# APPENDIX B:

# Probabilistic Seismic Hazard Analysis Results

# Appendix B.1 – Electronic Files

This appendix contains a description for the suite of electronic Excel files that contain the PSHA results for the 10 site locations and two $V_{S30}$ values. For a given site and $V_{S30}$ value, two sets of Excel files have been created which contain the (1) the mean hazard curves and (2) the UHS and deaggregation results. These two files all have the same structure for the suite of 10 site locations and two $V_{S30}$ values. The listing of the suite of Excel files and a description of their data are listed in the Table B.1.

Table B.1. Electronic Excel files containing the PSHA results.

| Site | $V_{S30}$ (m/s) | Excel Filenames |
|---|---|---|
| Oakland | 270 | 01-Oakland-Vs270-HC.xlsx<br>01-Oakland-UHSDeag-Vs270.xlsx |
| | 760 | 01-Oakland-Vs760-HC.xlsx<br>01-Oakland-UHSDeag-Vs760.xlsx |
| Sacramento | 270 | 02-Sacramento-Vs270-HC.xlsx<br>02-Sacramento-UHSDeag-Vs270.xlsx |
| | 760 | 02-Sacramento-Vs760-HC.xlsx<br>02-Sacramento-UHSDeag-Vs760.xlsx |
| San Francisco | 270 | 03-SanFrancisco-Vs270-HC.xlsx<br>03-SanFrancisco-UHSDeag-Vs270.xlsx |
| | 760 | 03-SanFrancisco-Vs760-HC.xlsx<br>03-SanFrancisco-UHSDeag-Vs760.xlsx |
| San Jose | 270 | 04-SanJose-Vs270-HC.xlsx<br>04-SanJose-UHSDeag-Vs270.xlsx |
| | 760 | 04-SanJose-Vs760-HC.xlsx<br>04-SanJose-UHSDeag-Vs760.xlsx |
| Bakersfield | 270 | 05-Bakersfield-Vs270-HC.xlsx<br>05-Bakersfield-UHSDeag-Vs270.xlsx |
| | 760 | 05-Bakersfield-Vs760-HC.xlsx<br>05-Bakersfield-UHSDeag-Vs760.xlsx |
| Long Beach | 270 | 06-LongBeach-Vs270-HC.xlsx<br>06-LongBeach-UHSDeag-Vs270.xlsx |
| | 760 | 06-LongBeach-Vs760-HC.xlsx<br>06-LongBeach-UHSDeag-Vs760.xlsx |
| Los Angeles | 270 | 07-LosAngeles-Vs270-HC.xlsx<br>07-LosAngeles-UHSDeag-Vs270.xlsx |
| | 760 | 07-LosAngeles-Vs760-HC.xlsx<br>07-LosAngeles-UHSDeag-Vs760.xlsx |
| Northridge | 270 | 08-Northridge-Vs270-HC.xlsx<br>08-Northridge-UHSDeag-Vs270.xlsx |
| | 760 | 08-Northridge-Vs760-HC.xlsx<br>08-Northridge-UHSDeag-Vs760.xlsx |

| | | |
|---|---|---|
| San Bernadino | 270 | 09-SanBernadino-Vs270-HC.xlsx<br>09-SanBernadino-UHSDeag-Vs270.xlsx |
| | 760 | 09-SanBernadino-Vs760-HC.xlsx<br>09-SanBernadino-UHSDeag-Vs760.xlsx |
| San Diego | 270 | 10-SanDiego-Vs270-HC.xlsx<br>10-SanDiego-UHSDeag-Vs270.xlsx |
| | 760 | 10-SanDiego-Vs760-HC.xlsx<br>10-SanDiego-UHSDeag-Vs760.xlsx |

This structure of the two Excel files will be explained for the Oakland site with a $V_{S30}$ of 270 m/s. All of the Excel files are contained in the electronic appendix associated with this report.

*Mean Hazard Curve Results (01-Oakland-Vs270-HC.xlsx)*

This file contains the summarized mean hazard curves for the given PSHA case. The suite of mean hazard curves for the 22 spectral periods are contained on the worksheet "HC-Data". Mean hazard curves are provided for the gridded seismic sources, fault sources and total hazard. The total mean hazard curves are also provided on the worksheet "Summary HC" in a reformatted structure (i.e., columns of ground motion values and mean hazard values for the suite of 22 spectral periods). For each of the 22 spectral periods, individual worksheets are contained in the Excel file which list the mean hazard curve for the given spectral period for the gridded seismic sources, fault sources and total hazard. These reformatted mean hazard curves are plotted on the companion chart for each of the 22 spectral periods. This same structure is applied for the other $V_{S30}$ value and the other 9 site locations.

*Uniform hazard Spectra and Dreaggregation Results (01-Oakland-UHSDeag-Vs270.xlsx)*

This file contains the uniform hazard spectra (UHS) and deaggregation results from the PSHA study. The first worksheet in this Excel file is identified as "Data" and contains the output results from the post-processing program for the PSHA results. The data contained on this worksheet are actively linked to the additional worksheets in the file. The next worksheet "UHS-Mean" contains the UHS values for a suite of 10 hazard levels (i.e., see Columns 1 – 12, Rows 10 – 32). The spectral shapes are computed in Columns 13 – 23, Rows 10 – 32. Below the UHS (i.e., Columns 1 – 12) the mean deaggregation results for magnitude (Rows 37 – 59), distance (Rows 64 – 86) and epsilon (Rows 91 – 113) are provided. Finally the modal binned deaggregation value as a function of spectral period and hazard level are contained in Columns 13 – 23, Rows 37 – 59.

The mean UHS are plotted on the "Chart-UHS". The corresponding spectral shapes are plotted on "Chart-Shape". The mean deaggregation results are plotted on "Chart-Mbar", "Chart-Dbar", and "Chart-EpsBar".

Following these summary plots a suite a single worksheet and 9 chart sheets are provided for each of the 10 hazard levels:

- 15 year
- 25 year
- 50 year
- 75 year
- 100 year
- 150 year
- 250 year
- 500 year
- 1,000 year
- 2,500 year

As an example for the first hazard level of 15 years, the binned deggregation results (which are actively linked back to the results on the "Data" worksheet) are summarized on the worksheet "Deag-15yr" for each of the 22 spectral periods. For each of the given magnitude-distance bins, the fraction contribution to the total hazard is provided. Visually, the results from the following nine representative spectral periods are provided in the noted charts:

- Chart-15-T0.01 (PGA)
- Chart-15-T0.04 (T=0.04sec)
- Chart-15-T0.10 (T=0.10sec)
- Chart-15-T0.20 (T=0.20sec)
- Chart-15-T0.30 (T=0.30sec)
- Chart-15-T0.50 (T=0.50sec)
- Chart-15-T1.00 (T=1.00sec)
- Chart-15-T2.00 (T=3.00sec)
- Chart-15-T5.00 (T=5.00sec)

The same structure is used for the other 9 hazard levels with the only difference being the naming of the worksheets and charts depending on the hazard level (i.e., "15yr").

This same structure is applied for the other $V_{S30}$ value and the other 9 site locations.