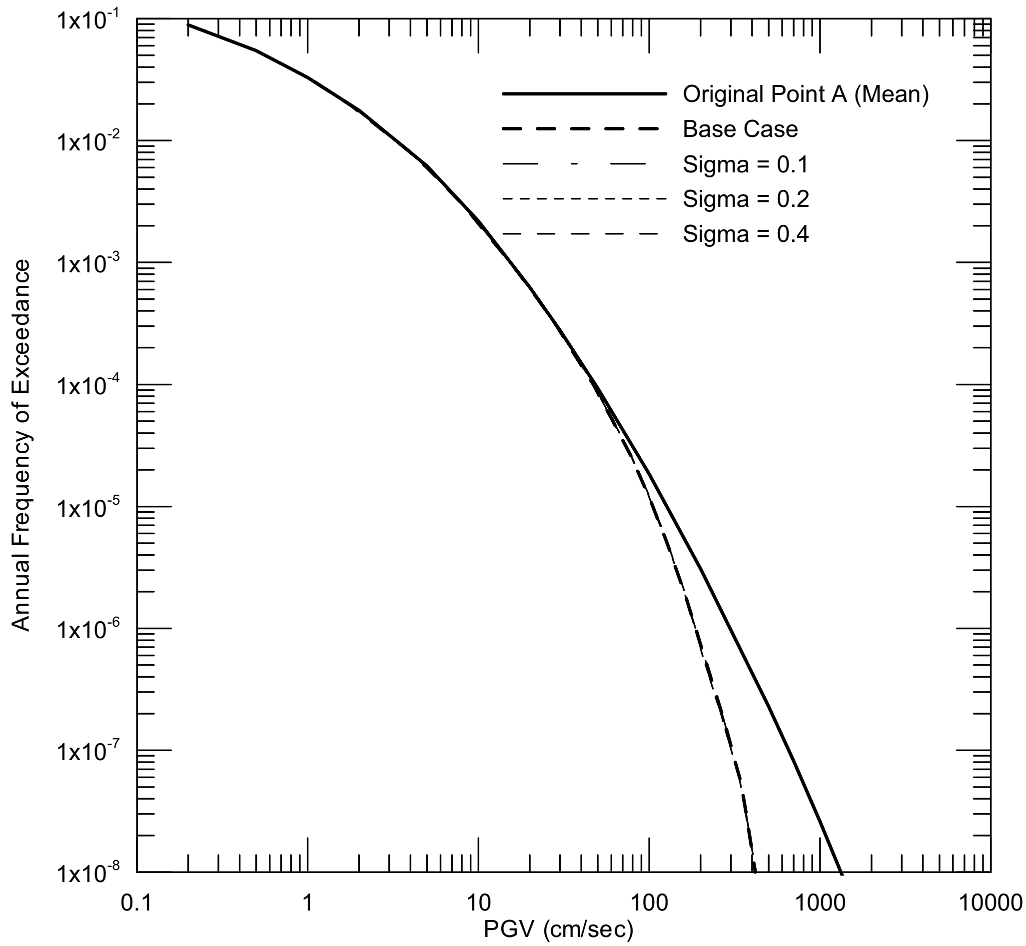


Point A 1.0 Second SA Mean Hazard Curve
versus
Strain Conditioned Hazard Curves

Source: Appendix D, Table D-1

NOTE: Base case shear strain sigma is determined from site-response modeling.

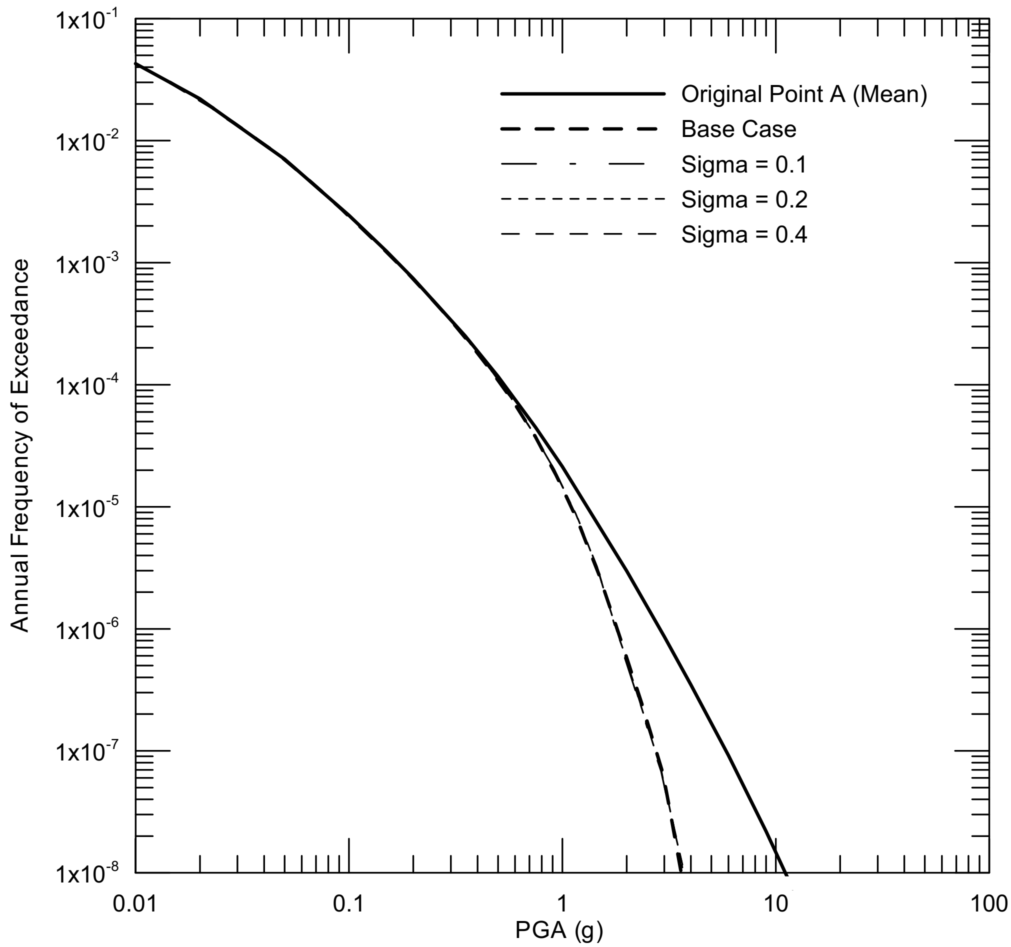
Figure A10(c). Strain conditioned PSHA Reference Rock Outcrop 1.0-second spectral acceleration hazard using the methodology described in Section A4.2. The conditioned hazard dependence on shear strain sigma is also illustrated.



Point A PGV Mean Hazard Curve
versus
Stress and Strain Conditioned Hazard Curves

Source: Appendix D, Table D-1

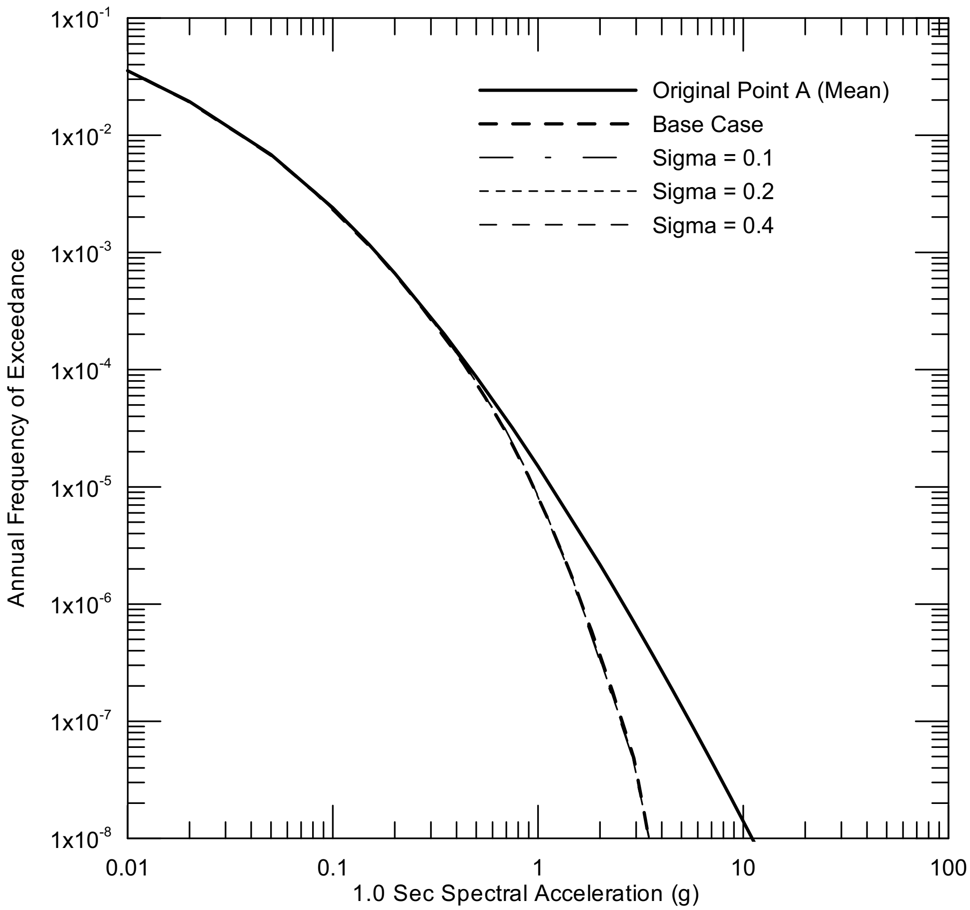
Figure A11(a). Extreme-stress-drop and shear-strain-threshold conditioned PGV hazard using the methodology described in Sections A4.1 and A4.2. The effects of ground motion and shear strain sigma are also illustrated.



Point A Mean Hazard Curve
versus
Stress and Strain Conditioned Hazard Curves

Source: Appendix D, Table D-1

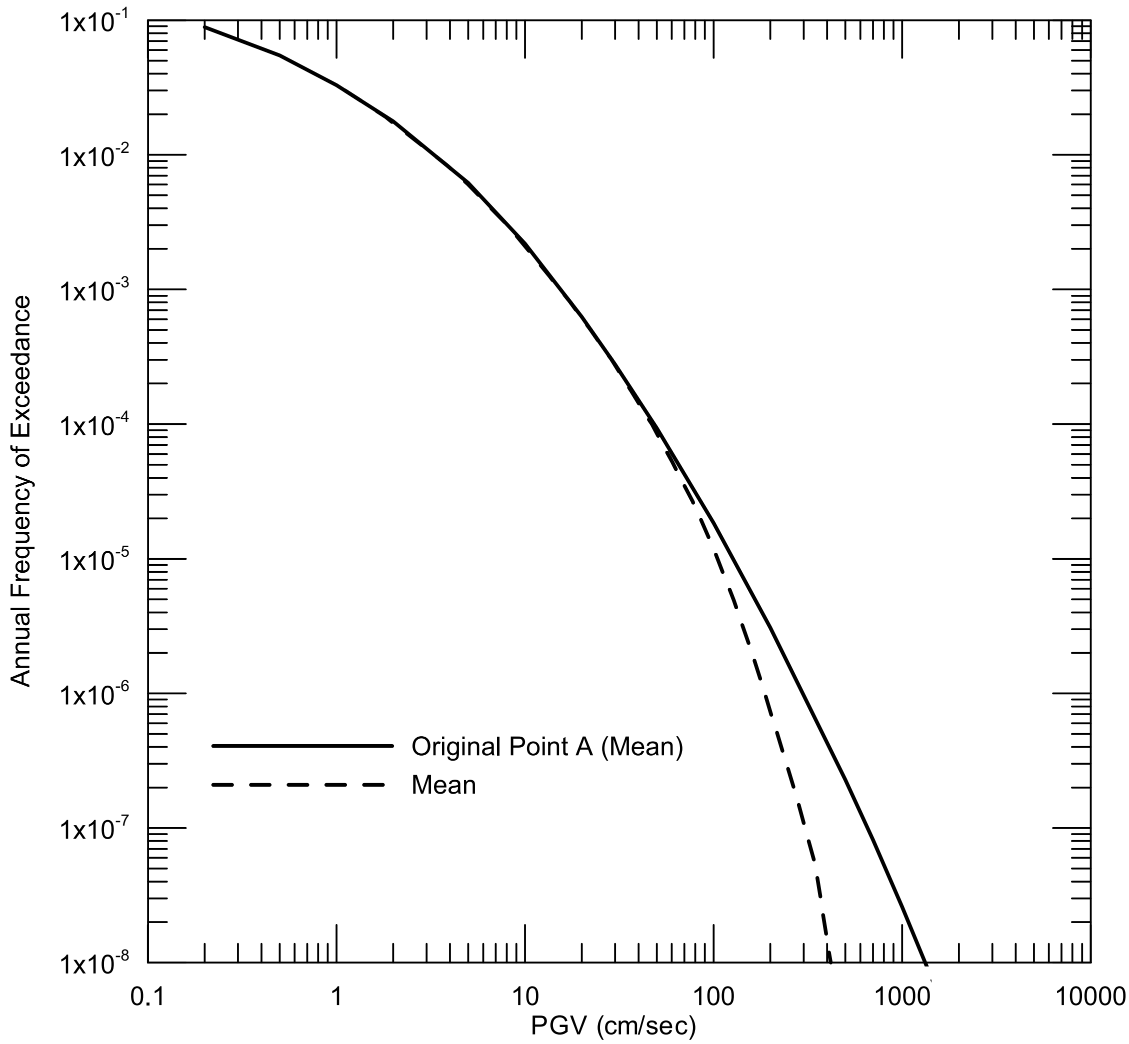
Figure A11 (b). Extreme-stress-drop and shear-strain-threshold conditioned PGA hazard using the methodology described in Sections A41 and A4.2. The effects of ground motion and shear strain sigma are also illustrated.



Point A 1.0 Second SA Mean Hazard Curve
versus
Stress and Strain Conditioned Hazard Curves

Source: Appendix D, Table D-1

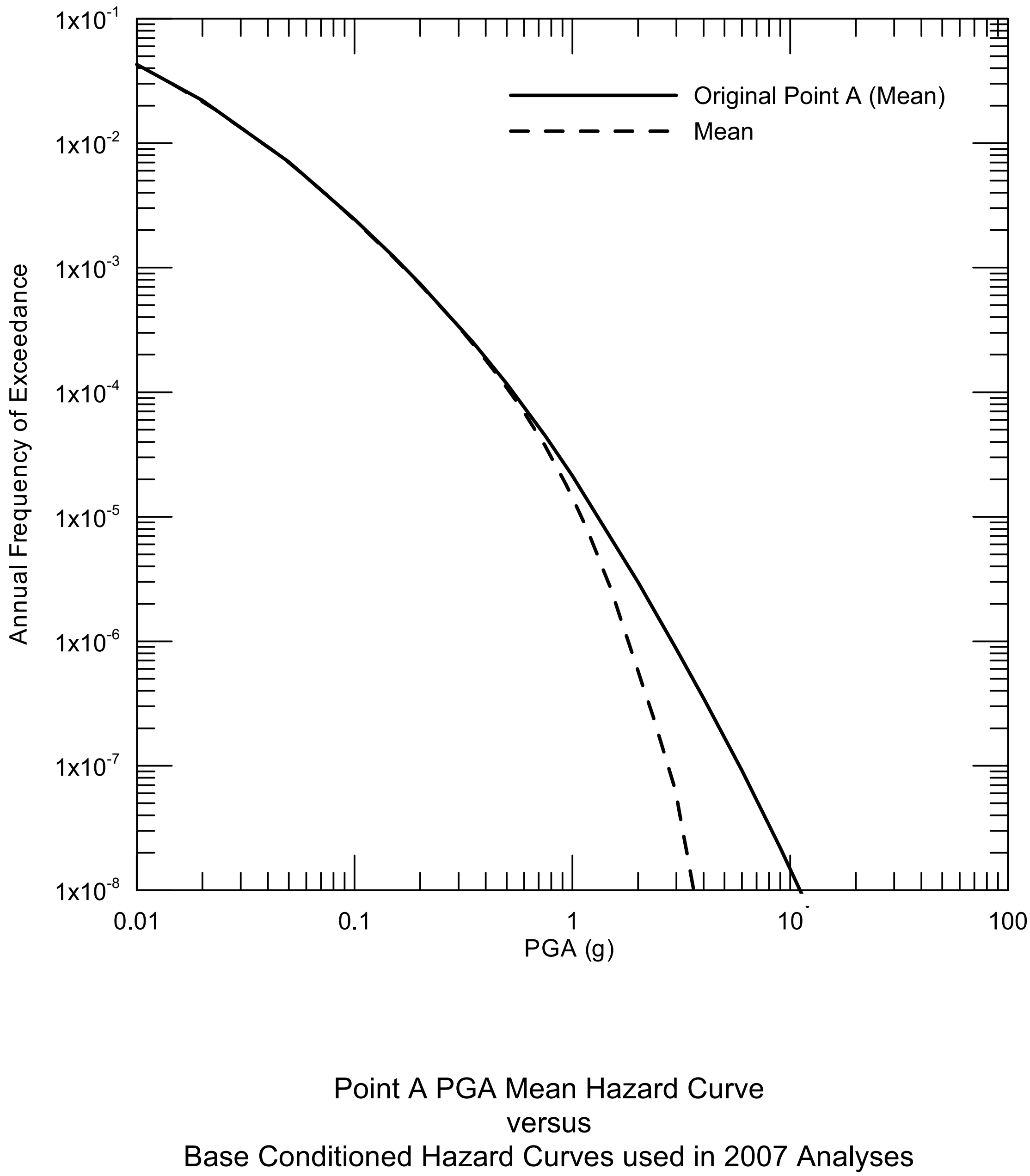
Figure A11(c). Extreme-stress-drop and shear-strain-threshold conditioned 1-second spectral acceleration hazard using the methodology described in Sections A4.1 and A4.2. The effects of ground motion and shear strain sigma are also illustrated.



Point A PGV Mean Hazard Curve
versus
Base Conditioned Hazard Curves used in 2007 Analyses

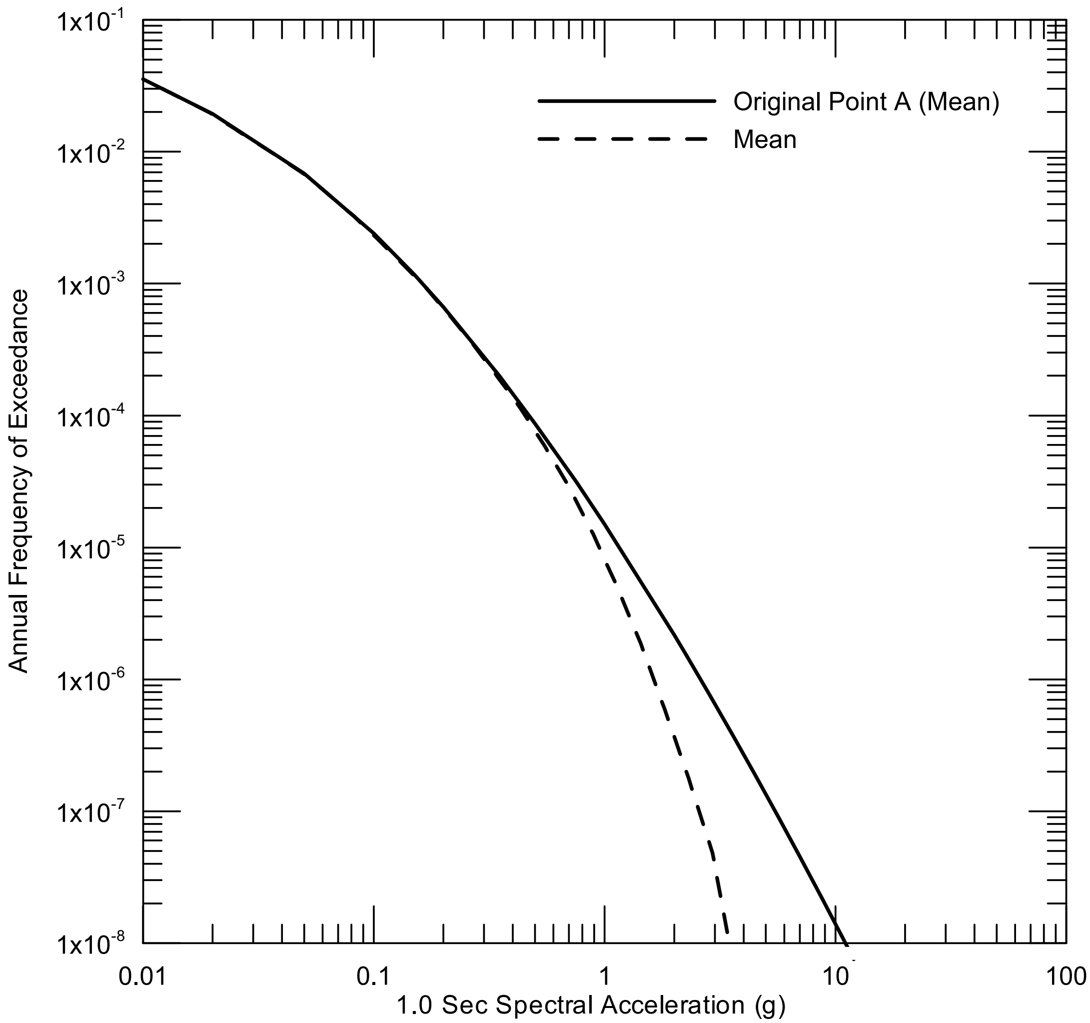
Source: Appendix D, Table D-1

Figure A12(a). Conditioned PSHA Reference Rock Outcrop mean horizontal PGV hazard.



Source: Appendix D, Table D-1

Figure A12 (b). Conditioned PSHA Reference Rock Outcrop mean horizontal PGA hazard.



Point A 1.0 Second SA Mean Hazard Curve
versus
Base Conditioned Hazard Curves used in 2007 Analyses

Source: Appendix D, Table D-1

Figure A12(c). Conditioned PSHA Reference Rock Outcrop mean horizontal 1-second spectral acceleration hazard.

The "smoothing" process has been documented in the scientific notebook SN-M&O-SCI-037-V1 and the data is contained in Supplemental Records (SR) 17 of the same. The smooth profiles obtained from the raw data (BSC, 2004) were used in this analysis as well. Therefore, the suspension data on the spreadsheets need to be checked against the data in SR17.

REPORT FIGURES

Table C-1 in the attached CD lists the paths in the CD data files in which the data shown on the figures in Section 6.4.2 can be found.

Explanation of Data Digitization Method

The raw Vs data obtained from TDMS were digitized in 5 feet intervals. As a result, the reported value on the spreadsheets could be up to 5 feet offset from the actual depth at which the transition in Vs values was observed. In addition, continuing with the convention used in the 2004 study (BSC, 2004), the jump was assumed to occur just below the depth reported in the TDMS data. As an example, if the Vs value changed from 500 feet/sec to 1000 feet/sec at 25 feet depth, the new value (1000 feet/sec) was assumed to occur at 25.01 feet depth. Therefore, on the spreadsheets, the Vs value at 25 feet would be 500 feet/sec and at 30 feet would be 1000 feet/sec.

In the site response analyses performed for the project, the average profiles calculated on the spreadsheets in Appendix C were smoothed “by eye” and the smooth profiles were run as base case velocity profiles. Therefore, the offset caused due to our digitizing scheme gets averaged out in the final base case profiles that were run and does not impact the results.

DATA FILES

All of the data files have been included as attachments on six DVDs. Each of the DVDs also includes a copy of the Readme.txt file that describes the basic directory structure of the entire set of data and the inputs and outputs of each program at each step of the process. A separate CD contains lists of all of the files on each of the DVDs.

INPUTS

The first step is to develop transfer functions, or amplification factors, between a reference rock outcrop site, known as Point A, and Point D (Surface Facilities Area (SFA)) and Point B (Repository Block (RB)).

The inputs into the calculations include a velocity profile (known as a PAR file), nonlinear dynamic material properties which include material damping and shear modulus reduction curves (known as a MAT file), correlation model, and control motions at Point A.

Material Model

The nonlinear dynamic material models are the shear modulus reduction (G/Gmax) and material damping ratio curves, and were developed by URS. There are two upper mean tuff (UMT) curves, six lower mean tuff (LMT) curves, one upper mean alluvium (UMA) curve and three lower mean alluvium (LMA) curves (Table D-2). Also, upper and lower bounding curves were developed.

For the SFA, which includes alluvium, there are four variations that are run: UMT/UMA, UMT/LMA, LMT/UMA, LMT/LMA, for the appropriate depth. For the repository block the velocity profile does not include alluvium, thus only two material variations are used: UMT, LMT, for the appropriate depth.

TABLE D-2
Material Models

1	Unity
2	Upper Mean Tuff 0-500 Ft
3	Upper Mean Tuff 500- Ft
4	Lower Mean Tuff; 0 - 20 FT
5	Lower Mean Tuff; 21 - 50 FT
6	Lower Mean Tuff; 51 - 120 FT
7	Lower Mean Tuff; 121 - 250 FT.
8	Lower Mean Tuff;251 - 500 FT
9	Lower Mean Tuff;501 -1000 F
10	Granular Fill ; 0 - 20 FT
11	Upper Mean Alluvium ; 51 - 120 FT
12	Lower Mean Alluvium 0-50 FEET
13	Lower Mean Alluvium 50-100 FEET
14	Lower Mean Alluvium 100-200 FEET
15	AVERAGE OF LOWER MEAN AND UPPER MEAN ALLUVIUM MODULUS REDUCTION CURVE , Site D’

Currently models 1, 10, and 15 are not being used. These were developed for previous calculations.