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Scientific Notebook No. 609 Evaluation of Earthquake Ground Motion Data Developed for the Proposed High-Level Waste Repository at Yucca Mountain, Nevada (02/10/2004 through 10/16/2006)

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

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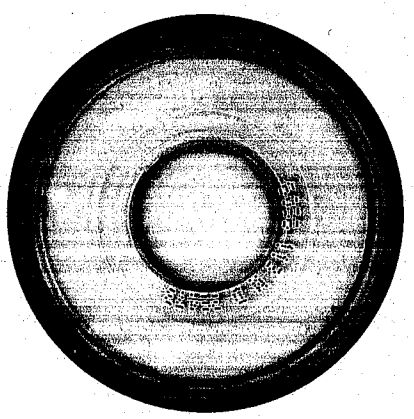
Scientific Notebook 609



September 5, 2006
Sarah Gonzalez

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ENTRY: SARAH GONZALEZ

DATE: 02/10/2004

INITIAL ENTRY: INTRODUCTION

TITLE: EVALUATION OF EARTHQUAKE GROUND MOTION DATA DEVELOPED FOR THE PROPOSED HIGH-LEVEL WASTE REPOSITORY AT YUCCA MOUNTAIN, NEVADA.

AUTHORS: SARAH GONZALEZ, JOHN STAMATAKOS.

OBJECTIVES: THIS NOTEBOOK DOCUMENTS THE PROCEDURES AND CODES USED TO EVALUATE THE SITE-SPECIFIC SEISMIC GROUND MOTIONS DEVELOPED BY THE DOE FOR THE PROPOSED HIGH-LEVEL WASTE REPOSITORY AT YUCCA MOUNTAIN, NEVADA. THE AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) STANDARD FOR SEISMIC ANALYSIS OF SAFETY-RELATED NUCLEAR STRUCTURES AND COMMENTARY WILL BE USED AS A GUIDELINE FOR THE EVALUATION.

DATA: THE DOE GENERATED A SUITE OF GROUND MOTION TIME HISTORIES FOR THE YUCCA MOUNTAIN SITE BASED ON THE RESULTS OF A PROBABILISTIC SEISMIC HAZARD ANALYSIS (PSHA). THERE ARE THREE GROUPS OF GROUND MOTION DATA WHICH SG 02/10/04 ~~REPES~~ REPRESENT ANNUAL PROBABILITY OF EXCEEDANCE (APE) LEVELS OF 5×10^{-4}, 10^{-6} AND 10^{-7}. THE RESPECTIVE DATA TRACKING NUMBERS (DTNs) ARE M00211TMH1S104.002, M00301TMH1S106.001 AND M00211AVTMH107.001. EACH GROUP OF DATA CONSISTS OF THREE-COMPONENT ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES.

CODES: THE SOFTWARE MATLAB, VERSION 6.5.1 (RELEASE 13) WILL BE USED TO

EVALUATE THE GROUND MOTION DATA.

REFERENCES:

AMERICAN SOCIETY OF CIVIL ENGINEERS. "SEISMIC ANALYSIS OF SAFETY-RELATED NUCLEAR STRUCTURES AND COMMENTARY" ASCE 4-98. RESTON, VA: AMERICAN SOCIETY OF CIVIL ENGINEERS. 2000.

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ENTRY: SARAH GONZALEZ

DATE: 02/10/2004

ENTRY 1: DATA PLOTTING

M-FILES ARE WRITTEN IN MATLAB TO PLOT ACCELERATION, VELOCITY AND DISPLACEMENT DATA FOR EACH APE LEVEL. IN ADDITION TO PLOTTING THE DATA, PEAK GROUND ACCELERATION (PGA), PEAK GROUND VELOCITY (PGV) AND PEAK GROUND DISPLACEMENT (PGD) VALUES ARE ALSO CALCULATED AND SAVED.

A). 5×10^{-4} APE LEVEL TIME HISTORIES

DATA REPRESENTING THE 5×10^{-4} APE LEVEL AT THE REPOSITORY HORIZON (POINT B) IS COMPRISED OF ONE SET OF THREE-COMPONENT (TWO HORIZONTAL AND ONE VERTICAL) ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES. THE DATA FILES ARE ON THE ATTACHED CD IN THE DIRECTORY mo0211tmhis104_002. TABLE 1 LISTS THE ASSOCIATED FILE NAMES. THE TWO HORIZONTAL COMPONENTS

ARE REFERRED TO AS H1 AND H2, AND THE VERTICAL COMPONENT IS REFERRED TO AS V.

TABLE 1. 5×10^{-4} APE FILE NAMES

File number	Component	File name		
		Acceleration	Velocity	Displacement
1	H1	H1.ATH	H1.VTH	H1.DTH
	H2	H2.ATH	H2.VTH	H2.DTH
	V	V.ATH	V.VTH	V.DTH

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THE ~~M-FIE~~ SG 02/10/04 M-FILES acc104.m, vel104.m, dis104.m PLOT THE ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES. THESE M-FILES ARE ON THE ATTACHED CD.

FIGURE 1 SHOWS THE THREE-COMPONENT ACCELERATION TIME HISTORIES. FIGURES 2 AND 3 SHOW THE VELOCITY AND DISPLACEMENT RESPECTIVELY. TABLE 2 CONTAINS THE PEAK ACCELERATION, VELOCITY AND DISPLACEMENT VALUES FOR EACH COMPONENT.

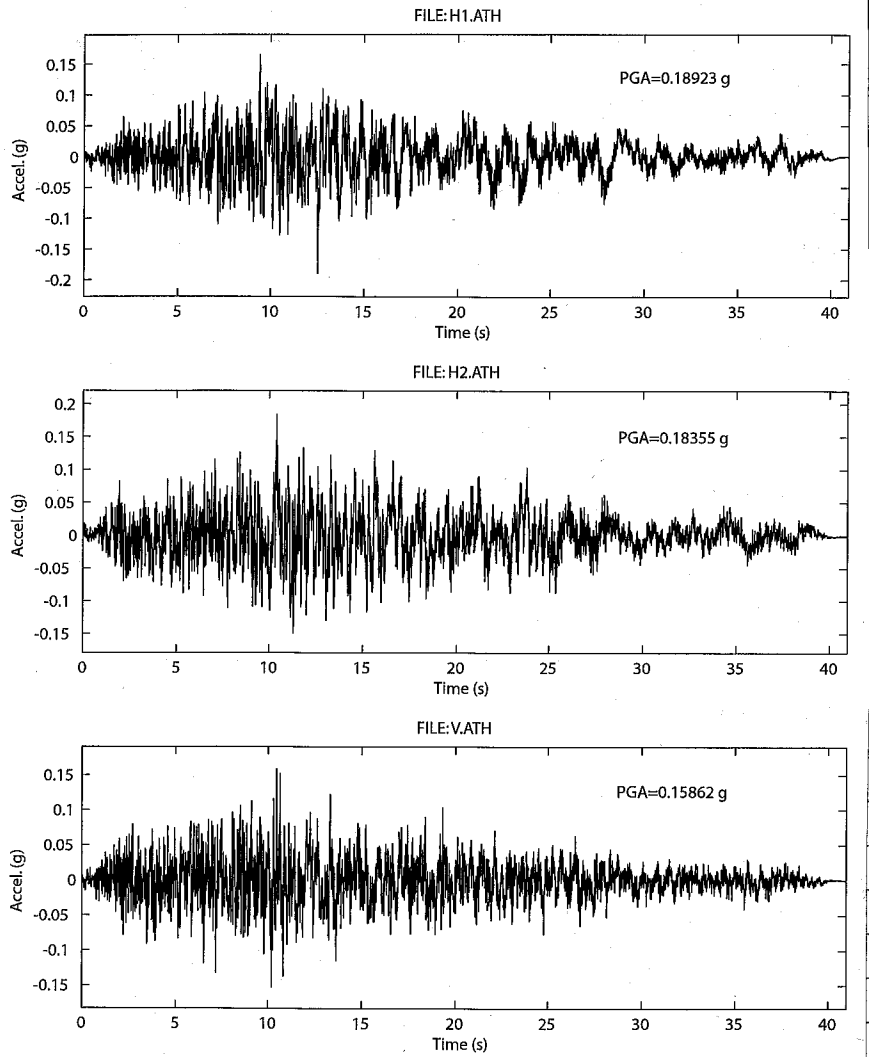

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FIGURE 1. 5×10^{-4} APE ACCELERATION TIME HISTORIES

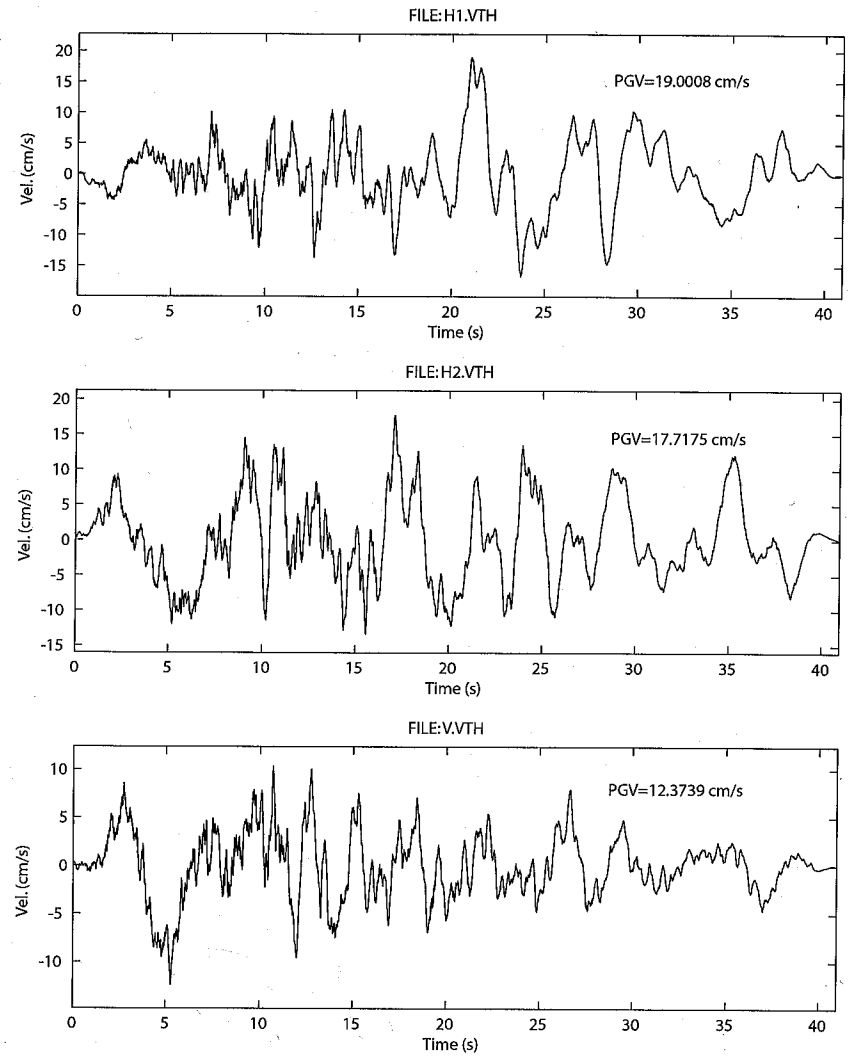

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FIGURE 2. 5×10^{-4} APE VELOCITY TIME HISTORIES

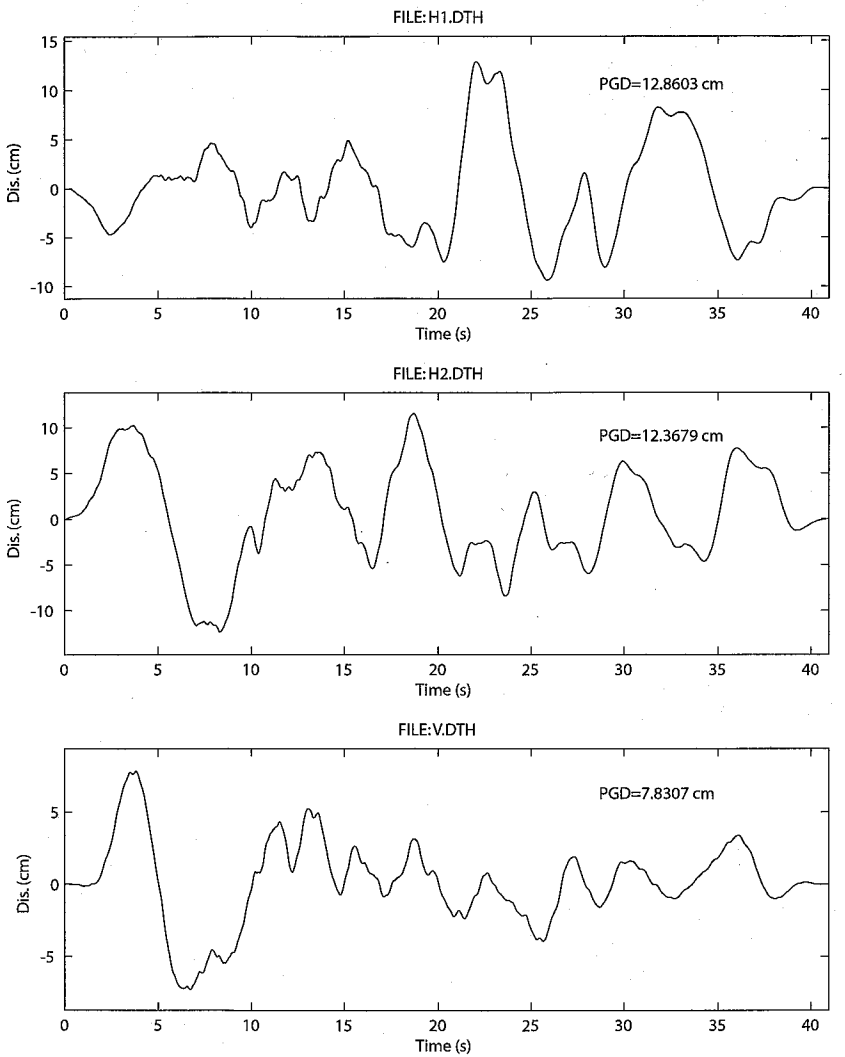

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FIGURE 3. 5×10^{-4} APE DISPLACEMENT TIME HISTORIES.

TABLE 2. 5×10^{-4} APE PEAK AMPLITUDES.

File number	Component	PGA (g)	PGV (cm/sec)	PGD (cm)
1	H1	0.19	19.00	12.86
	H2	0.18	17.72	12.37
	V	0.16	12.37	7.83

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B) 10^{-6} APE LEVEL TIME HISTORIES

DATA REPESENTING THE 10^{-6} APE LEVEL AT POINT B IS COMPRISED OF SEVENTEEN SETS OF THREE-COMPONENT ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES. THE DATA FILES ARE ON THE ATTACHED CD IN THE DIRECTORY m0030Hmhis106_001. TABLE 3 LISTS THE ASSOCIATED FILE NAMES.

THE M-FILES acc106.m, vel106.m AND dis106.m PLOT THE ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES, AND ARE ON THE ATTACHED CD.

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FIGURES 4, 5 AND 6 ~~PLOT~~ ARE PLOTS OF THE RESPECTIVE ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES. ~~TAB~~ SLT 02/10/04 FOR A SELECTED FILE. TABLE 4 CONTAINS THE PEAK AMPLITUDE VALUES FOR ALL FILES.

TABLE 3. 10^{-6} APE FILE NAMES.

File number	Component	File name		
		Acceleration	Velocity	Displacement
1	H1	ptB10-61H1Acc.xls	ptB10-61H1Vel.xls	ptB10-61H1Dis.xls
	H2	ptB10-61H2Acc.xls	ptB10-61H2Vel.xls	ptB10-61H2Dis.xls
	V	ptB10-61VAcc.xls	ptB10-61VVel.xls	ptB10-61VDis.xls
2	H1	ptB10-62H1Acc.xls	ptB10-62H1Vel.xls	ptB10-62H1Dis.xls
	H2	ptB10-62H2Acc.xls	ptB10-62H2Vel.xls	ptB10-62H2Dis.xls
	V	ptB10-62VAcc.xls	ptB10-62VVel.xls	ptB10-62VDis.xls
3	H1	ptB10-63H1Acc.xls	ptB10-63H1Vel.xls	ptB10-63H1Dis.xls
	H2	ptB10-63H2Acc.xls	ptB10-63H2Vel.xls	ptB10-63H2Dis.xls
	V	ptB10-63VAcc.xls	ptB10-63VVel.xls	ptB10-63VDis.xls
4	H1	ptB10-64H1Acc.xls	ptB10-64H1Vel.xls	ptB10-64H1Dis.xls
	H2	ptB10-64H2Acc.xls	ptB10-64H2Vel.xls	ptB10-64H2Dis.xls
	V	ptB10-64VAcc.xls	ptB10-64VVel.xls	ptB10-64VDis.xls
5	H1	ptB10-65H1Acc.xls	ptB10-65H1Vel.xls	ptB10-65H1Dis.xls
	H2	ptB10-65H2Acc.xls	ptB10-65H2Vel.xls	ptB10-65H2Dis.xls
	V	ptB10-65VAcc.xls	ptB10-65VVel.xls	ptB10-65VDis.xls
6	H1	ptB10-66H1Acc.xls	ptB10-66H1Vel.xls	ptB10-66H1Dis.xls
	H2	ptB10-66H2Acc.xls	ptB10-66H2Vel.xls	ptB10-66H2Dis.xls
	V	ptB10-66VAcc.xls	ptB10-66VVel.xls	ptB10-66VDis.xls
7	H1	ptB10-67H1Acc.xls	ptB10-67H1Vel.xls	ptB10-67H1Dis.xls
	H2	ptB10-67H2Acc.xls	ptB10-67H2Vel.xls	ptB10-67H2Dis.xls
	V	ptB10-67VAcc.xls	ptB10-67VVel.xls	ptB10-67VDis.xls
8	H1	ptB10-68H1Acc.xls	ptB10-68H1Vel.xls	ptB10-68H1Dis.xls
	H2	ptB10-68H2Acc.xls	ptB10-68H2Vel.xls	ptB10-68H2Dis.xls
	V	ptB10-68VAcc.xls	ptB10-68VVel.xls	ptB10-68VDis.xls
9	H1	ptB10-69H1Acc.xls	ptB10-69H1Vel.xls	ptB10-69H1Dis.xls
	H2	ptB10-69H2Acc.xls	ptB10-69H2Vel.xls	ptB10-69H2Dis.xls
	V	ptB10-69VAcc.xls	ptB10-69VVel.xls	ptB10-69VDis.xls
10	H1	ptB10-610H1Acc.xls	ptB10-610H1Vel.xls	ptB10-610H1Dis.xls
	H2	ptB10-610H2Acc.xls	ptB10-610H2Vel.xls	ptB10-610H2Dis.xls
	V	ptB10-610VAcc.xls	ptB10-610VVel.xls	ptB10-610VDis.xls
11	H1	ptB10-611H1Acc.xls	ptB10-611H1Vel.xls	ptB10-611H1Dis.xls
	H2	ptB10-611H2Acc.xls	ptB10-611H2Vel.xls	ptB10-611H2Dis.xls
	V	ptB10-611VAcc.xls	ptB10-611VVel.xls	ptB10-611VDis.xls
12	H1	ptB10-612H1Acc.xls	ptB10-612H1Vel.xls	ptB10-612H1Dis.xls
	H2	ptB10-612H2Acc.xls	ptB10-612H2Vel.xls	ptB10-612H2Dis.xls
	V	ptB10-612VAcc.xls	ptB10-612VVel.xls	ptB10-612VDis.xls
13	H1	ptB10-613H1Acc.xls	ptB10-613H1Vel.xls	ptB10-613H1Dis.xls
	H2	ptB10-613H2Acc.xls	ptB10-613H2Vel.xls	ptB10-613H2Dis.xls
	V	ptB10-613VAcc.xls	ptB10-613VVel.xls	ptB10-613VDis.xls
14	H1	ptB10-614H1Acc.xls	ptB10-614H1Vel.xls	ptB10-614H1Dis.xls
	H2	ptB10-614H2Acc.xls	ptB10-614H2Vel.xls	ptB10-614H2Dis.xls
	V	ptB10-614VAcc.xls	ptB10-614VVel.xls	ptB10-614VDis.xls
15	H1	ptB10-615H1Acc.xls	ptB10-615H1Vel.xls	ptB10-615H1Dis.xls
	H2	ptB10-615H2Acc.xls	ptB10-615H2Vel.xls	ptB10-615H2Dis.xls
	V	ptB10-615VAcc.xls	ptB10-615VVel.xls	ptB10-615VDis.xls
16	H1	ptB10-616H1Acc.xls	ptB10-616H1Vel.xls	ptB10-616H1Dis.xls
	H2	ptB10-616H2Acc.xls	ptB10-616H2Vel.xls	ptB10-616H2Dis.xls
	V	ptB10-616VAcc.xls	ptB10-616VVel.xls	ptB10-616VDis.xls
17	H1	ptB10-617H1Acc.xls	ptB10-617H1Vel.xls	ptB10-617H1Dis.xls
	H2	ptB10-617H2Acc.xls	ptB10-617H2Vel.xls	ptB10-617H2Dis.xls
	V	ptB10-617VAcc.xls	ptB10-617VVel.xls	ptB10-617VDis.xls

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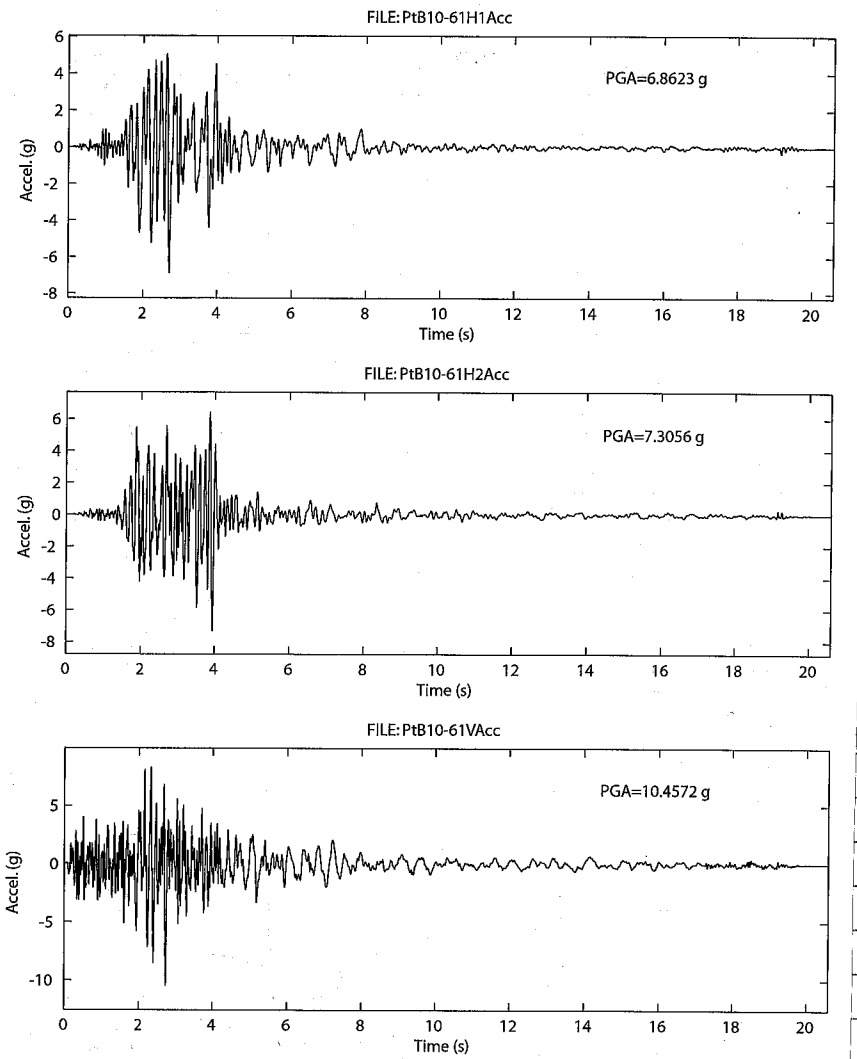

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FIGURE 4. 10^{-6} APE ACCELERATION TIME HISTORIES

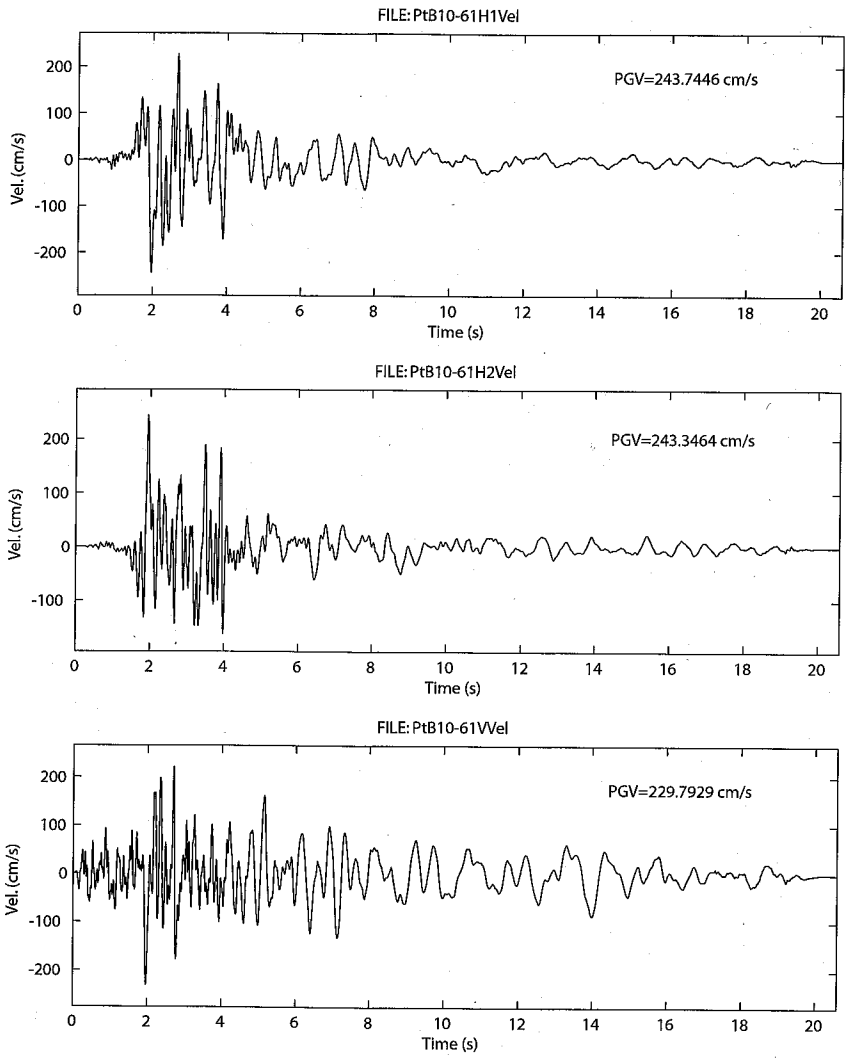

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FIGURE 5. 10^{-6} APE VELOCITY TIME HISTORIES

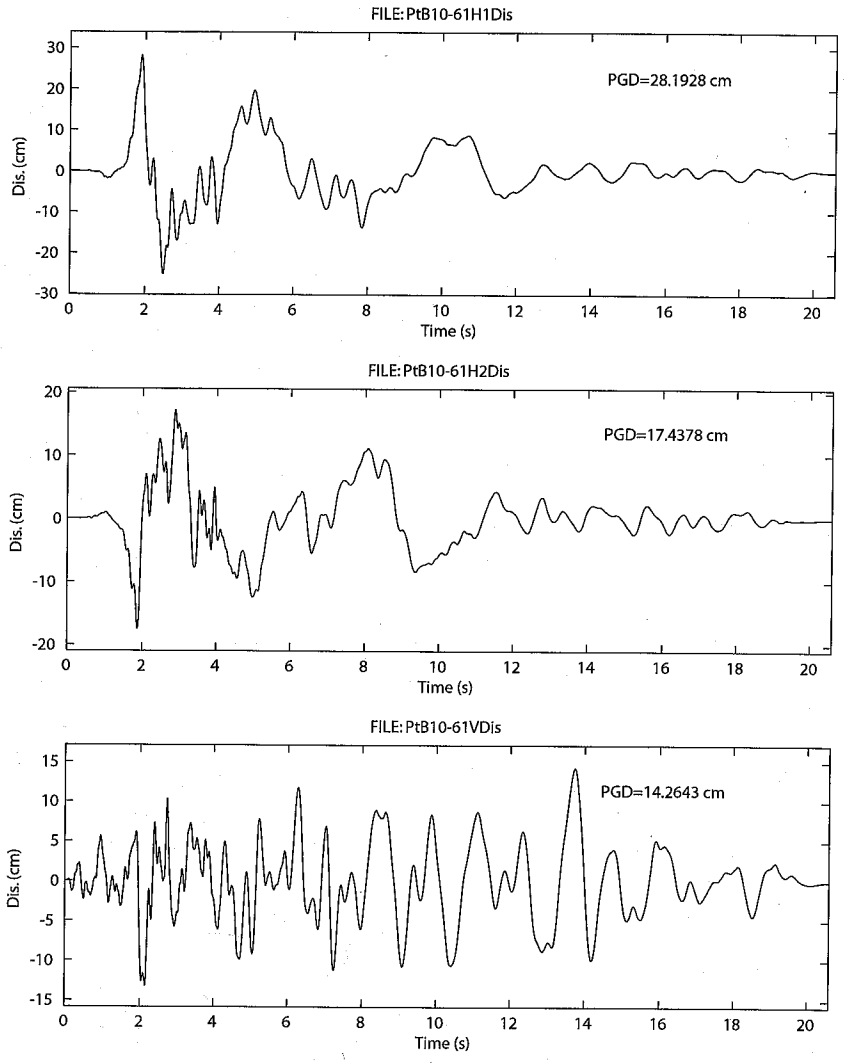

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FIGURE 6. 10^{-6} APE DISPLACEMENT TIME HISTORIES

TABLE 4. PEAK AMPLITUDES FOR 10^{-6} APE LEVEL

File number	PGA (g)			PGV (cm/sec)			PGD (cm)		
	H1	H2	V	H1	H2	V	H1	H2	V
1	6.86	7.31	10.46	243.74	243.35	229.79	28.19	17.44	14.26
2	5.93	5.86	8.42	243.79	243.90	229.34	38.53	55.23	17.37
3	6.61	2.56	3.23	254.63	242.69	228.36	45.62	34.51	70.90
4	5.89	5.86	6.26	243.61	243.28	228.37	85.08	69.23	80.11
5	4.05	4.41	7.14	243.35	243.39	229.27	43.17	54.70	58.34
6	2.66	5.21	2.84	244.11	243.05	229.59	76.87	52.99	74.09
7	2.27	2.45	4.53	243.86	244.08	229.92	94.66	80.88	107.91
8	3.36	3.92	5.71	244.21	243.93	229.78	56.83	28.90	39.25
9	4.75	1.94	6.63	244.01	243.98	229.62	52.57	40.78	30.51
10	3.22	4.41	10.11	241.90	238.07	230.00	35.35	22.95	19.02
11	2.85	2.59	5.91	243.76	243.82	229.73	47.83	60.96	92.39
12	2.34	2.05	2.57	243.27	242.83	229.76	87.16	37.73	61.86
13	2.40	2.93	2.45	243.95	243.95	229.77	90.64	65.39	98.15
14	1.80	6.01	4.10	244.13	244.27	230.13	175.87	125.81	111.34
15	0.96	1.36	0.57	244.22	244.09	230.12	282.22	235.47	306.01
16	1.29	2.21	4.33	243.99	244.07	229.80	60.30	51.41	74.66
17	1.80	1.64	2.90	244.13	244.13	230.12	140.46	106.03	96.74
Mean	3.47	3.69	5.19	244.39	243.34	229.62	84.79	67.08	79.58
Standard deviation	1.88	1.83	2.77	2.69	1.44	0.53	63.94	51.71	66.43

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C) 10^{-7} APE LEVEL TIME HISTORIES

DATA REPRESENTING THE 10^{-7} APE LEVEL AT POINT B IS COMPRISED OF SEVENTEEN SETS OF THREE-COMPONENT ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES. THE DATA FILES ARE ON THE ATTACHED CD IN THE DIRECTORY mo0211avtmh107_001. TABLE 5 LISTS THE ASSOCIATED FILE NAMES.

THE M-FILES acc107.m, vel107.m ~~&~~ AND dis107.m PLOT THE ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES RESPECTIVELY, AND ARE ON THE ATTACHED CD.

FIGURES 7, 8 AND 9 ARE PLOTS OF THE RESPECTIVE ACCELERATION, VELOCITY AND DISPLACEMENT TIME HISTORIES FOR A SELECTED FILE. PEAK AMPLITUDES FOR ALL FILES ARE PROVIDED IN TABLE 6.

TABLE 5. 10^{-7} APE FILE NAMES

File number	Component	File name		
		Acceleration	Velocity	Displacement
1	H1	MAT01H1.ATS	MAT01H1.VTS	MAT01H1.DTS
	H2	MAT01H2.ATS	MAT01H2.VTS	MAT01H2.DTS
	V	MAT01V.ATS	MAT01V.VTS	MAT01V.DTS
2	H1	MAT02H1.ATS	MAT02H1.VTS	MAT02H1.DTS
	H2	MAT02H2.ATS	MAT02H2.VTS	MAT02H2.DTS
	V	MAT02V.ATS	MAT02V.VTS	MAT02V.DTS
3	H1	MAT03H1.ATS	MAT03H1.VTS	MAT03H1.DTS
	H2	MAT03H2.ATS	MAT03H2.VTS	MAT03H2.DTS
	V	MAT03V.ATS	MAT03V.VTS	MAT03V.DTS
4	H1	MAT04H1.ATS	MAT04H1.VTS	MAT04H1.DTS
	H2	MAT04H2.ATS	MAT04H2.VTS	MAT04H2.DTS
	V	MAT04V.ATS	MAT04V.VTS	MAT04V.DTS
5	H1	MAT05H1.ATS	MAT05H1.VTS	MAT05H1.DTS
	H2	MAT05H2.ATS	MAT05H2.VTS	MAT05H2.DTS
	V	MAT05V.ATS	MAT05V.VTS	MAT05V.DTS
6	H1	MAT06H1.ATS	MAT06H1.VTS	MAT06H1.DTS
	H2	MAT06H2.ATS	MAT06H2.VTS	MAT06H2.DTS
	V	MAT06V.ATS	MAT06V.VTS	MAT06V.DTS
7	H1	MAT07H1.ATS	MAT07H1.VTS	MAT07H1.DTS
	H2	MAT07H2.ATS	MAT07H2.VTS	MAT07H2.DTS
	V	MAT07V.ATS	MAT07V.VTS	MAT07V.DTS
8	H1	MAT08H1.ATS	MAT08H1.VTS	MAT08H1.DTS
	H2	MAT08H2.ATS	MAT08H2.VTS	MAT08H2.DTS
	V	MAT08V.ATS	MAT08V.VTS	MAT08V.DTS
9	H1	MAT09H1.ATS	MAT09H1.VTS	MAT09H1.DTS
	H2	MAT09H2.ATS	MAT09H2.VTS	MAT09H2.DTS
	V	MAT09V.ATS	MAT09V.VTS	MAT09V.DTS
10	H1	MAT10H1.ATS	MAT10H1.VTS	MAT10H1.DTS
	H2	MAT10H2.ATS	MAT10H2.VTS	MAT10H2.DTS
	V	MAT10V.ATS	MAT10V.VTS	MAT10V.DTS
11	H1	MAT11H1.ATS	MAT11H1.VTS	MAT11H1.DTS
	H2	MAT11H2.ATS	MAT11H2.VTS	MAT11H2.DTS
	V	MAT11V.ATS	MAT11V.VTS	MAT11V.DTS
12	H1	MAT12H1.ATS	MAT12H1.VTS	MAT12H1.DTS
	H2	MAT12H2.ATS	MAT12H2.VTS	MAT12H2.DTS
	V	MAT12V.ATS	MAT12V.VTS	MAT12V.DTS
13	H1	MAT13H1.ATS	MAT13H1.VTS	MAT13H1.DTS
	H2	MAT13H2.ATS	MAT13H2.VTS	MAT13H2.DTS
	V	MAT13V.ATS	MAT13V.VTS	MAT13V.DTS
14	H1	MAT14H1.ATS	MAT14H1.VTS	MAT14H1.DTS
	H2	MAT14H2.ATS	MAT14H2.VTS	MAT14H2.DTS
	V	MAT14V.ATS	MAT14V.VTS	MAT14V.DTS
15	H1	MAT15H1.ATS	MAT15H1.VTS	MAT15H1.DTS
	H2	MAT15H2.ATS	MAT15H2.VTS	MAT15H2.DTS
	V	MAT15V.ATS	MAT15V.VTS	MAT15V.DTS
16	H1	MAT16H1.ATS	MAT16H1.VTS	MAT16H1.DTS
	H2	MAT16H2.ATS	MAT16H2.VTS	MAT16H2.DTS
	V	MAT16V.ATS	MAT16V.VTS	MAT16V.DTS
17	H1	MAT17H1.ATS	MAT17H1.VTS	MAT17H1.DTS
	H2	MAT17H2.ATS	MAT17H2.VTS	MAT17H2.DTS
	V	MAT17V.ATS	MAT17V.VTS	MAT17V.DTS

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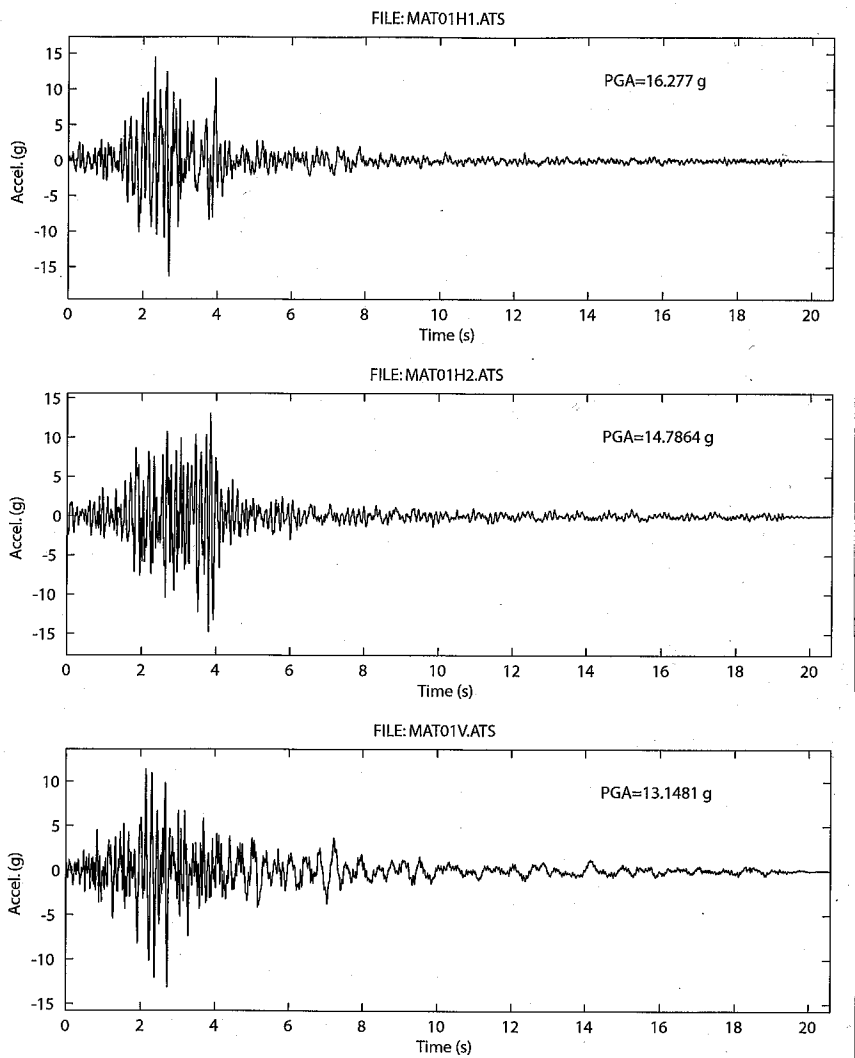

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FIGURE 7. 10^{-7} APE ACCELERATION TIME HISTORIES

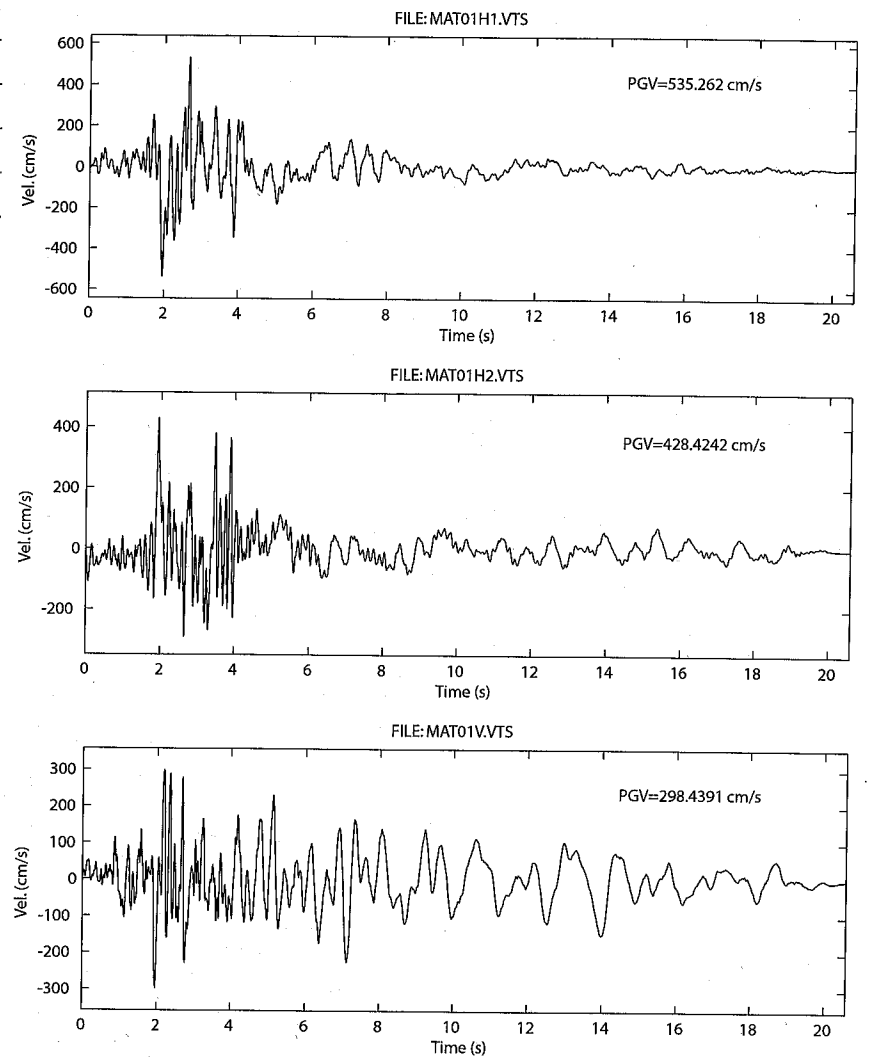

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FIGURE 8. 10^{-7} APE VELOCITY TIME HISTORIES

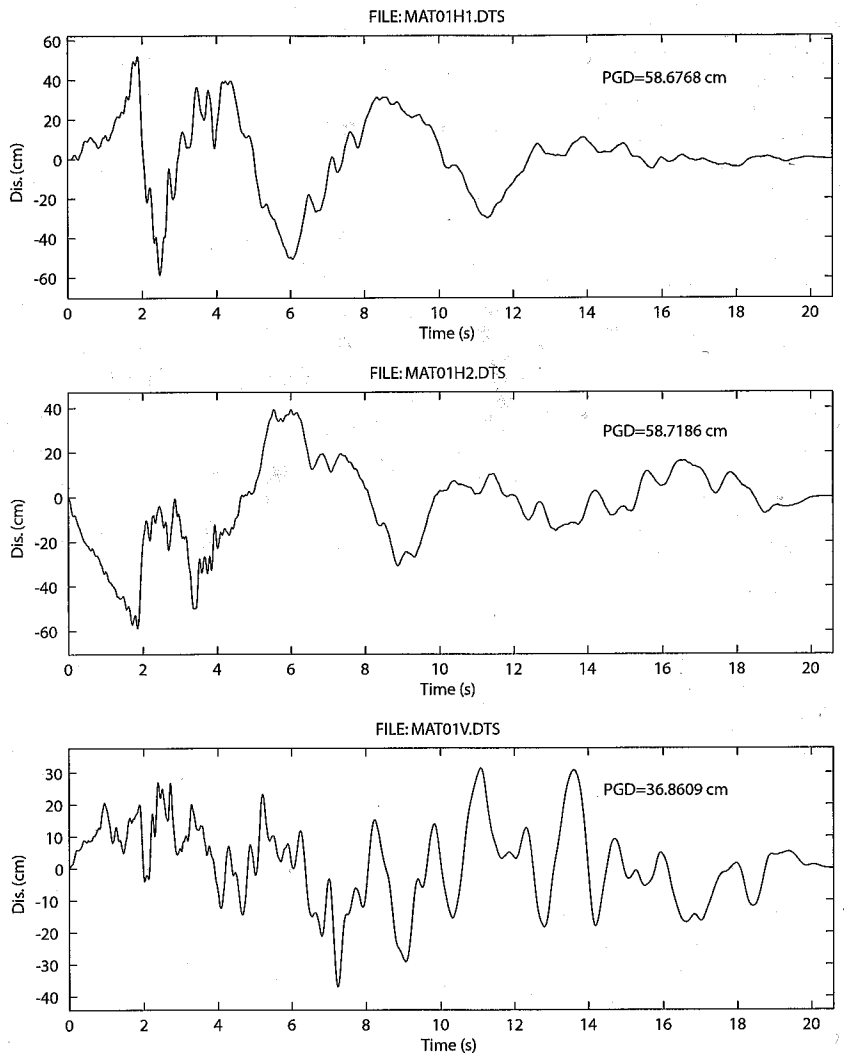

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FIGURE 9. 10^{-7} APE DISPLACEMENT TIME HISTORIES

TABLE 6. 10^{-7} APE PEAK AMPLITUDES

File number	PGA (g)			PGV (cm/sec)			PGD (cm)		
	H1	H2	V	H1	H2	V	H1	H2	V
1	16.28	14.79	13.15	535.26	428.42	298.44	58.68	58.72	36.86
2	12.32	15.37	19.56	535.32	588.89	625.10	76.24	125.51	54.10
3	16.22	18.61	17.50	535.27	1409.33	1634.24	92.11	246.13	515.14
4	14.23	13.04	12.04	535.27	569.05	797.61	277.29	236.24	210.10
5	11.72	8.10	8.28	535.27	522.70	305.27	110.85	129.22	107.51
6	8.01	8.17	8.53	535.27	290.00	726.52	247.27	60.02	319.98
7	4.88	5.85	20.94	536.24	530.78	1708.30	253.93	293.16	582.92
8	7.71	18.95	10.08	535.14	880.81	411.80	131.54	125.32	105.26
9	12.66	13.66	34.52	535.22	1791.14	1225.68	138.69	368.33	168.72
10	6.29	3.63	9.53	535.24	171.62	226.79	84.08	19.56	28.24
11	7.18	5.70	8.05	535.23	561.25	342.73	110.86	140.55	190.89
12	3.68	5.85	3.92	535.39	595.47	521.62	205.06	151.42	225.79
13	6.74	8.50	8.43	535.27	665.45	904.21	227.06	264.40	586.77
14	3.99	5.89	9.08	535.28	275.36	659.11	395.51	105.19	280.93
15	1.81	2.09	2.30	535.30	336.03	1216.09	580.06	203.76	1258.96
16	2.97	3.21	6.89	535.27	347.33	567.89	172.79	133.13	225.46
17	2.76	2.18	4.42	535.27	349.91	470.27	234.20	158.01	182.11
Mean	8.20	9.04	11.60	535.33	606.68	743.63	199.78	165.80	298.81
Standard deviation	4.80	5.60	7.86	0.24	416.84	455.02	132.56	91.55	303.07

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ENTRY: SARAH GONZALEZ

DATE: 03/24/04

ENTRY 2: CALCULATION OF STRONG MOTION DURATION

A) Calculations

The equivalent strong motion is defined as the time required for the cumulative energy, $E(t)$, of the acceleration time history, $a(\tau)$, to rise from 5 to 75% (ASCE, 2000), where

$$E(t) = \int_0^t a^2(\tau)d\tau .$$

This calculation is performed by the M-file ***psdfn.m***, which is on the attached CD. The relevant part of this M-file is provided below.

```
%-----------------------------------------------------------------------------------------%
% Calculation of strong motion duration
t=(0:1:npts-1)*dt;  % time
NRG=dt*(cumsum(series.^2)); % cumulative energy
ind75=max(find(NRG<=(0.75*NRG(npts)))); % time index for 75% of cumulative energy
ind5=max(find(NRG<=(0.05*NRG(npts))));  % time index for 5% of cumulative energy
t5=t(ind5);
t75=t(ind75);
tm=t75-t5;  % strong motion duration
%-----------------------------------------------------------------------------------------%
```

B) RESULTS

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TABLES 7, 8 AND 9 LIST THE STRONG MOTION DURATION VALUES FOR APE LEVELS OF 5×10^{-4}, 10^{-6} AND 10^{-7} RESPECTIVELY.

TABLE 7. 5×10^{-4} STRONG MOTION DURATION VALUES

File number	Component	Duration (sec)
1	H1	13.30
	H2	14.30
	V	14.20

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TABLE 8. 10^{-6} APE STRONG MOTION DURATION VALUES

File number	Duration (sec)		
	H1	H2	V
1	1.66	2.00	2.69
2	2.47	2.12	2.62
3	1.26	1.10	1.10
4	5.90	3.73	3.96
5	1.32	1.31	3.19
6	5.44	5.84	5.46
7	4.53	5.37	5.05
8	3.03	1.68	2.98
9	3.12	4.50	0.53
10	2.38	2.74	2.56
11	3.37	4.63	3.47
12	5.70	5.62	6.92
13	4.51	4.49	5.14
14	8.37	8.37	7.43
15	12.75	11.78	13.23
16	3.33	3.72	2.81
17	6.36	8.09	8.37
Mean	4.44	4.53	4.56
Standard deviation	2.90	2.86	3.10

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TABLE 9. 10^{-7} APE STRONG MOTION DURATION VALUES

File number	Duration (sec)		
	H1	H2	V
1	1.59	2.14	2.44
2	2.83	2.47	2.63
3	1.21	1.10	1.15
4	5.20	3.73	5.61
5	1.49	5.10	3.63
6	5.48	5.82	5.36
7	5.06	6.48	5.74
8	3.03	2.77	3.09
9	3.11	4.75	1.40
10	1.80	2.68	2.66
11	3.69	3.37	3.11
12	5.82	6.06	8.38
13	4.86	4.28	6.28
14	9.96	11.04	9.33
15	14.51	14.90	13.97
16	3.27	3.67	3.64
17	5.20	7.05	8.25
Mean	4.59	5.14	5.10
Standard deviation	3.34	3.44	3.35

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FINAL ENTRY: OCT. 16, 2006 By JOHN A. STAMATAKOS

DOE IS MODIFYING THEIR SEISMIC HAZARD RESULTS TO INCLUDE MAPS ON THE LOW PROBABILITY GROUND MOTIONS USED FOR POST CLOSURE PERFORMANCE ASSESSMENT. AT THIS TIME IT SEEMS LIKELY THAT DOE MAY DEVELOP SUITES OF NEW GROUND MOTION TIME HISTORIES FOR THESE ANALYSES. THUS, THE STATUS OF THESE TIME HISTORIES IS, AT PRESENT, UNKNOWN.

SARAH GONZALEZ, PRINCIPAL AUTHOR OF THIS NOTEBOOK IS LEAVING THE CNWRA, AS OF 10/20/2006. THEREFORE THIS NOTEBOOK WILL BE CLOSED. I HAVE REVIEWED THIS NOTEBOOK AND FIND IT IN AGREEMENT WITH QAP-001.

10/16/2006

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