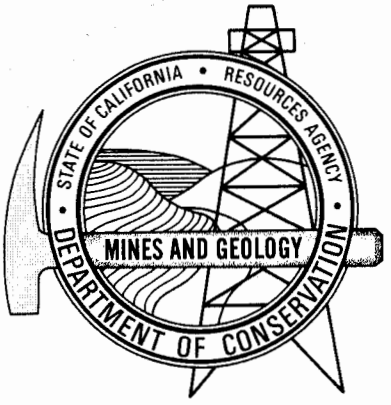
CSMIP STRONG-MOTION RECORDS FROM THE PALM SPRINGS, CALIFORNIA EARTHQUAKE OF 8 JULY 1986

CALIFORNIA DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
OFFICE OF STRONG MOTION STUDIES
REPORT OSMS 86-05



1986

DIVISION OF MINES AND GEOLOGY
JAMES F. DAVIS
STATE GEOLOGIST

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Report No. OSMS 86-05

California Strong Motion Instrumentation Program

California Department of Conservation

Division of Mines and Geology

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CSMIP STRONG-MOTION RECORDS FROM THE PALM SPRINGS, CALIFORNIA EARTHQUAKE OF 8 JULY 1986

Introduction

Strong motion records were recovered at over thirty stations of the California Strong Motion Instrumentation Program (CSMIP) following the earthquake of 8 July 1986 which occurred approximately 18 km north of Palm Springs. In total, records were recovered from 21 free-field stations, 8 buildings, 2 earth dams and one power plant. In addition to these records recovered by CSMIP, records were also recovered by such agencies as the U.S. Geological Survey and the University of Southern California.

Current estimates of the earthquake location and magnitude are (K. Hutton, CIT, personal communication):
Hypocenter: 33.998 N, 116.607 W, 12 km depth. Magnitude: 5.9 ML
Origin Time: 09:20:45 GMT (02:20:45 PDT), 8 July 1986.

Surface faulting was observed in the epicentral area (E. Hart, personal communication). A total of about 7 cm of predominantly right-lateral strike-slip displacement was observed on the Banning Fault, a branch fault of the San Andreas Fault. The displacement observed was distributed over several parallel fault strands crossing Highway 62. Minor rupture was also observed on the Mission Creek Fault and along a branch fault at the mouth of Whitewater Canyon.

Serious damage was reported at an electric power substation near Devers Hill, and at the Whitewater Interstate 10 overpass west of North Palm Springs.

Highlights of CSMIP Strong-Motion Data

Particularly noteworthy features of the strong motion data from the Palm Springs earthquake include:

- Hemet Array. The Hemet strong motion array is a northeast-southwest alignment of stations which transects the San Jacinto Fault south of San Bernardino and is presently comprised of 8 stations. Although the array was installed in 1975, this earthquake is the first which triggered all stations of the array. The array station closest to the epicenter (28 km) recorded a peak acceleration of 15% g. The most distant station, at 66 km, recorded 5% g. Interestingly, an intermediate station, at 34 km, recorded a peak acceleration of 26% g. There are also clear variations in the frequency content of the records from the array stations.

- Palm Springs Desert Hospital. One of the few hospitals instrumented by SMIP is located in the town of Palm Springs, approximately 19 km south of the epicenter. The building is a 4-story steel-frame structure. Peak acceleration at the ground floor was approximately 20% g; the peak acceleration at the roof was 60% g. Despite these acceleration levels, little damage was reported.

- Desert Hot Springs Fire Station. A triaxial instrument in this light 1-story structure located approximately 10 km from the epicenter recorded a peak acceleration near 60% g on the vertical component and 35% g on a horizontal component. Little damage was observable at the Fire Station.

- Rancho Cucamonga - San Bernardino County Law and Justice Center (base-isolated building). The Palm Springs earthquake generated the second set of low-amplitude records from this 4-story base-isolated building which was constructed and instrumented during 1985. These records, like those recorded during the 1985 Redlands earthquake (Huang et al., 1986), are of low amplitude but allow detailed analyses of the response of the structure at low input levels.

These and other selected records from this earthquake will be digitized and processed for inclusion in a future processed-data report.

Organization of Report

The locations of stations from which strong motion records were recovered for this event are shown on the map of Figure 1. A three-digit identifying code is shown on the map adjacent to each station. This identifying code, the station name, and the station number are cross-referenced in Table 1. Table 2, ordered by station name, provides information on the site conditions and the structures in which the instruments are located. Detailed information on each record, including peak acceleration values, is given in Table 3. In Tables 1, 2 and 3 the number of the page on which a copy of the accelerogram appears is also listed.

The part of the report containing the accelerogram reproductions has two sections. The first section contains copies of the records from ground-response stations. The second section contains copies of the structural-response records. Each section begins with an index list for records in that section. The structural-response section includes a description of the structure and a schematic illustration of the layout of the sensors for most structures. By convention, the orientation of sensors in a building is given by cardinal directions; the relation of these reference directions to actual directions is given on each building record.

Acknowledgments

The California Strong Motion Instrumentation Program extends its appreciation to the individuals and organizations which have permitted the installation of seismic strong-motion equipment on their property. C. Rojahn, J. Ragsdale and R. Nutt assisted in planning sensor layouts for the structures considered in this report.

The records presented in this report were recovered at stations instrumented by M. Huston, H. LaGesse, R. Meneely, M. Seaton, L. Stange, V. Steeves and W. Williams. These stations have been maintained by H. LaGesse; he was assisted in record recovery for this event by R. Meneely and V. Steeves. P. Knight and S. Weaver assisted in report preparation. R. Boylan verified orientations and also assisted in report preparation. The joint efforts of all those involved made possible the timely publication of these data.

References

Huang, M.J., A.F. Shakal, D.L. Parke, J.T. Ragsdale and R.W. Sherburne, 1986, Processed data from the strong-motion record obtained at a base-isolated building in Rancho Cucamonga, California during the Redlands earthquake of 2 October 1985, Calif. Div. Mines and Geology, Report OSMS 86-01.

Switzer, J., D. Johnson, R. Maley, and R.B. Matthiesen, 1981, Western hemisphere strong-motion accelerograph station list - 1980, U.S. Geological Survey Open File Report No. 81-664.

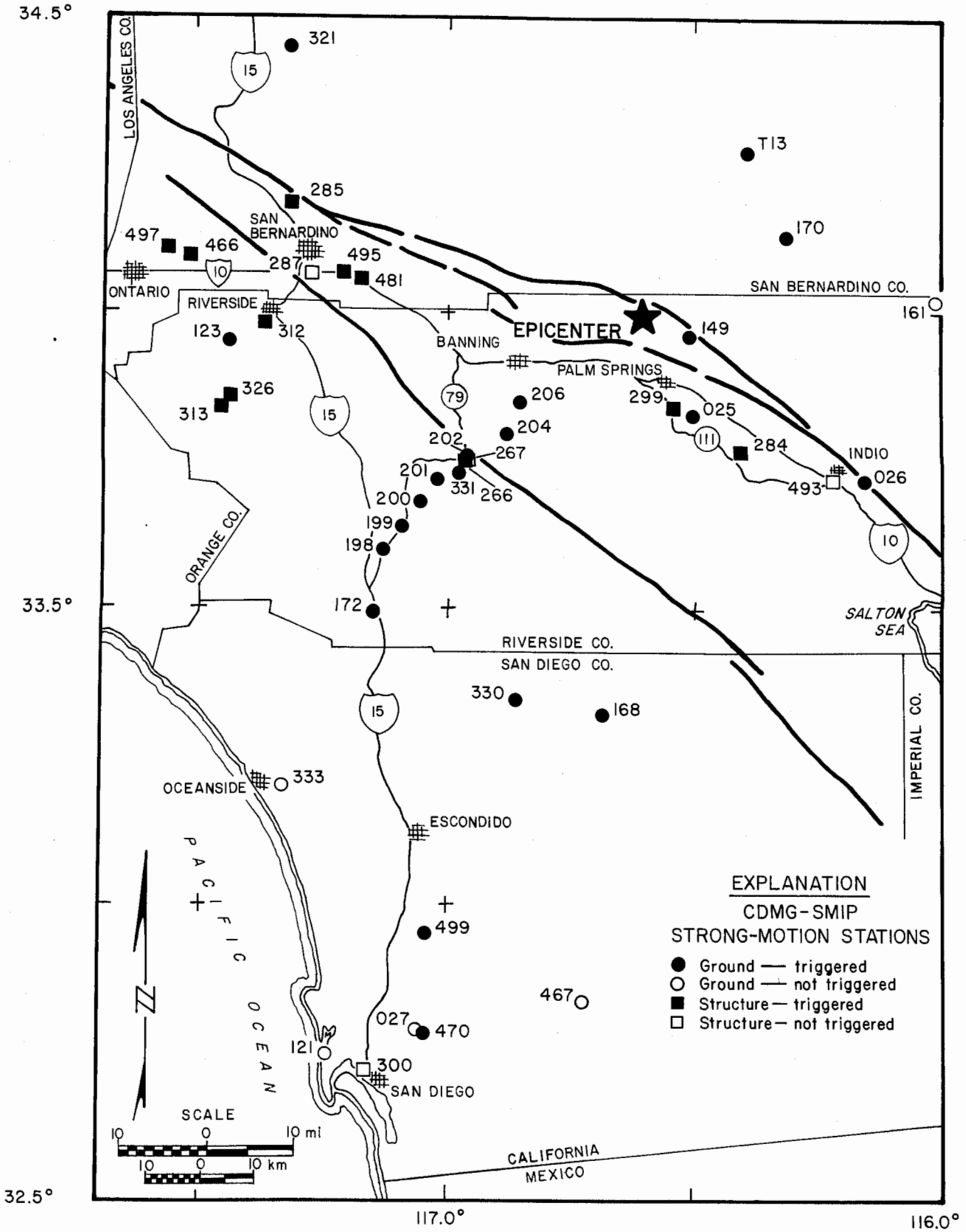


Figure 1. CSMIP strong motion stations in the vicinity of the 8 July 1986 earthquake near Palm Springs. Stations are identified by a three-digit code cross-referenced to station names in Table 1.

TABLE 1

Station-Code Reference Table

Code	CSMIP Number	Station Name	Record on Page
025	12025	Palm Springs - Airport	17
026	12026	Indio - Coachella Canal	23
027	03027	San Diego - Murray Hill	--
121	03121	Ocean Beach	--
123	13123	Riverside - Airport	26
149	12149	Desert Hot Springs-Pierson Blvd Fire Station	17
161	22161	Twenty Nine Palms	--
168	12168	Puerta La Cruz - USFS Storage Bldg.	24
170	22170	Joshua Tree - Fire Station	22
172	13172	Temecula - CDF Fire Station	23
198	13198	Murrieta Hot Springs - Collins Ranch	21
199	13199	Winchester - Bergman Ranch	21
200	13200	Winchester - Hidden Valley Farms	20
201	13201	Winchester - Page Bros. Ranch	20
202	12202	San Jacinto - Valley Cemetery	19
204	12204	San Jacinto - Soboba	18
206	12206	Silent Valley - Poppet Flat	18
266	12266	Hemet - City Library	39
267	12267	Hemet - Valley Hospital	--
284	12284	Palm Desert - Kiewit Bldg.	35
285	23285	San Bernardino - State College Library	51
287	23287	San Bernardino - Hilton Inn	--
299	12299	Palm Springs - Desert Hospital	31
300	03300	San Diego - San Diego Gas & Electric Bldg	--
312	13312	Riverside - Riverside Co. Admin. Bldg.	59
313	13313	Lake Mathews - Main Dam	61
321	23321	Hesperia	26
326	13326	Lake Mathews - Dike 1	61
330	12330	Palomar Mountain - Palomar Observatory	24
331	12331	Hemet - Stetson Ave Fire Station	19
333	13333	Oceanside B	--
466	23466	Etiwanda - SCE Power Plant #3	64
467	02467	Alpine	--
470	03470	San Diego - Murray Dam Left Abutment	25
481	23481	Redlands - Redlands Fed. Savings Bldg.	47
493	12493	Indio - Riverside Co. Admin. Bldg.	--
495	23495	Redlands - Interstate Van Lines Warehouse	43
497	23497	Rancho Cucamonga - Law & Justice Center	27 & 55
499	03499	Poway - City Hall FF	25
T13	22T13	Landers - Fire Station	22

TABLE 2

CSMIP Strong-Motion Stations - Palm Springs Earthquake

Station Name	N.Lat.	W.Long.	Sta. No.	Code	Site Geology	Record Page*
Alpine	32.838	116.724	02467	467		NT
Desert Hot Springs- Pierson Blvd Fire Station	33.962	116.509	12149	149	Alluvium	17
Etiwanda - SCE Power Plant #3	34.091	117.527	23466	466		64
Hemet - City Library	33.748	116.966	12266	266	Deep Alluvium	39
Hemet - Stetson Ave Fire Station	33.729	116.979	12331	331	Deep Alluvium	19
Hemet - Valley Hospital	33.750	116.959	12267	267	Deep Alluvium	NT#
Hesperia	34.448	117.327	23321	321	Alluvium	26
Indio - Coachella Canal	33.717	116.156	12026	026	Alluvium (Shallow Vs~1100fps)	23
Indio - Riverside County Admin. Bldg.	33.714	116.221	12493	493		NT#
Joshua Tree - Fire Station	34.131	116.314	22170	170	Alluvium (Shallow Vs~1130fps)	22
Lake Mathews - Dike 1	33.854	117.444	13326	326		61
Lake Mathews - Main Dam	33.836	117.461	13313	313		61
Landers - Fire Station	34.274	116.392	22T13	T13	Alluvium	22
Murrieta Hot Springs - Collins Ranch	33.599	117.132	13198	198	Thin soil (1m) over weatherd granite	21
Ocean Beach	32.749	117.241	03121	121		NT
Oceanside B	33.201	117.331	13333	333		NT

TABLE 2 (Continued)

Station Name	N.Lat.	W.Long.	Sta. No.	Code	Site Geology	Record Page*
Palm Desert - Kiwiet Bldg.	33.762	116.407	12284	284	Alluvium	35
Palm Springs - Airport	33.829	116.501	12025	025	Sand (3m) over alluvium	17
Palm Springs - Desert Hospital	33.838	116.541	12299	299	Alluvium	31
Palomar Mountain - Palomar Observatory	33.353	116.862	12330	330	Granite	24
Poway - City Hall FF	32.954	117.040	03499	499		25
Puerta La Cruz - USFS Storage Bldg.	33.324	116.683	12168	168	Thin alluvium (8m?) over granite	24
Rancho Cucamonga - Law & Justice Cntr.	34.104	117.574	23497	497		27 & 55
Redlands - Redlands Federal Savings Bldg.	34.056	117.178	23481	481		47
Redlands - Interstate Van Lines Warehouse	34.066	117.214	23495	495		43
Riverside - Airport	33.951	117.446	13123	123	Alluvium	26
Riverside - Riverside County Admin. Bldg.	33.978	117.373	13312	312	Alluvium	59
San Bernardino - Hilton Inn	34.065	117.279	23287	287		NT#
San Bernardino - State College Library	34.183	117.323	23285	285	Alluvium	51
San Diego - Murray Dam Left Abutment	32.781	117.044	03470	470		25
San Diego - Murray Hill	32.791	117.059	03027	027	Greenstone	NT
San Diego - San Diego Gas & Electric Bldg.	32.719	117.163	03300	300		NT
San Jacinto - Soboba	33.797	116.880	12204	204	Alluvium	18
San Jacinto - Valley Cemetery	33.760	116.960	12202	202	Alluvium	19

TABLE 2 (Continued)

Station Name	N.Lat.	W.Long.	Sta. No.	Code	Site Geology	Record Page*
Silent Valley - Poppet Flat	33.851	116.852	12206	206	Weathered granite	18
Temecula- CDF Fire Station	33.496	117.149	13172	172		23
Twenty Nine Palms	34.021	116.009	22161	161		NT
Winchester - Bergman Ranch	33.640	117.094	13199	199	Weathered granite	21
Winchester - Hidden Valley Farms	33.681	117.056	13200	200	Thin soil (1m) over schist,granite	20
Winchester - Page Bros. Ranch	33.718	117.022	13201	201	Deep (200m?) alluvium	20

Footnote: NT - Instrument not triggered, though operational.
NT# - Instrument not triggered, probable instrument malfunction.

TABLE 3 - Strong Motion Data

Station Name	No.	Structure Type,Size*	Epicenter Dist.**	Trigger Time#	Comp.	Max. Acceleration Grnd. (g)	Struct. (g)	Pg.
Desert Hot Springs	12149	1-story	10	20:47.5	90	0.26		17
Pierson Blvd		bldg.			Up	0.59		
Fire Station					360	0.33		
Palm Springs	12299	4-story	19	---	360	0.16	0.62	31
Desert Hospital		bldg.			Up	0.13	--	
		(13 sensors)			270	0.19	0.62	
Palm Springs	12025	Instr.	21	20:48.8	90	0.21		17
Airport		shltr. A			Up	0.21		
					360	0.17		
Palm Desert	12284	4-story	32	---	360	0.12	0.20	35
Kiewit Bldg.		bldg.			Up	0.09	--	
		(9 sensors)			90	0.07	0.15	
----- Hemet Array Stations (Northeast to Southwest) -----								
Silent Valley	12206	Instr.	28	20:50.9	90	0.12		18
Poppet Flat		shltr. A			Up	0.10		
					360	0.15		
San Jacinto	12204	1-story	34	20:50.9	90	0.24		18
Soboba		bldg.			Up	0.21		
Castile Cyn Rd.					360	0.26		
San Jacinto	12202	1-story	42	20:53.8	360	0.07		19
Valley Cemetery		bldg.			Up	0.06		
					270	0.07		
Hemet	12331	1-story	46	20:53.1	360	0.13		19
Stetson Ave		bldg.			Up	0.09		
Fire Station					270	0.15		
Winchester	13201	Instr.	49	20:54.5	90	0.11		20
Page Bros. Ranch		shltr. A			Up	0.08		
					360	0.11		

TABLE 3 - Strong Motion Data (Continued)

Station Name	No.	Structure Type,Size*	Epicenter Dist.**	Trigger Time#	Max. Acceleration Comp.	Grnd. (g)	Struct. (g)	Pg.
Winchester Hidden Valley Farms-Newport Rd.	13200	Instr. shltr. A	54	21:00.6	360 Up 270	0.09 0.04 0.09		20
Winchester Bergman Ranch	13199	Instr. shltr. A	60	20:59.5	90 Up 360	0.10 0.08 0.08		21
Murrieta Hot Springs Collins Ranch	13198	Instr. shltr. A	66	20:56.9	90 Up 360	0.05 0.04 0.05		21
Hemet City Library	12266	1-story bldg. (6 sensors)	43	---	360 Up 270	0.10 0.08 0.10	0.21 -- 0.32	39
Joshua Tree Fire Station	22170	1-story bldg.	31	20:50.9	90 Up 360	0.06 0.04 0.06		22
Landers Fire Station	22T13	1-story bldg.	37	20:51.9	90 Up 360	0.10 0.05 0.08		22
Indio Coachella Canal	12026	Instr. shltr. A	52	20:54.4	90 Up 360	0.05 0.06 0.06		23
Temecula CDF Fire Station	13172	Instr. shltr. H	75	20:58.2	90 Up 360	0.11 0.03 0.11		23

TABLE 3 - Strong Motion Data (Continued)

Station Name	No.	Structure Type,Size*	Epicenter Dist.**	Trigger Time#	Max. Acceleration Comp.	Grnd. (g)	Struct. (g)	Pg.
Palomar Mountain	12330	Seismic	76	21:06.9	90	0.03		24
Palomar		vault			Up	0.03		
Observatory					360	0.03		
Puerta La Cruz	12168	1-story	75	20:57.7	348	0.06		24
USFS Storage		bldg.			Up	0.05		
Bldg.					258	0.08		
Poway	03499	Instr.	123	21:18.9	90	0.04		25
City Hall		shltr. H			Up	0.02		
Free Field					360	0.06		
San Diego	03470	Instr.	141	21:23.9	57	0.02		25
Murray Dam		shltr. H			Up	0.01		
Left Abutment					327	0.03		
Redlands	23481	7-story	53	20:54.3	180	0.03	0.05	47
Redlands Federal		bldg.			Up	0.03	--	
Savings		(13 sensors)			270	0.03	0.03	
Redlands	23495	1-story	57	20:54.4	360	0.04	0.11	43
Interstate Van		warehouse			Up	0.03	--	
Lines		(12 sensors)			90	0.05	0.25	
San Bernardino	23285	5-story	69	---	215	0.03	0.06	51
State College		bldg.			Up	0.02	--	
Library		(10 sensors)			125	0.03	0.09	
Riverside	13312	13-story	71	---	29	0.03	0.07	59
Riverside County		bldg.			Up	0.02	--	
Admin. Bldg.		(15 sensors)			119	0.02	0.05	
Riverside	13123	1-story	78	20:58.1	270	0.04		26
Airport		bldg.			Up	0.03		
					180	0.05		

TABLE 3 - Strong Motion Data (Continued)

Station Name	No.	Structure Type,Size*	Epicenter Dist.**	Trigger Time#	Comp.	Max. Acceleration Grnd. (g)	Struct. (g)	Pg.
Lake Mathews Dike 1	13326	Earth dam (9 sensors)	79	20:58.4	75	0.09	0.05	61
					Up	0.03	0.06	
					345	0.07	0.08	
Lake Mathews Main Dam	13313	Earth dam (6 sensors)	81	---	350		0.09	61
					Up		0.06	
					260		0.05	
Hesperia	23321	1-story bldg.	83	20:59.1	92	0.04		26
					Up	0.04		
					2	0.04		
Rancho Cucamonga Law & Justice Center	23497	4-story base-isolated bldg. (16 sensors)	90	21:01.7	360	0.02	0.04	55
					Up	0.02	--	
					90	0.02	0.03	
Rancho Cucamonga Law & Justice Center Free Field	23497	Instr. shltr. D	90	21:01.7	360	0.02		27
					Up	--		
					90	0.02		
Etiwanda SCE Power Plant #3	23466	Steam generating plant (12 sensors)	86	---	180	0.02	0.04	64
					Up	0.01	0.03	
					90	0.01	0.03	

Footnotes:

* - Instrument shelter types:
Instr. shltr. A - small prefabricated metal building
Instr. shltr. D - small metal box
Instr. shltr. H - small fiberglass shelter
(adopted from Switzer et al., 1981)

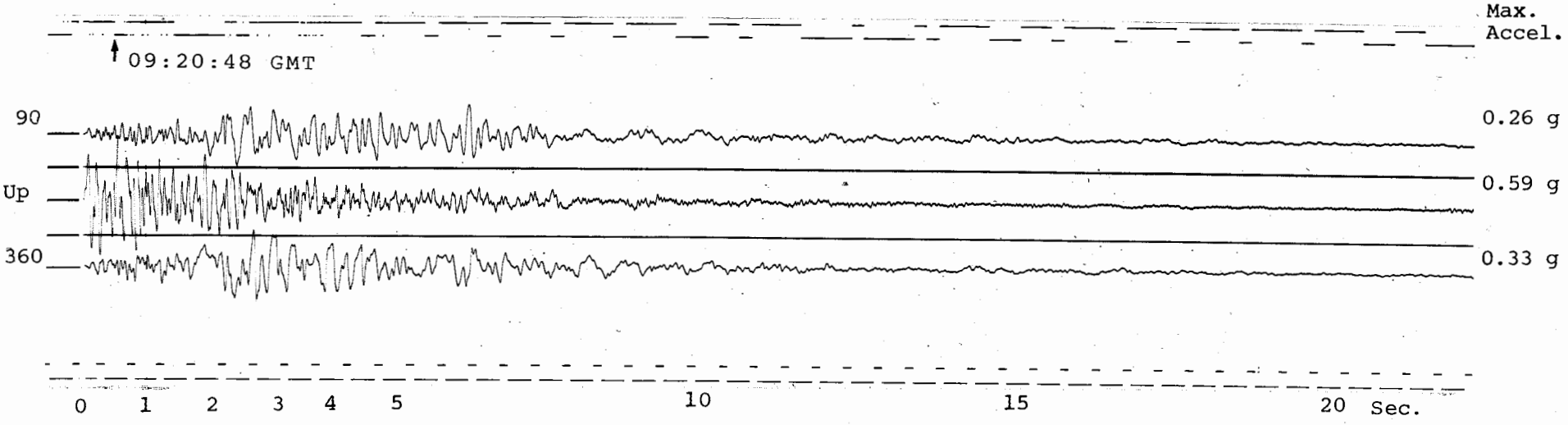
** - Distance given (in km) relative to the presently estimated epicenter at 33.998N, 116.607W. The distance to the nearest point on the fault is not given for this earthquake because the causative faulting associated with this event is not clearly known at this time.

\# - Accelerograph trigger time, when present, in minutes and seconds after 09:00 GMT on 8 July 1986.

INDEX TO GROUND-RESPONSE RECORDS

Desert Hot Springs -
Pierson Blvd. Fire Station
(CSMIP Station No. 12149)

Record 12149-S1832-86189.01



Palm Springs - Airport
(CSMIP Station No. 12025)

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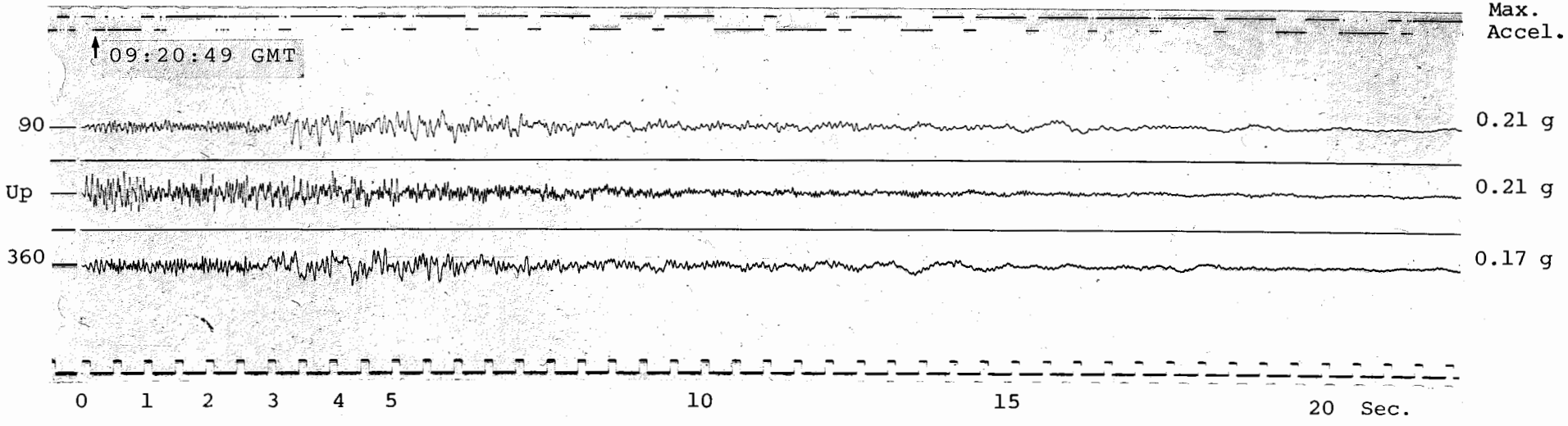

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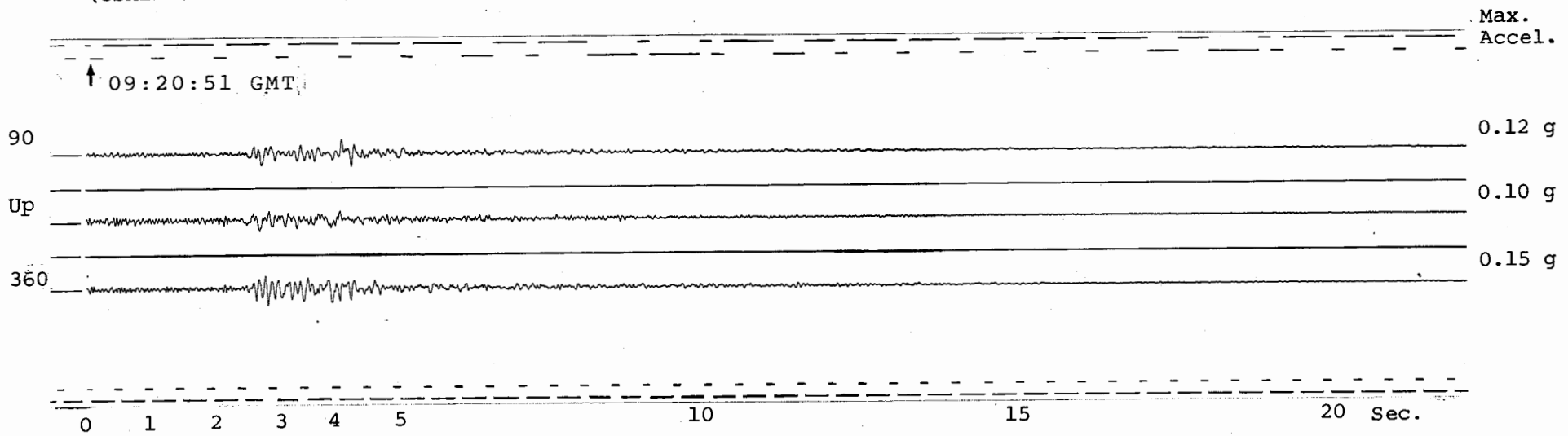

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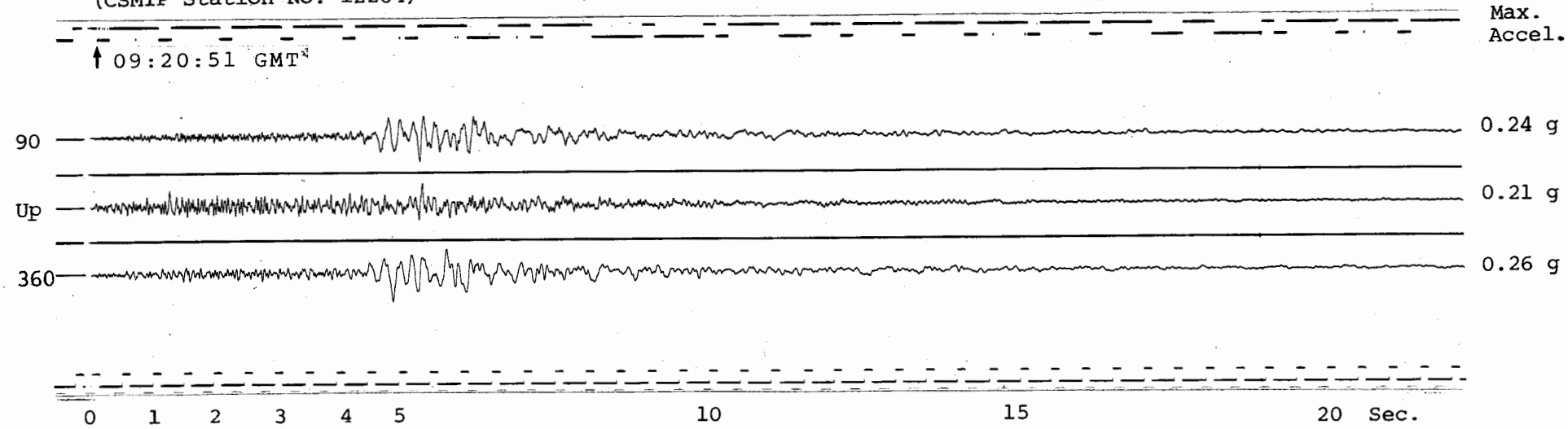

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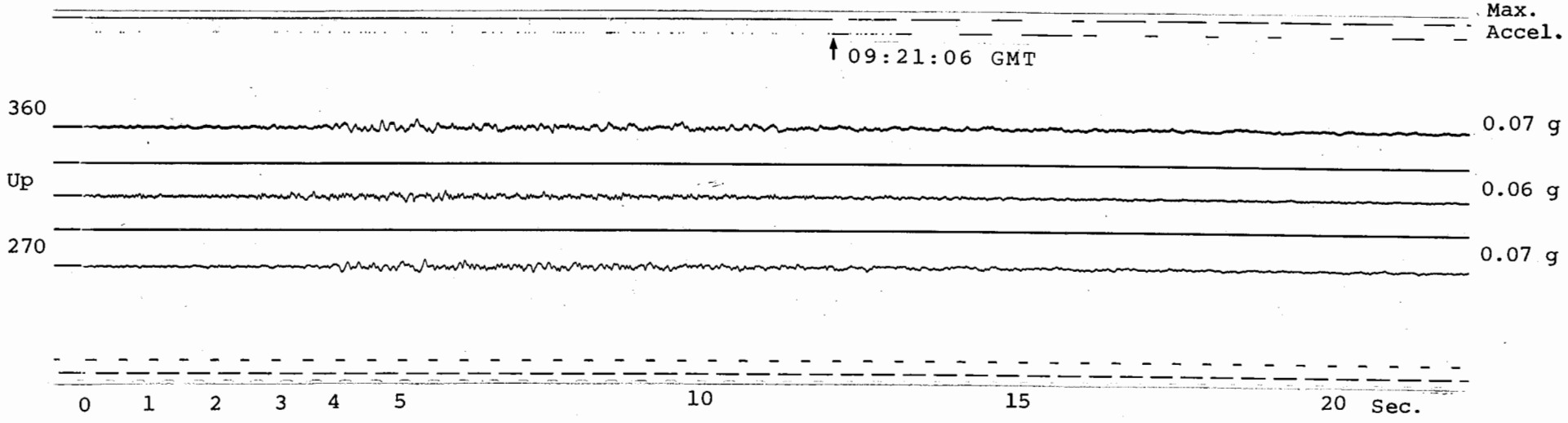

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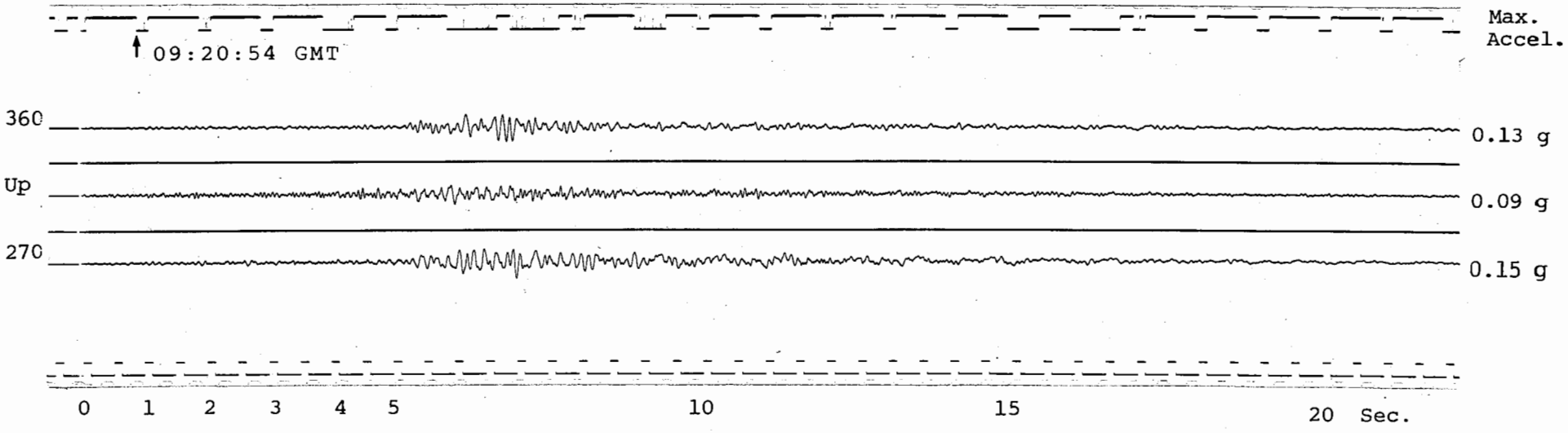

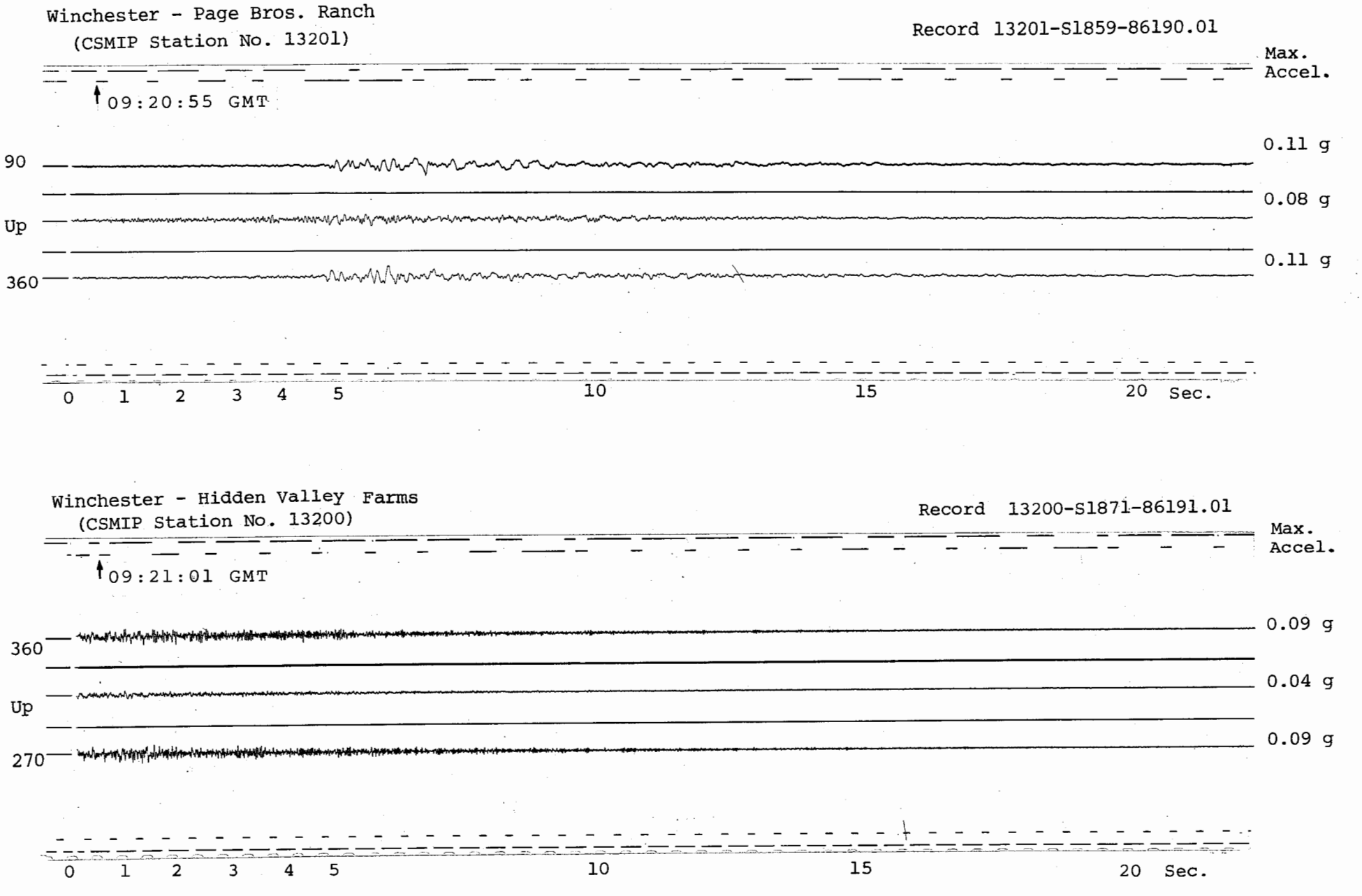
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Up
0.11 g
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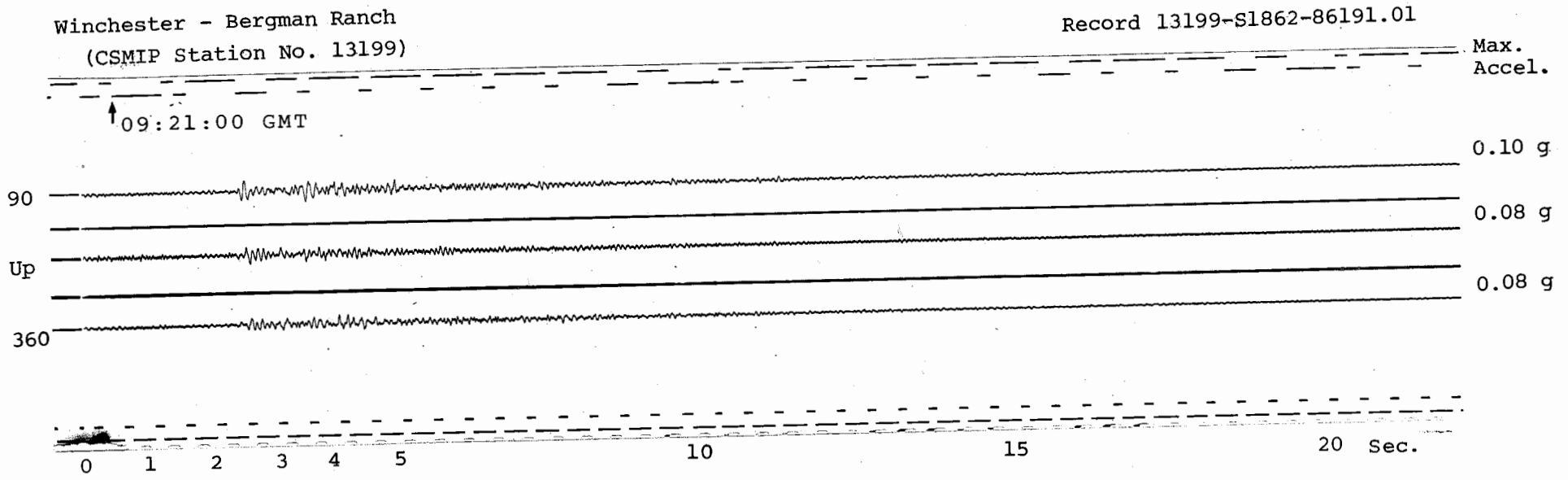
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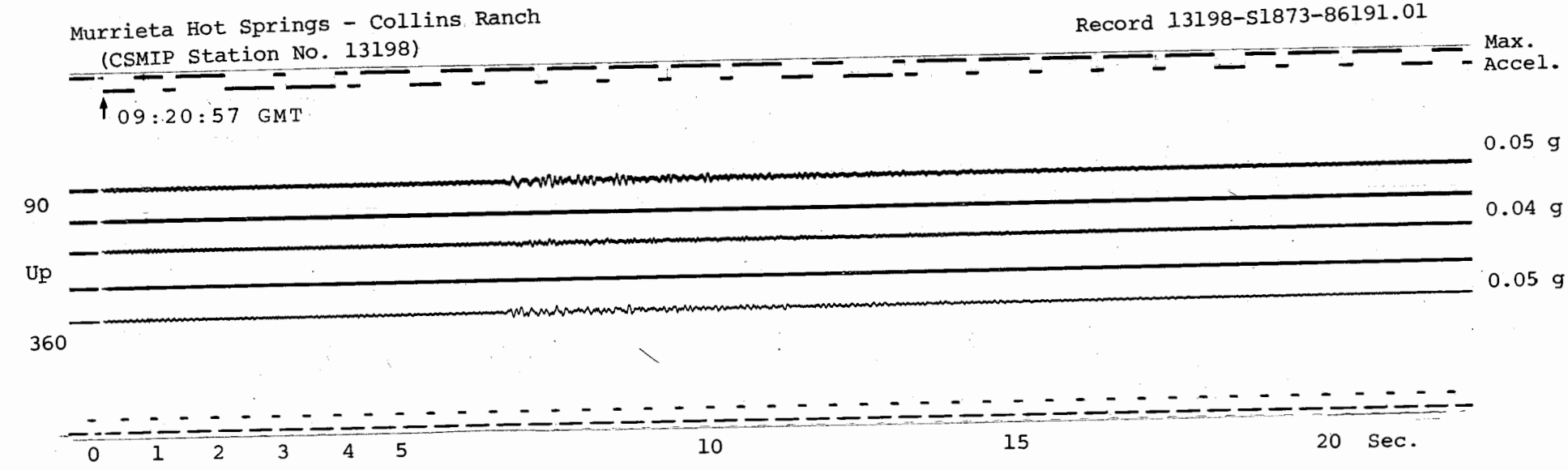
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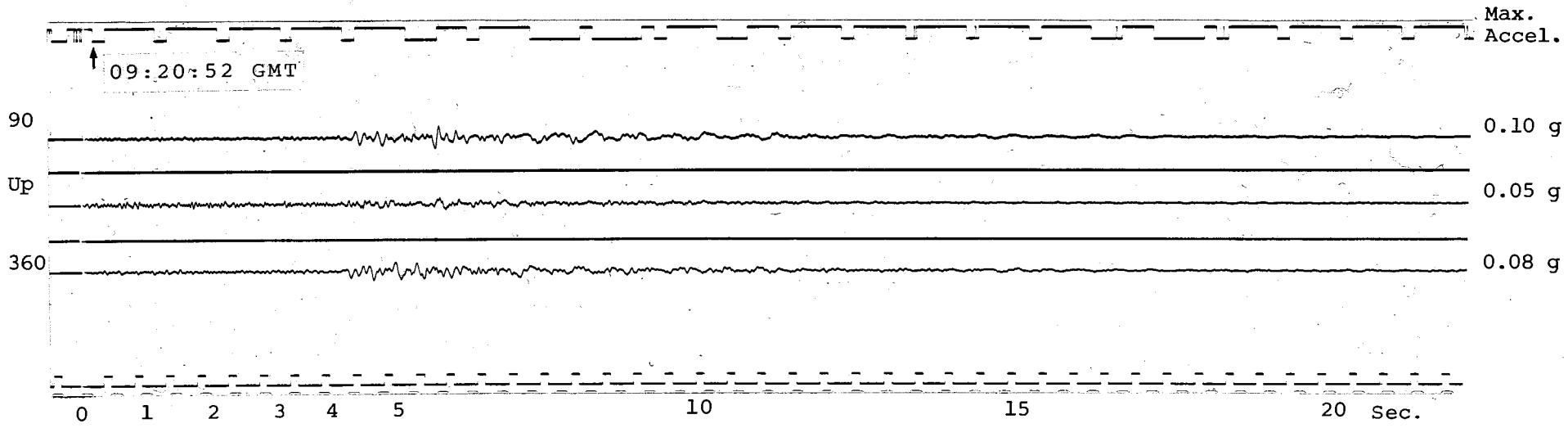
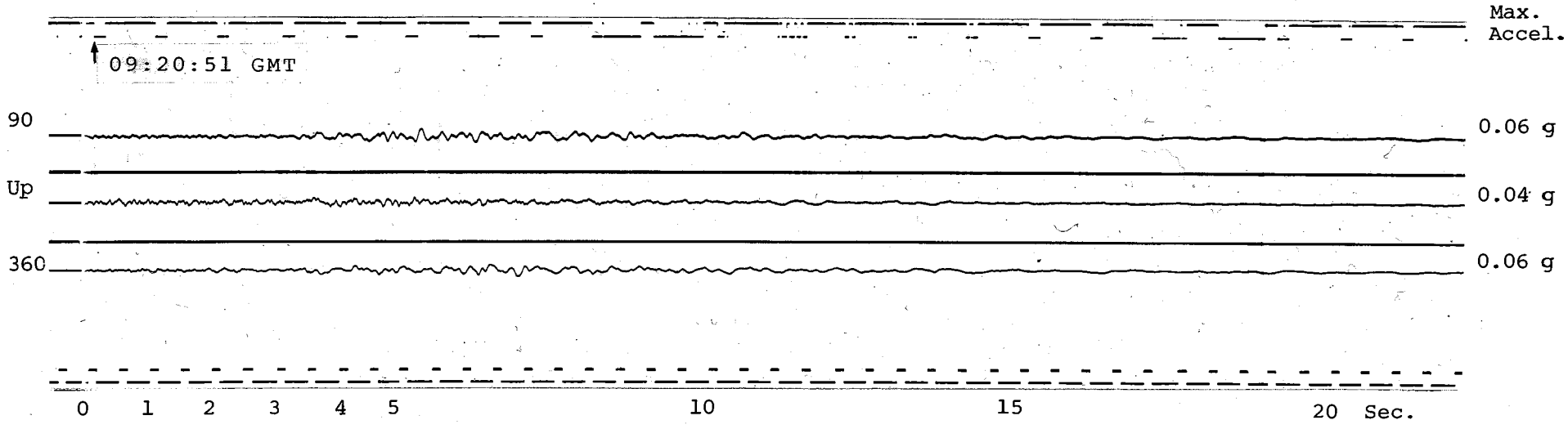
(CSMIP Station No. 22T13)

Record 22T13-S2587-86190.01



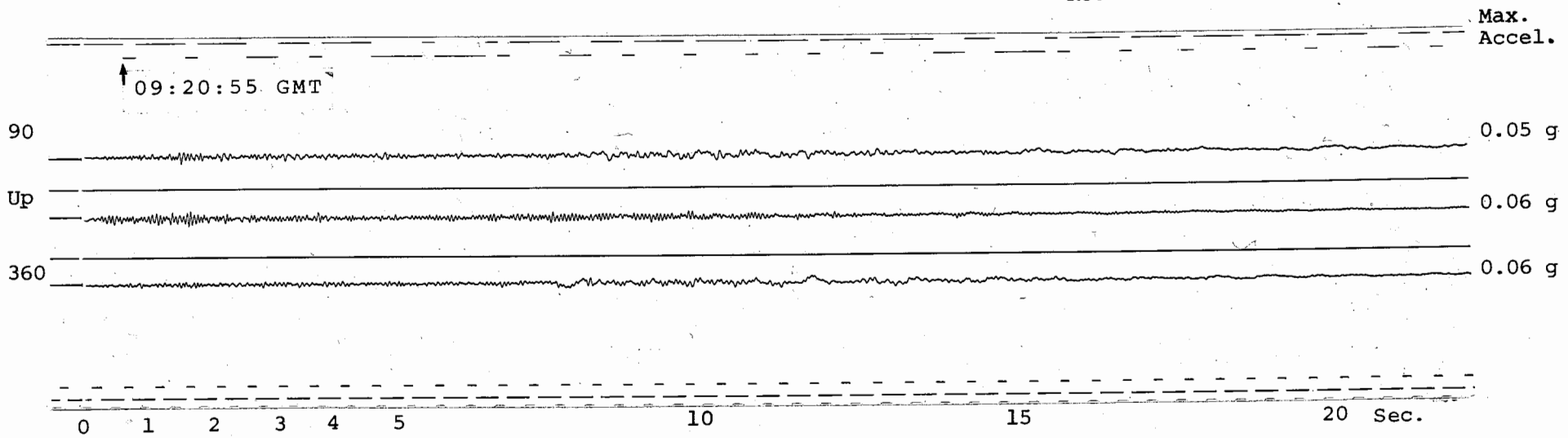
Joshua Tree - Fire Station
(CSMIP Station No. 22170)

Record 22170-S1612-86190.01



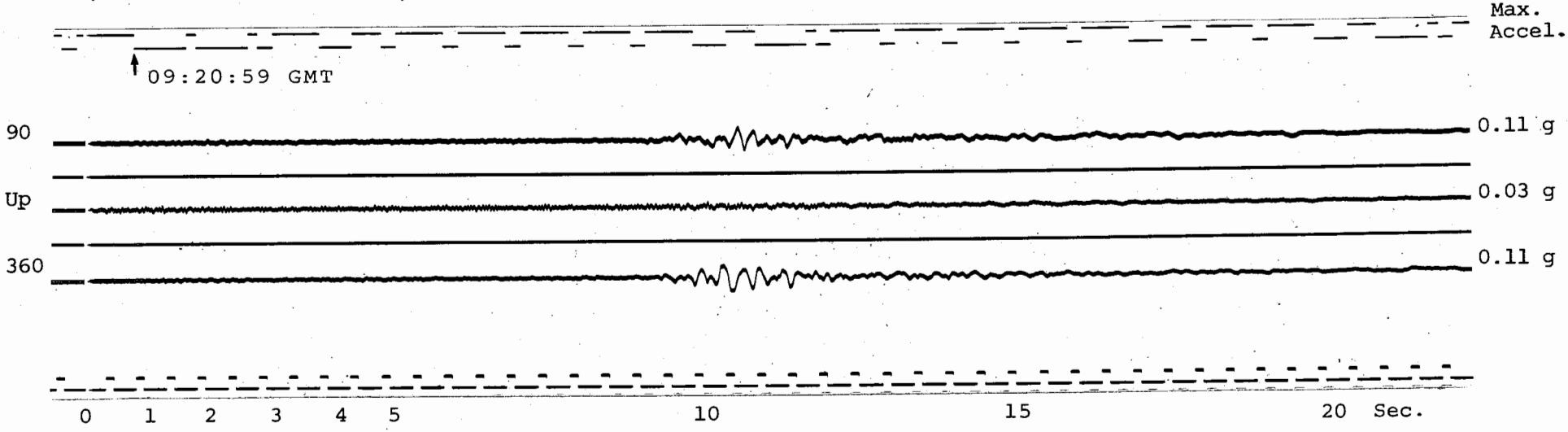
Indio - Coachella Canal
(CSMIP Station No. 12026)

Record 12026-S1839-86189.01



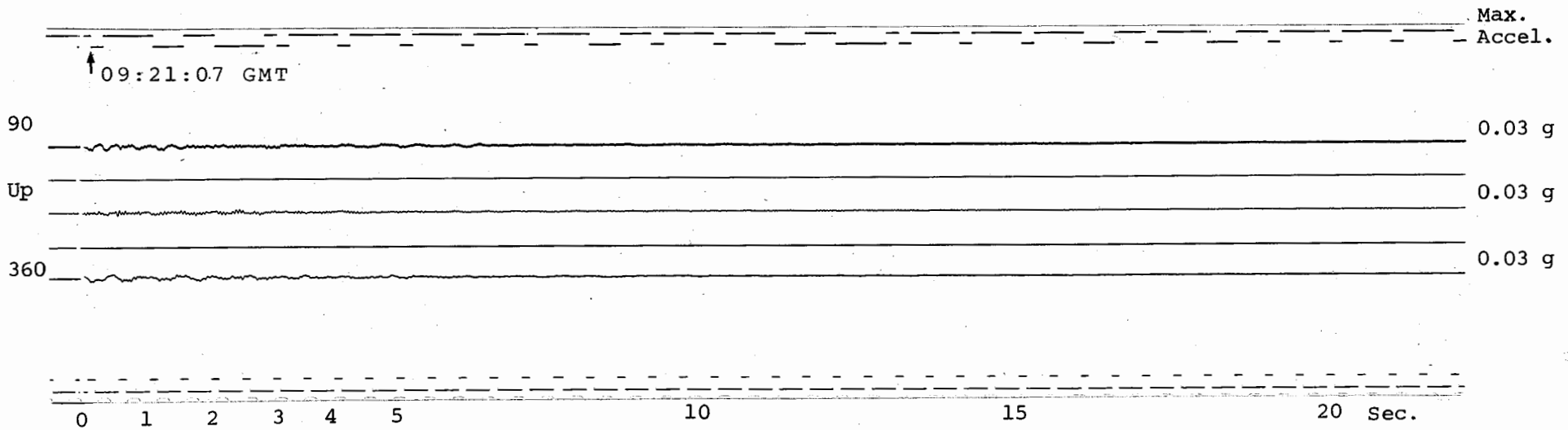
Temecula - CDF Fire Station
(CSMIP Station No. 13172)

Record 13172-S5090-86195.01



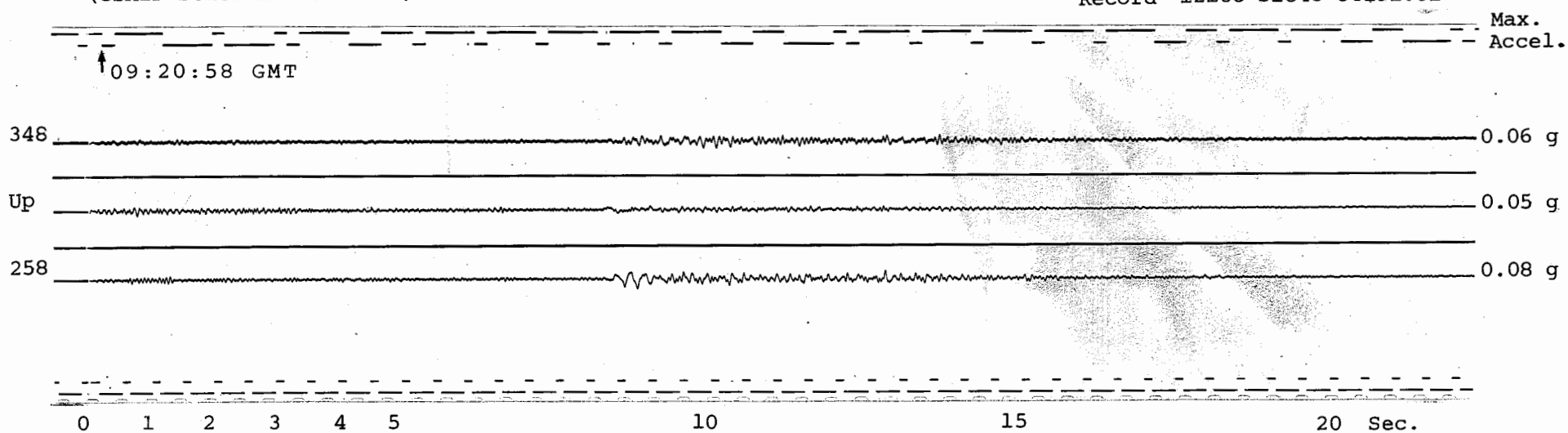
Palomar Mountain - Palomar Observatory
(CSMIP Station No. 12330)

Record 12330-S2571-86191.01



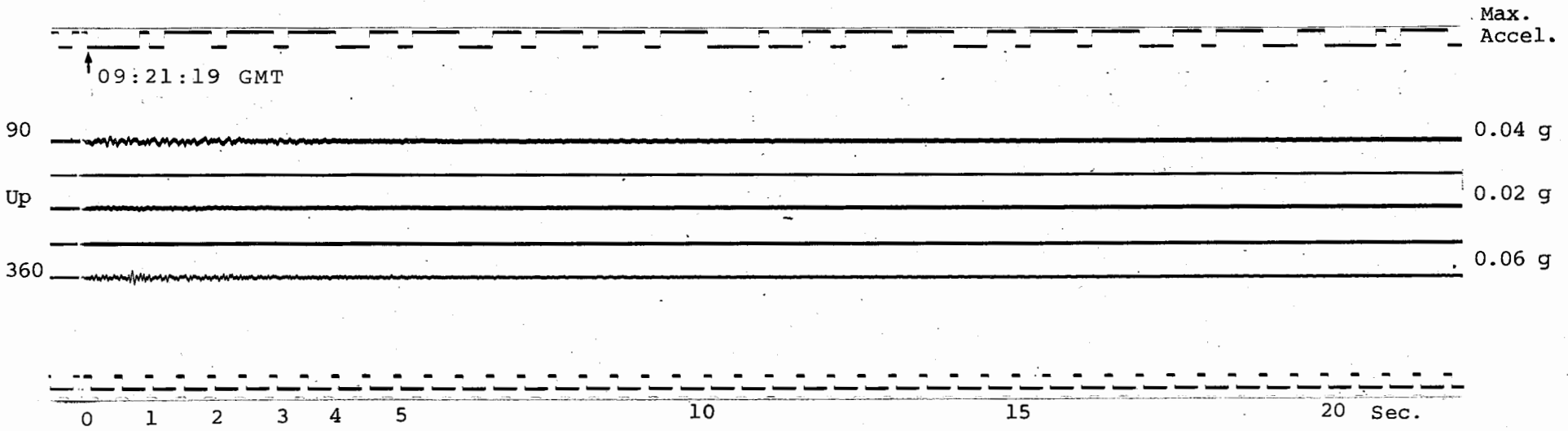
Puerta La Cruz - USF Storage Bldg.
(CSMIP Station No. 12168)

Record 12168-S1843-86191.01



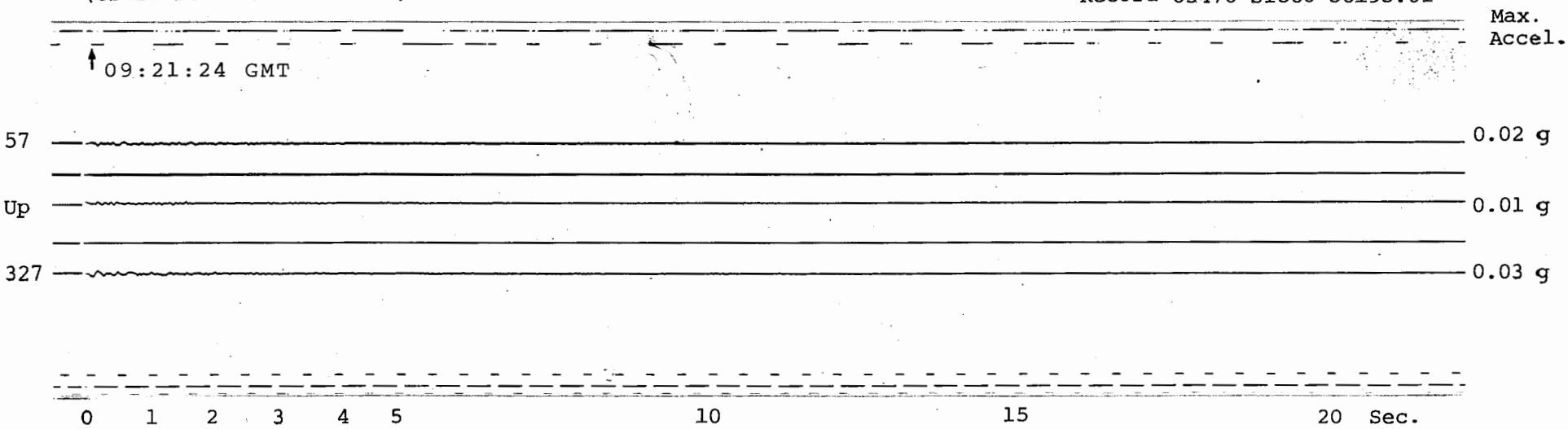
Poway - City Hall Free Field
(CSMIP Station No. 03499)

Record 03499-S5026-86195.01



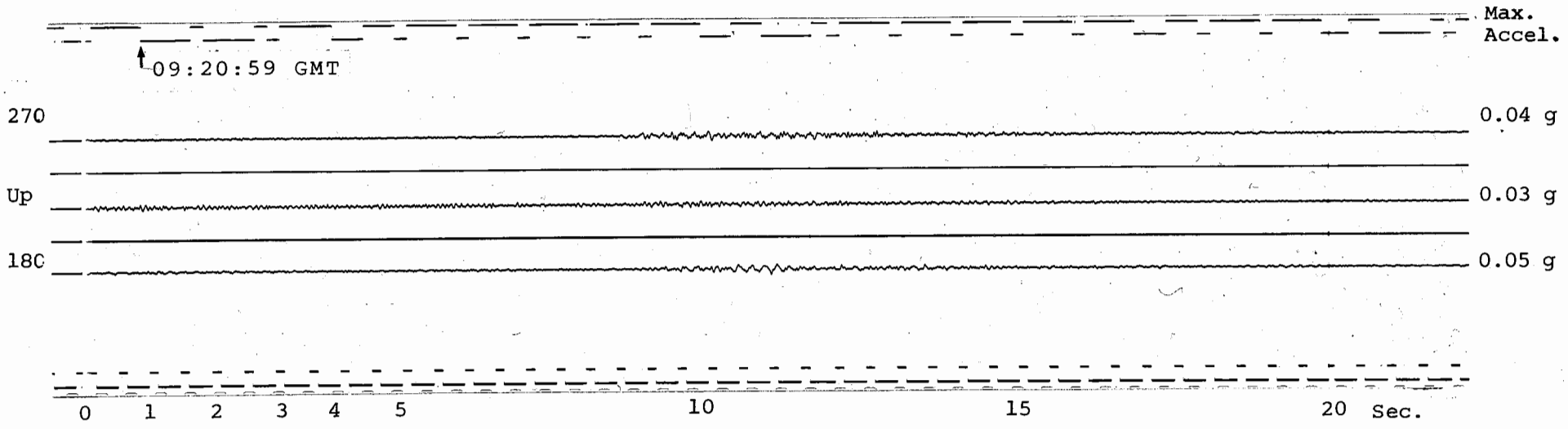
San Diego - Murray Dam Left Abutment
(CSMIP Station No. 03470)

Record 03470-S1860-86195.01



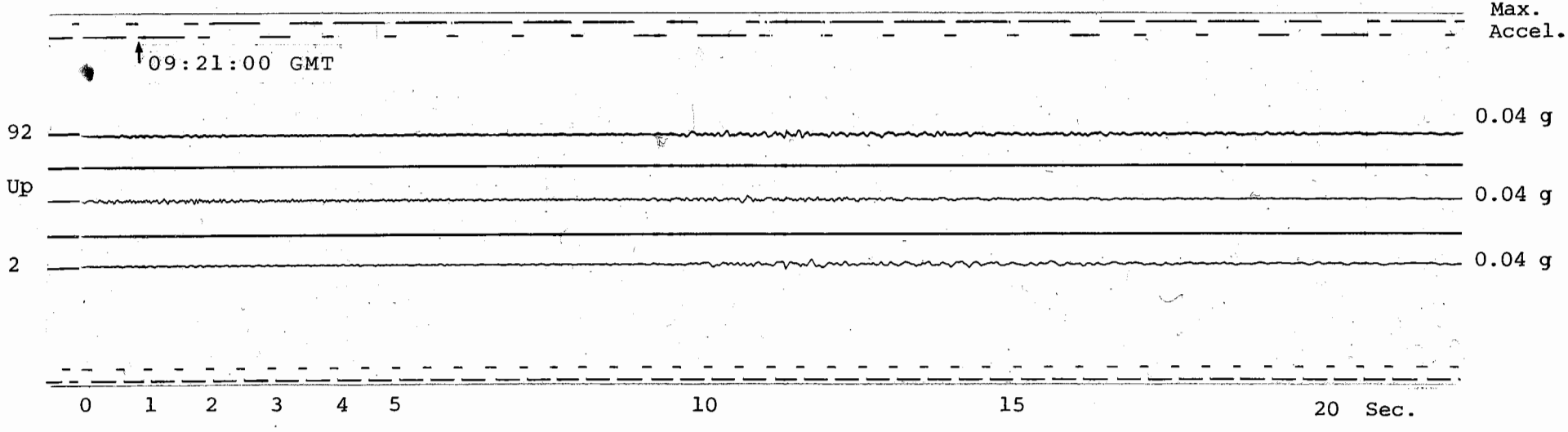
Riverside - Airport
(CSMIP Station No. 13123)

Record 13123-S1593-86190.01



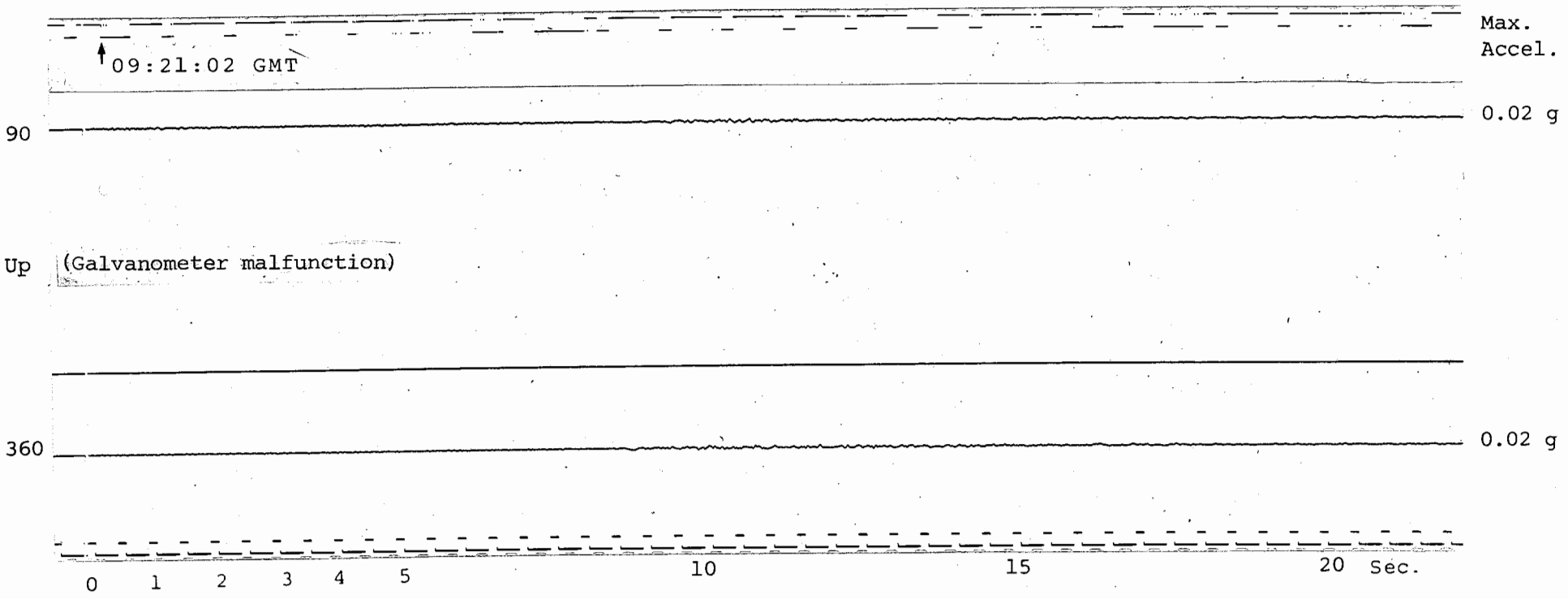
Hesperia
(CSMIP Station No. 23321)

Record 23321-S2562-86190.01



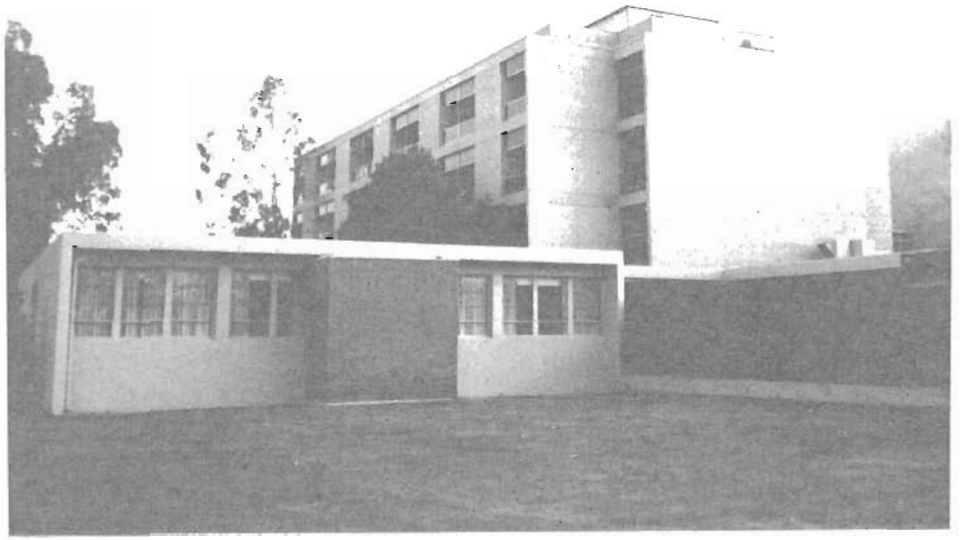
Rancho Cucamonga - Law and Justice Center Free Field
(CSMIP Station No. 23497)

(Channels 17 - 19 of Record 23497-C0118-86189.01)



INDEX TO STRUCTURAL-RESPONSE RECORDS

Palm Springs - Desert Hospital

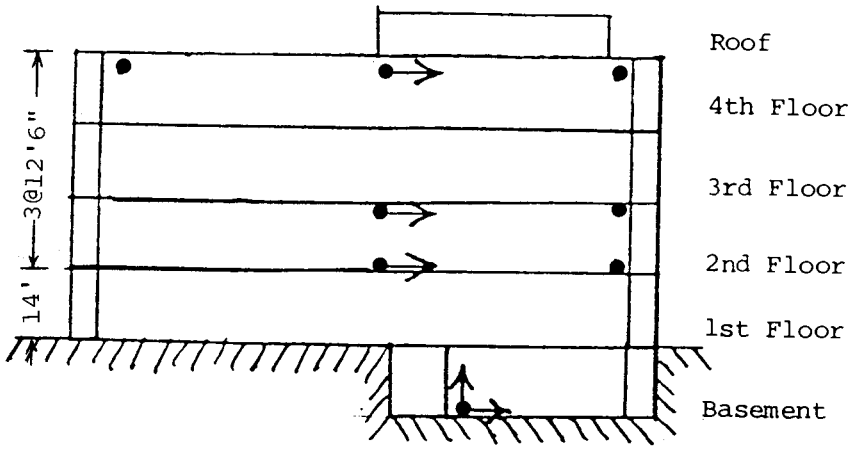


Address: 1151 N. Via Miraleste
Palm Springs, CA
No. of Stories above/below
ground: 4/partial basement
Plan Shape: Rectangular
Base Dimensions: 126' x 78'
Typical Floor Dimensions: Same
Design Date: 1967
Construction Date: 1974

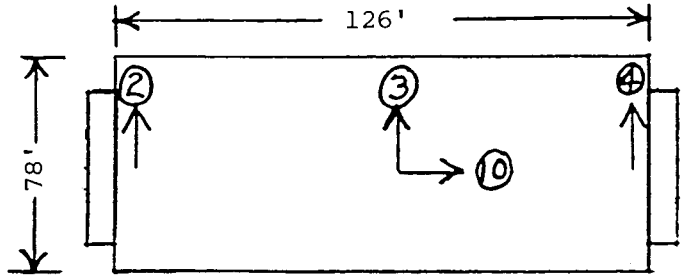
Vertical Load Carrying System:
4"-5" rc slabs supported by steel frame; steel columns encased in concrete between basement level and first floor.
Lateral Force Resisting System:
Steel frame.
Foundation Type:
Spread footings.

SENSOR LAYOUT

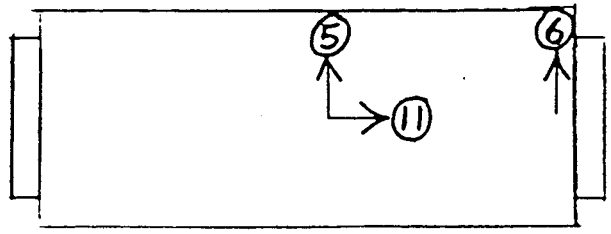
Palm Springs - Desert Hospital
(CSMIP Station No. 12299)



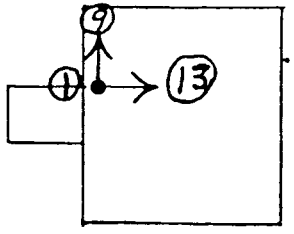
South/North Section



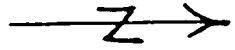
Roof Plan



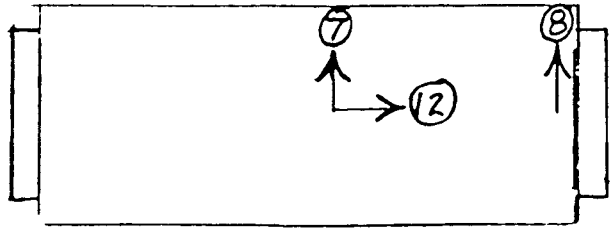
3rd Floor Plan



Basement Plan



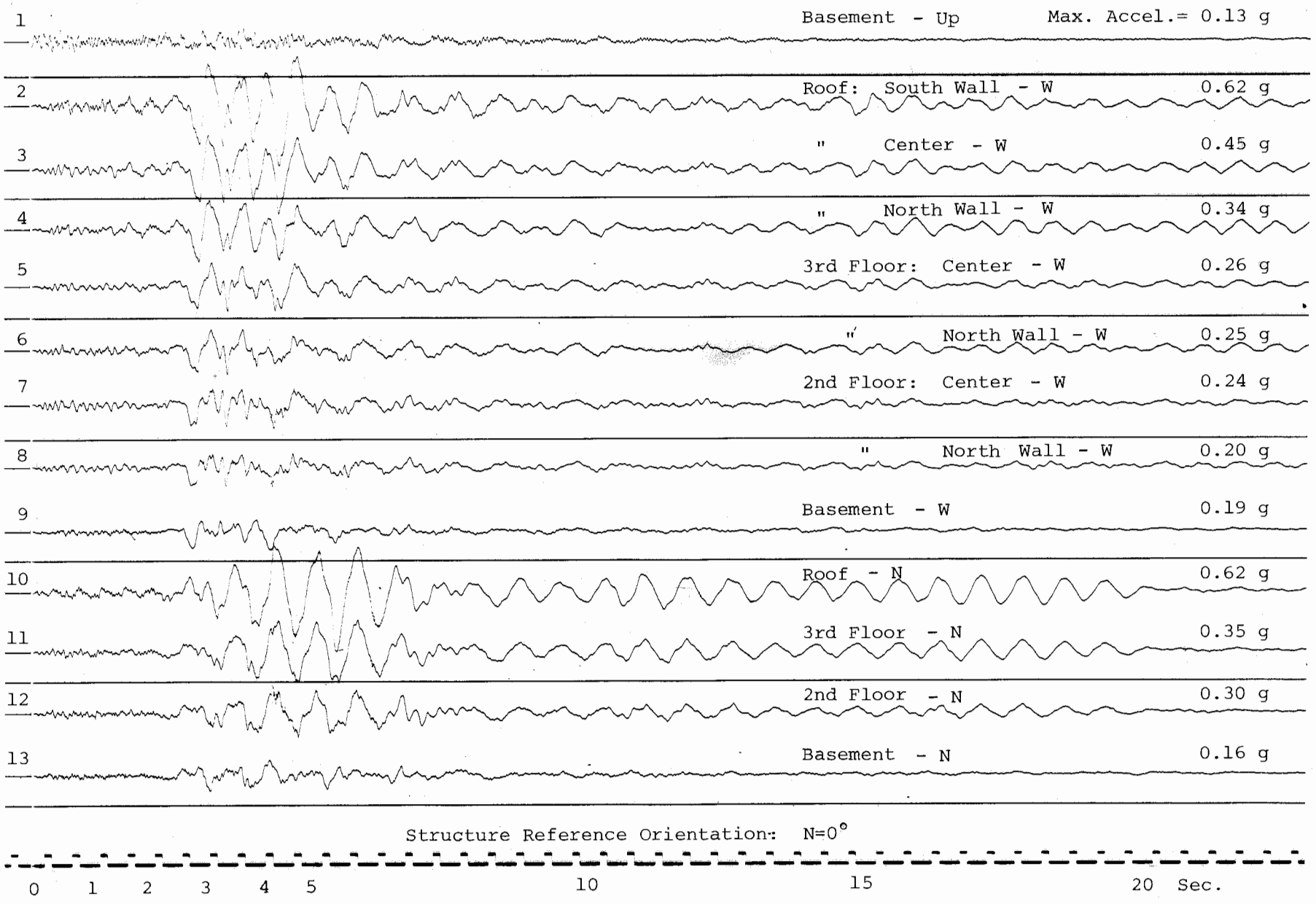
Structure Reference
Orientation: N = 0°



2nd Floor Plan

Palm Springs - Desert Hospital
(CSMIP Station No. 12299)

Record 12299-C0192-86189.01



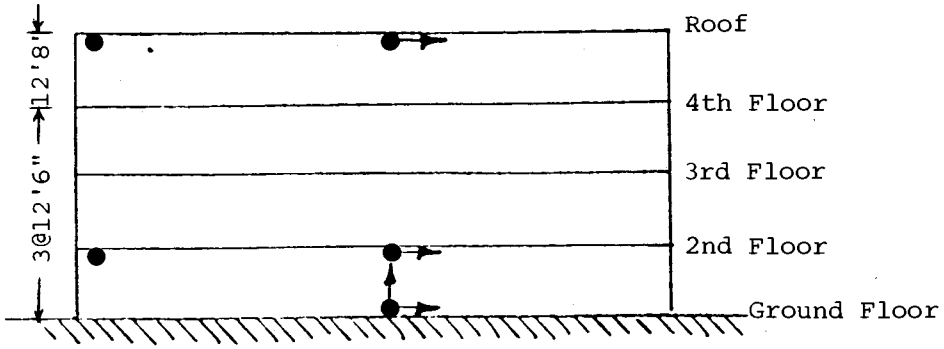
Palm Desert - Kiewit Building, Eisenhower Medical Center

Address: 39000 Bob Hope Drive
Palm Desert, CA
No. of Stories above/below ground: 4/0
Plan Shape: Rectangular
Base Dimensions: 180' x 60'
Typical Floor Dimensions: Same
Design Date: 1974
Construction Date: 1975

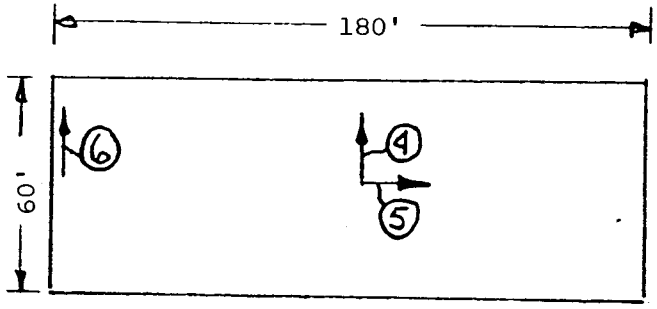
Vertical Load Carrying System:
Precast prestressed concrete slabs supported by precast beams and columns.
Lateral Force Resisting System:
Precast element system in conjunction with concrete shear walls around elevator near center of plan and around stair at each end wall.
Foundation Type:
Spread footings.

SENSOR LAYOUT

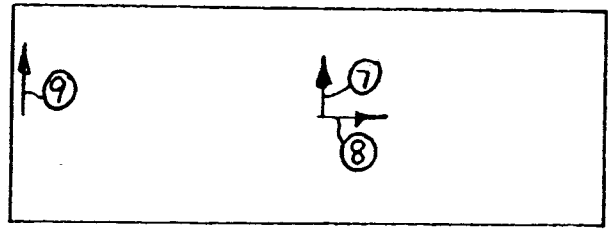
Palm Desert - Kiewit Building
Eisenhower Medical Center
(CSMIP Station No. 12284)



West/East Section

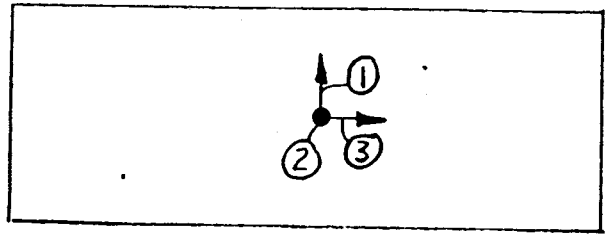


Roof Plan



2nd Floor Plan

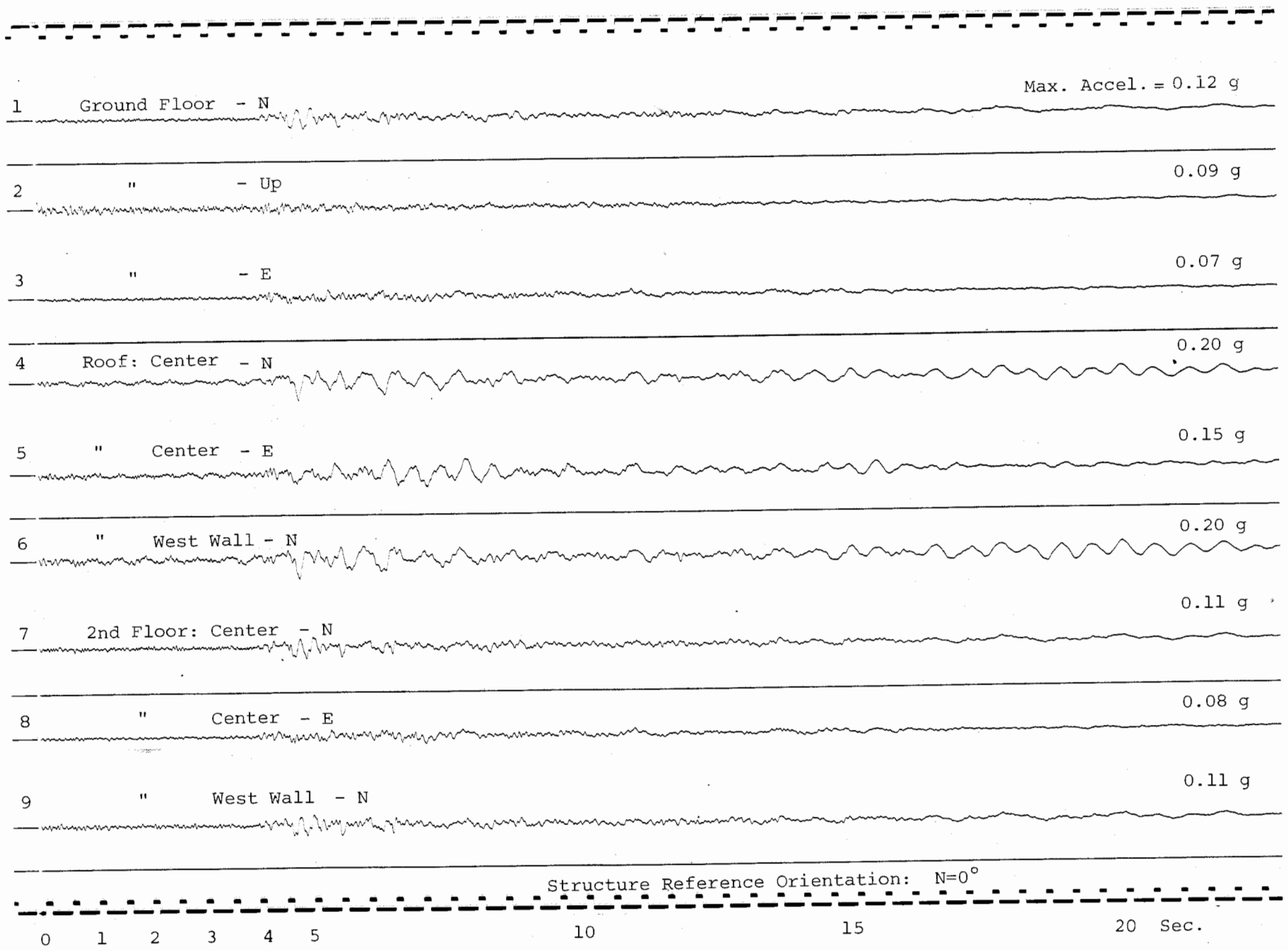
Structure Reference
Orientation: N = 0°



Ground Floor Plan

Palm Desert - Kiewit Building
(CSMIP Station No. 12284)

Record 12284-C0132-86189.01



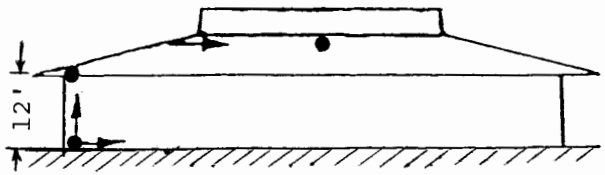
Hemet - City Library

Address: 510 E. Florida Ave.
Hemet, CA
No. of Stories above/below ground: 1/0
Plan Shape: Square
Base Dimensions: 96' x 96'
Typical Floor Dimensions: N/A
Design Date: 1970
Construction Date: 1971

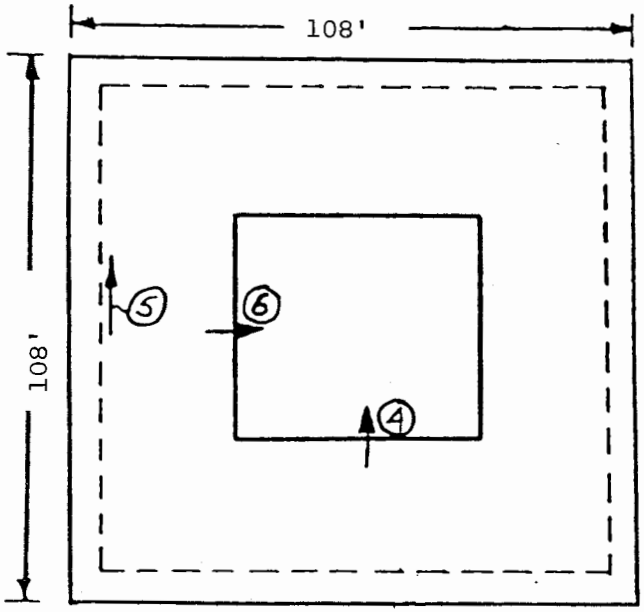
Vertical Load Carrying System:
Steel joist-girder roof framing system supported by steel columns and exterior masonry walls; 1/2" plywood sheathing over joists.
Lateral Force Resisting System:
Masonry block and rc shear walls at various locations along perimeter.
Foundation Type:
Spread footings.

SENSOR LAYOUT

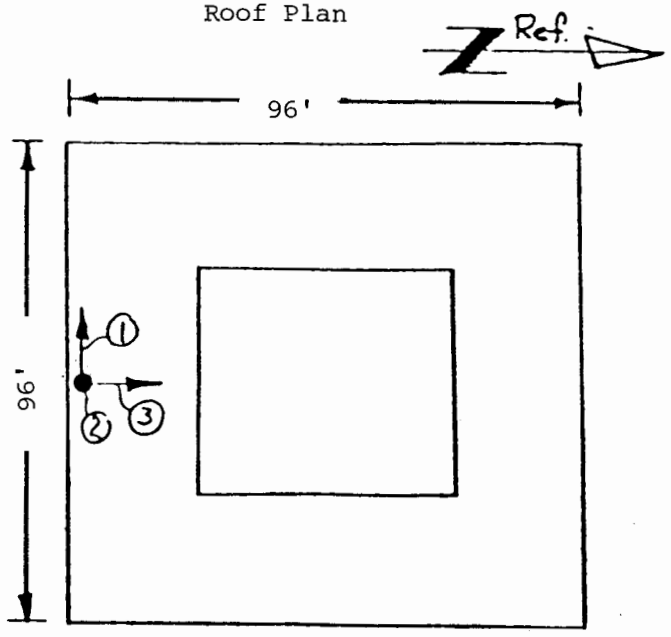
Hemet - City Library
(CSMIP Station No. 12266)



South/North Section



Roof Plan

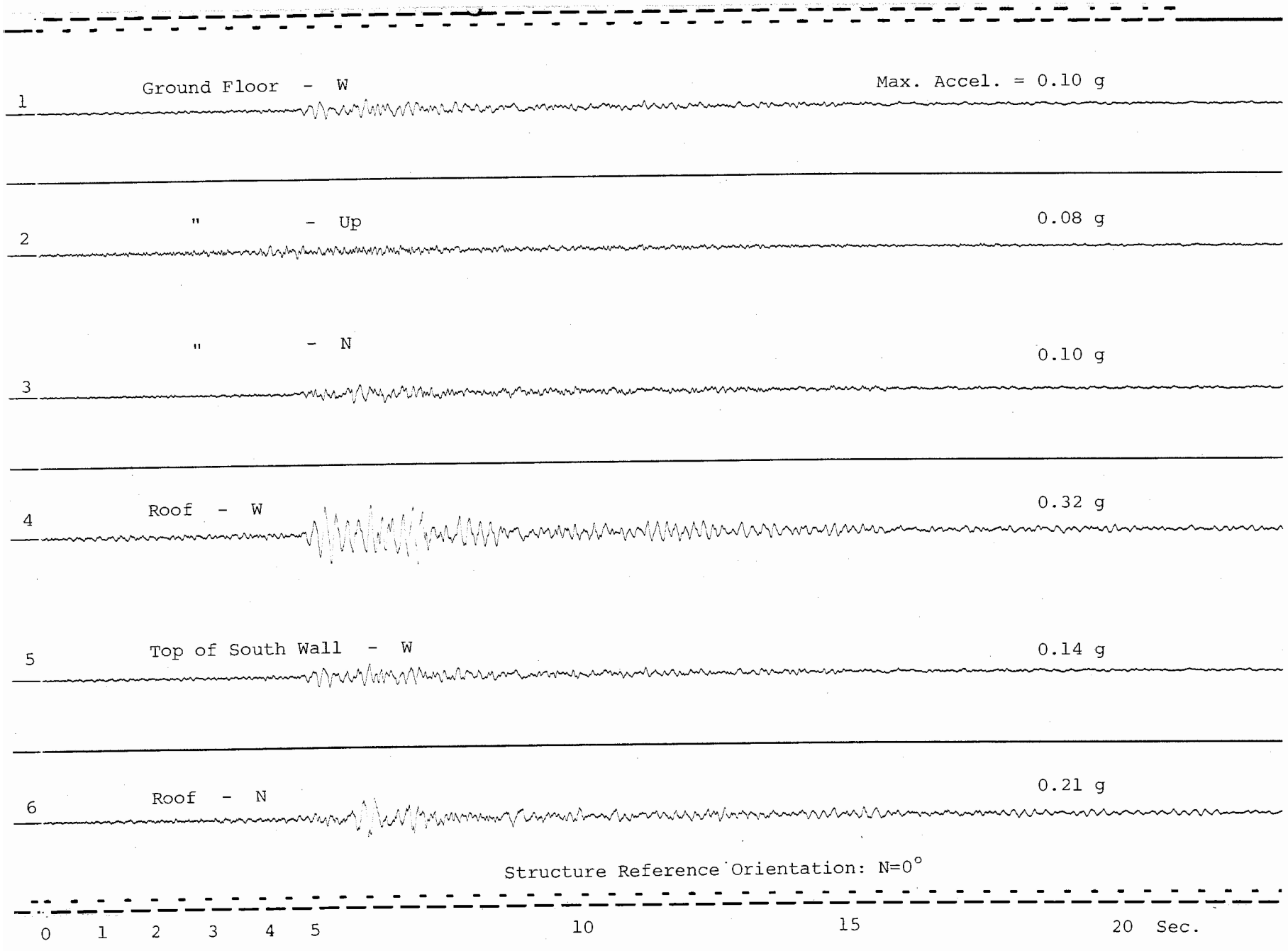


Ground Floor Plan

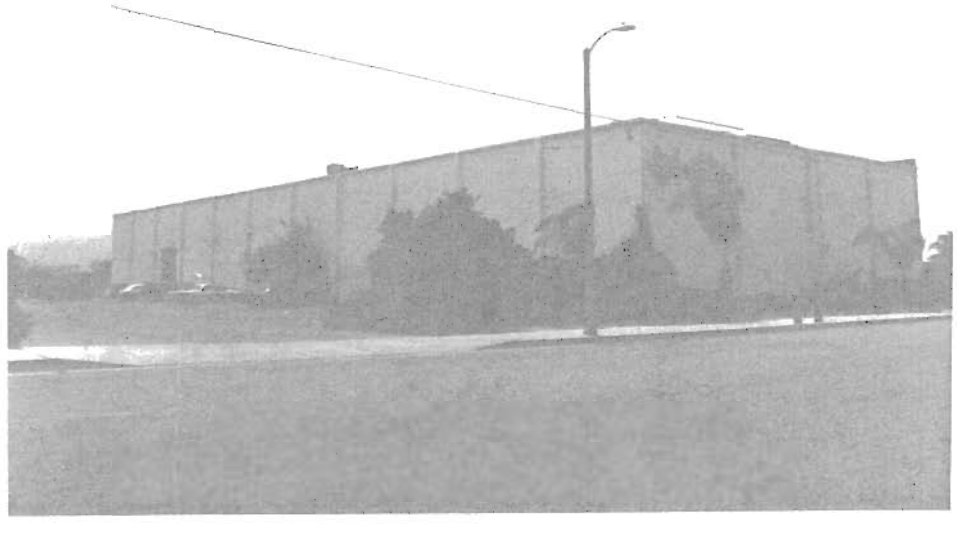
Structure Reference
Orientation: N = 0°

Hemet - City Library
(CSMIP Station No. 12266)

Record 12266-C0111-86190.01



Redlands - Interstate Van Lines Warehouse

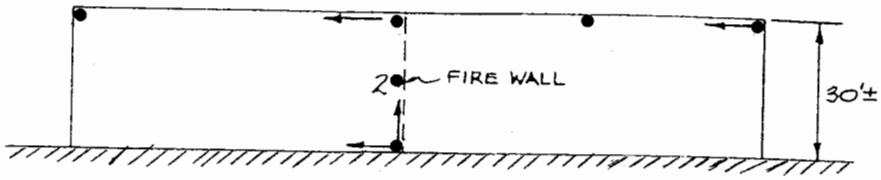


Address: 1785-B Industrial Park Ave.
Redlands, CA
No. of Stories above/below ground: 1/0
Plan Shape: Rectangular
Base Dimensions: 232' x 90'
Typical Floor Dimensions: Same
Design Date: 1971
Construction Date: 1972

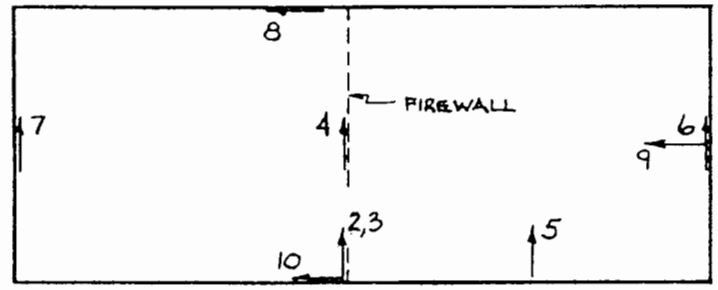
Vertical Load Carrying System:
Tilt-up bearing walls, plywood panelized roof on arched glulam beams.
Lateral Force resisting System:
Precast concrete tilt-up shear walls; plywood roof.
Foundation Type:
Cast-in-place concrete piles.

SENSOR LAYOUT

Redlands - Interstate Van Lines Warehouse
(CSMIP Station No. 23495)

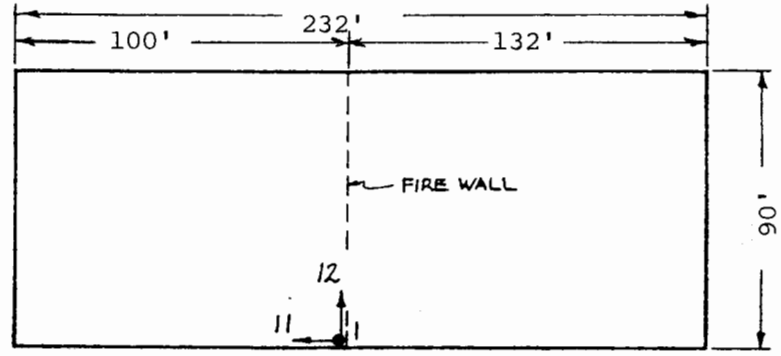


North/South Section



Roof Plan

Structure Reference
Orientation: N = 0°



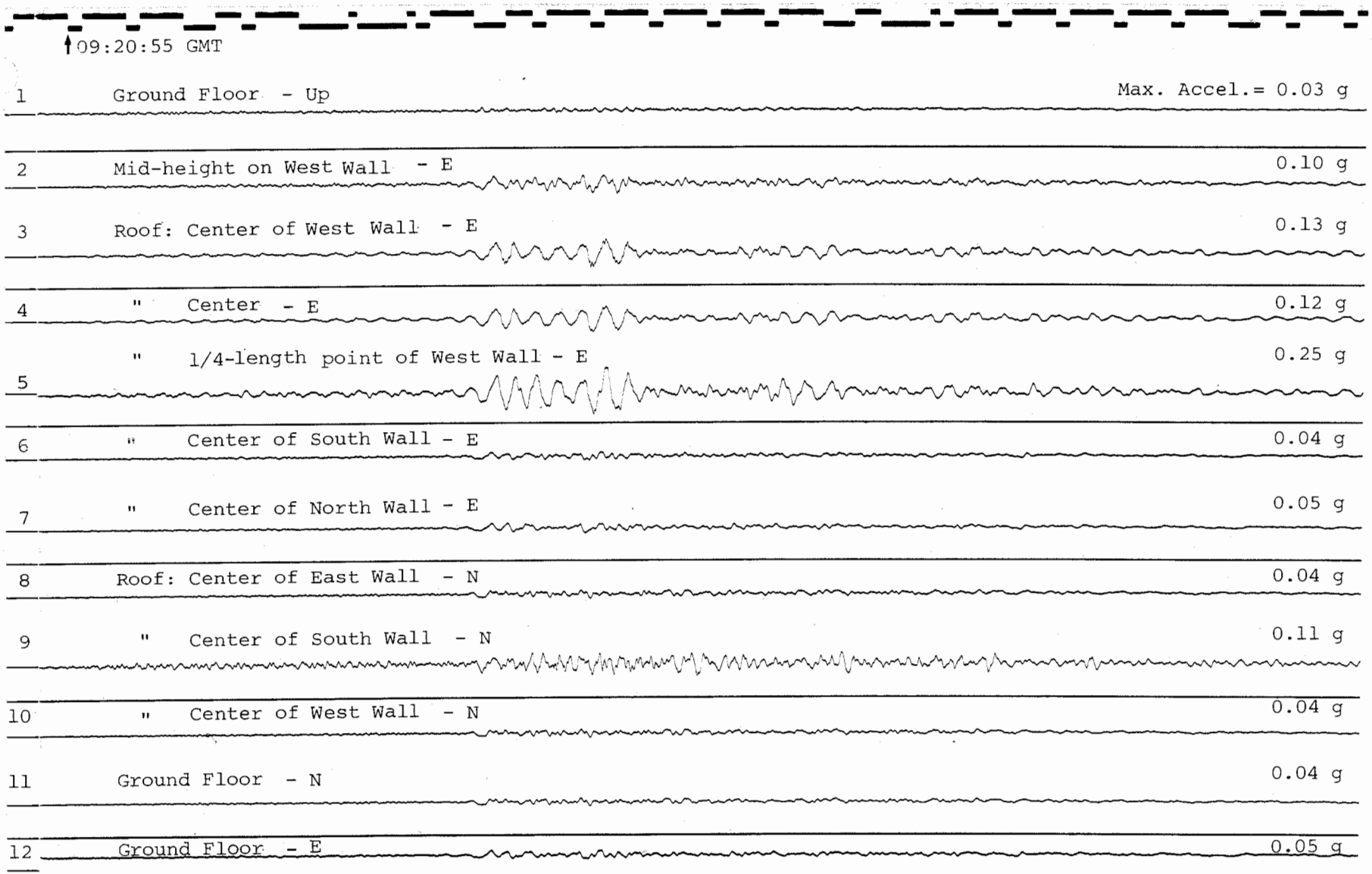
Ground Floor Plan

Redlands - Interstate Van Lines Warehouse
(CSMIP Station No. 23495)

Record 23495-C0115-86189.01

09:20:55 GMT

1	Ground Floor - Up	Max. Accel.= 0.03 g
2	Mid-height on West Wall - E	0.10 g
3	Roof: Center of West Wall - E	0.13 g
4	" Center - E	0.12 g
5	" 1/4-length point of West Wall - E	0.25 g
6	" Center of South Wall - E	0.04 g
7	" Center of North Wall - E	0.05 g
8	Roof: Center of East Wall - N	0.04 g
9	" Center of South Wall - N	0.11 g
10	" Center of West Wall - N	0.04 g
11	Ground Floor - N	0.04 g
12	Ground Floor - E	0.05 g



Structure Reference Orientation: N=0°

0 1 2 3 4 5 10 15 20 Sec.

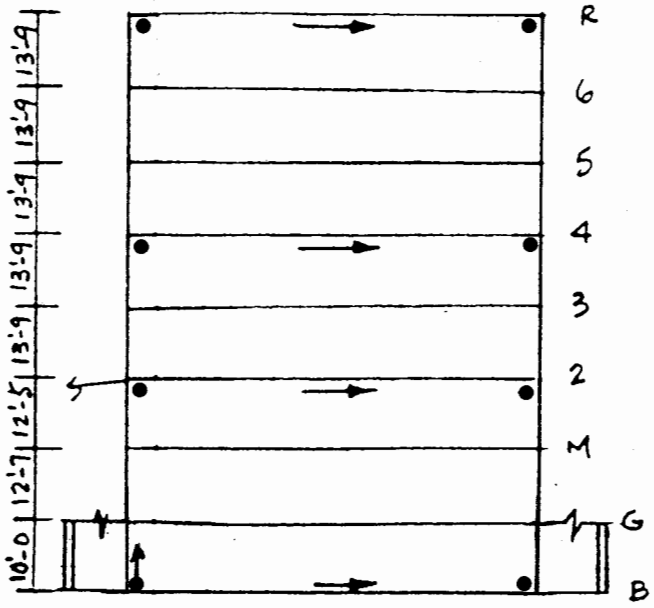
Redlands - Redlands Federal Savings Building

Address: 300 E. State Street
Redlands, CA
No. of Stories above/below ground: 7/1
Plan Shape: Rectangular tower, irregular base.
Base Dimensions: 250' x 228'
Typical Floor Dimensions: 140' x 93'
Design Date: 1980
Construction Date: 1980

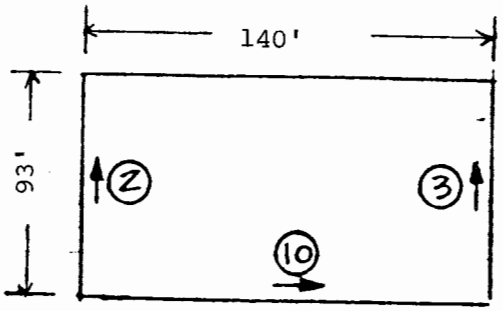
Vertical Load Carrying System:
2 1/2" concrete slab, steel deck supported by steel beams and columns.
Lateral Force resisting System:
Perimeter moment-resistant steel frame.
Foundation Type:
Spread footings.

SENSOR LAYOUT

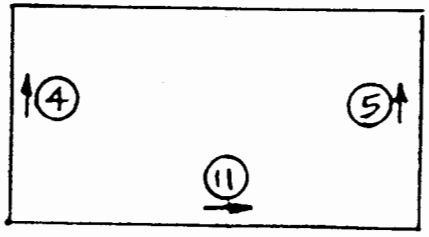
Redlands - Redlands Federal Savings Bldg.
(CSMIP Station No. 23481)



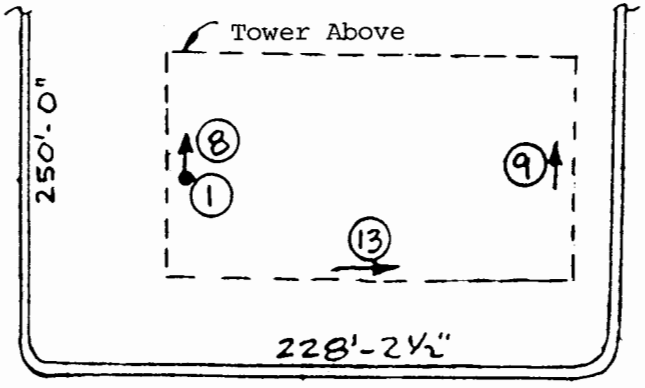
East/West Section



Roof Plan

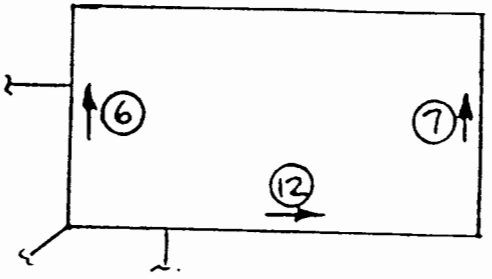


4th Floor Plan



Basement Plan

Structure Reference
Orientation: N=0°

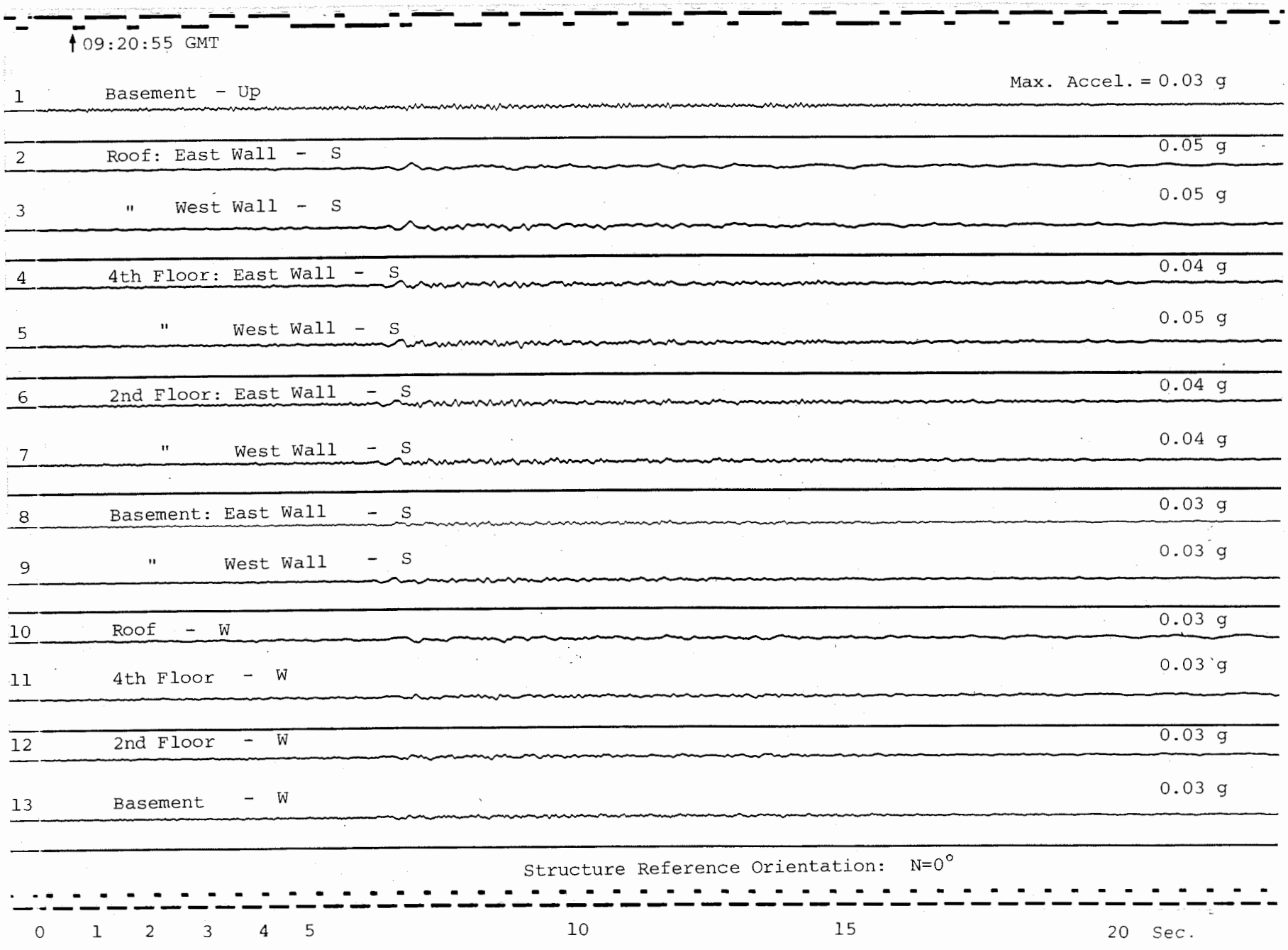


2nd Floor Plan

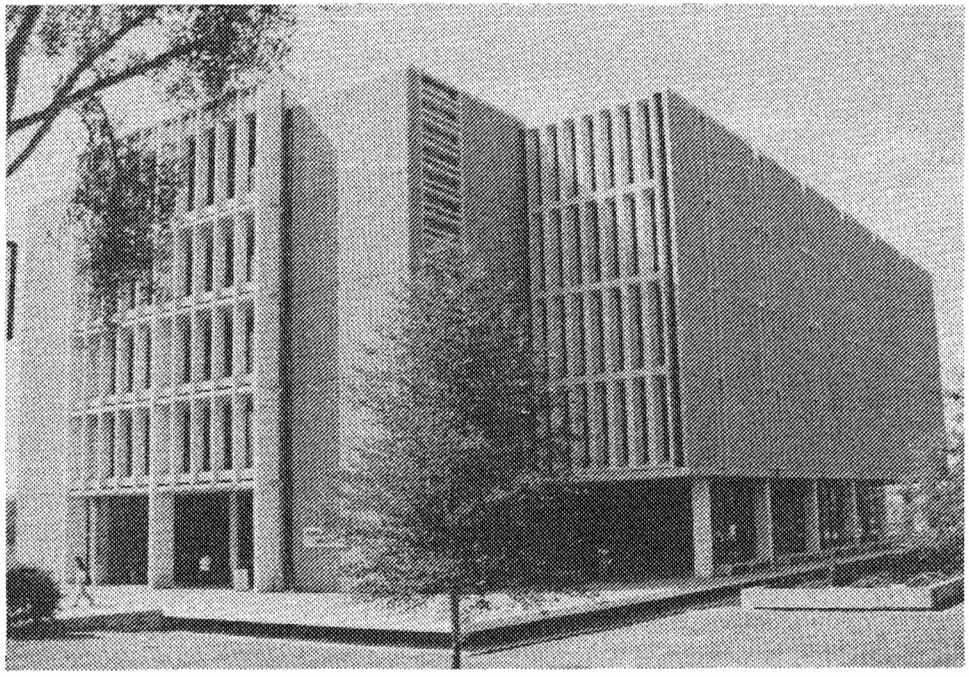
Redlands - Redlands Federal Savings Bldg.
(CSMIP Station No. 23481)

Record 23481-CO245-86189.01

09:20:55 GMT



San Bernardino - State College Library

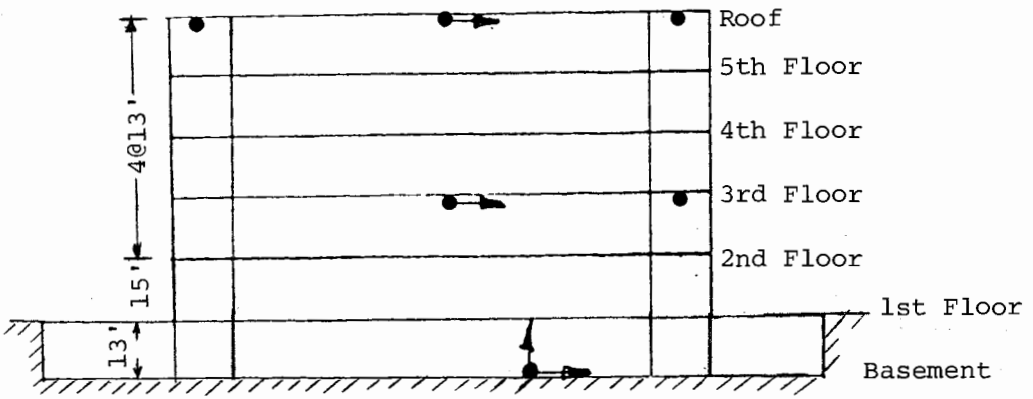


Address: 5500 College Parkway
San Bernardino, CA
No. of Stories above/below ground: 5/1
Plan Shape: Rectangular
Base Dimensions: 261' x 136'
Typical Floor Dimensions: 204' x 136'
Design Date: 1968
Construction Date: 1969

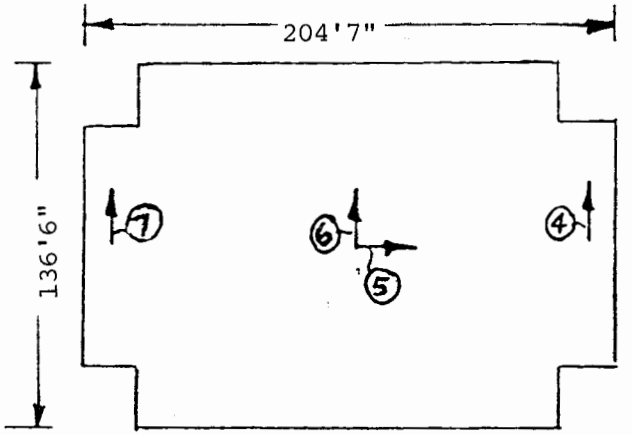
Vertical Load Carrying System:
9" rc slabs supported by rc columns.
Lateral Force resisting System:
rc shear walls, both directions, in each corner of building.
Foundation Type:
Spread footings

SENSOR LAYOUT

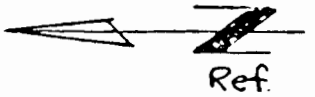
San Bernardino - State College Library
(CSMIP Station No. 23285)



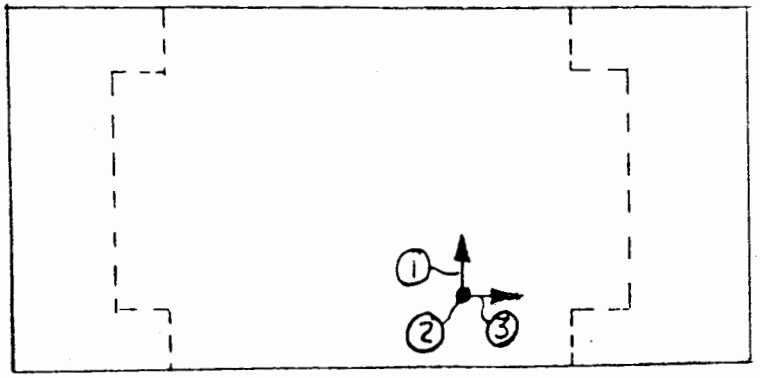
North/South Section



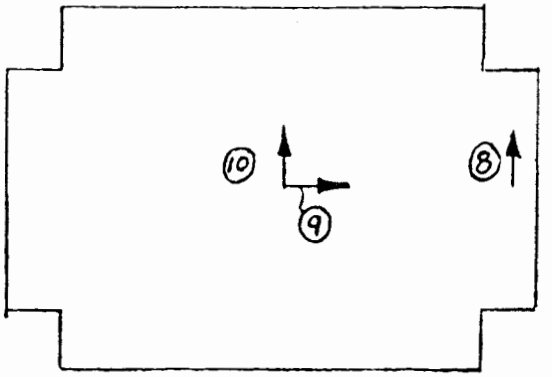
Roof Plan



Structure Reference
Orientation: N = 35°



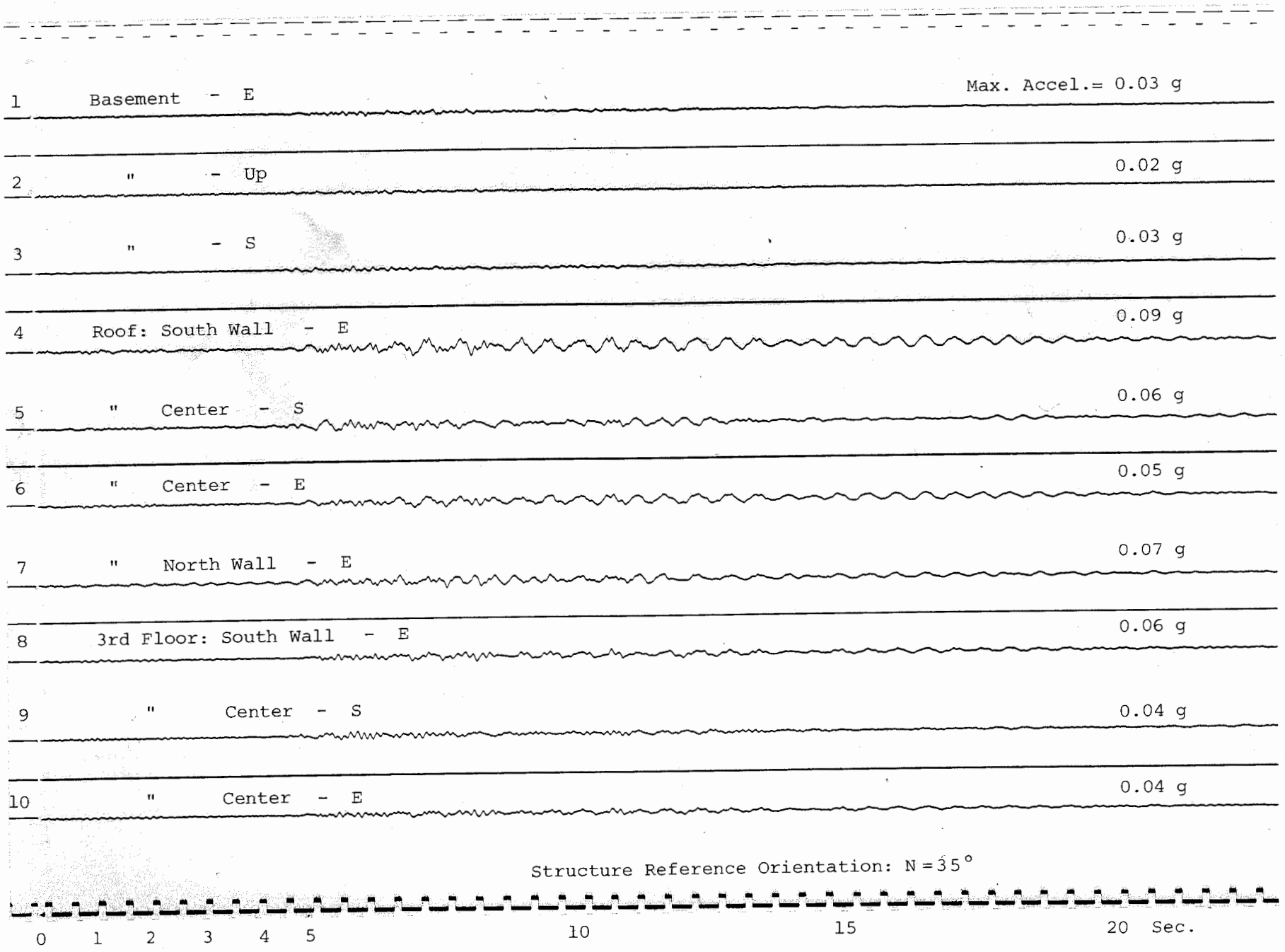
Basement Plan



3rd Floor Plan

San Bernardino - State College Library
(CSMIP Station No. 23285)

Record 23285-C0133-86190.01



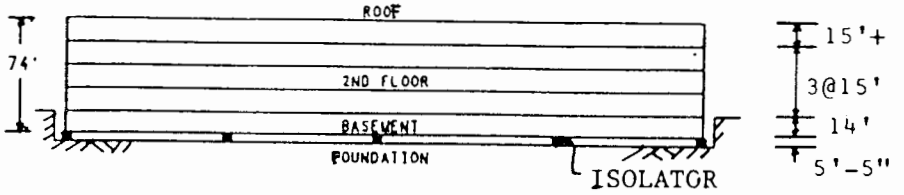
Rancho Cucamonga - San Bernardino County Law and Justice Center

Address: 8202 Aspen Street
Rancho Cucamonga, CA
No. of Stroies above/below ground: 4/1
Plan Shape: Rectangular
Base Dimensions: 414' x 110'
Typical Floor Dimensions: Same
Design Date: 1983
Construction Date: 1985

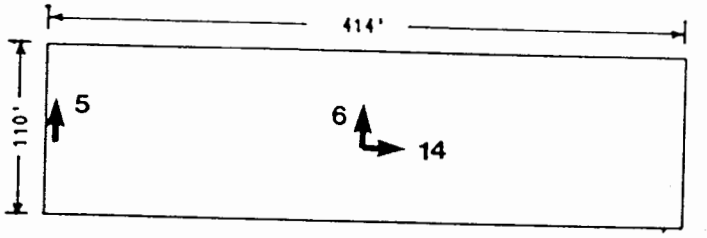
Vertical Load Carrying System:
Concrete slabs over steel deck supported by by steel beams and columns on elastomeric bearings.
Lateral Force resisting System:
Braced steel frame in upper four stories; concrete shear walls at the basement; base isolated on elastomeric bearings.
Foundation Type:
Spread footings.

SENSOR LAYOUT

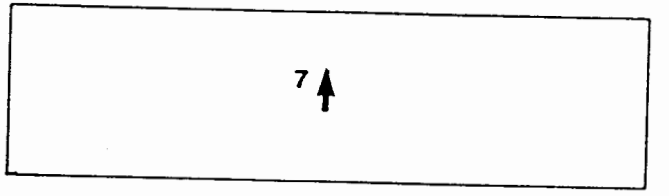
Rancho Cucamonga - San Bernardino County Law and Justice Center
(CSMIP Station No. 23497)



West/East Section

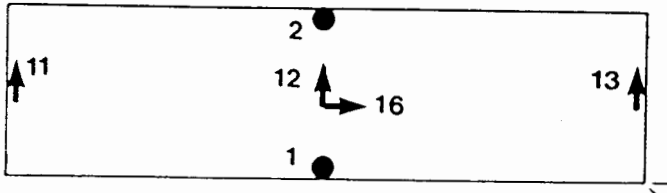


ROOF PLAN

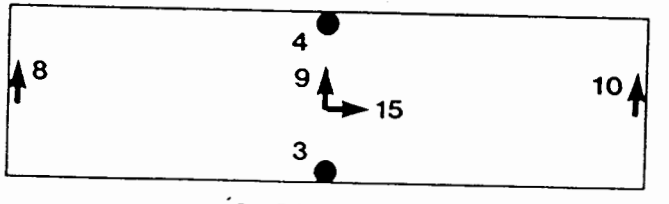


2ND FLOOR PLAN

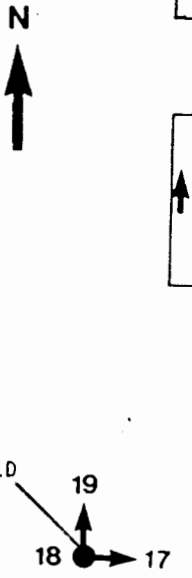
Structure Reference
Orientation: N = 0°

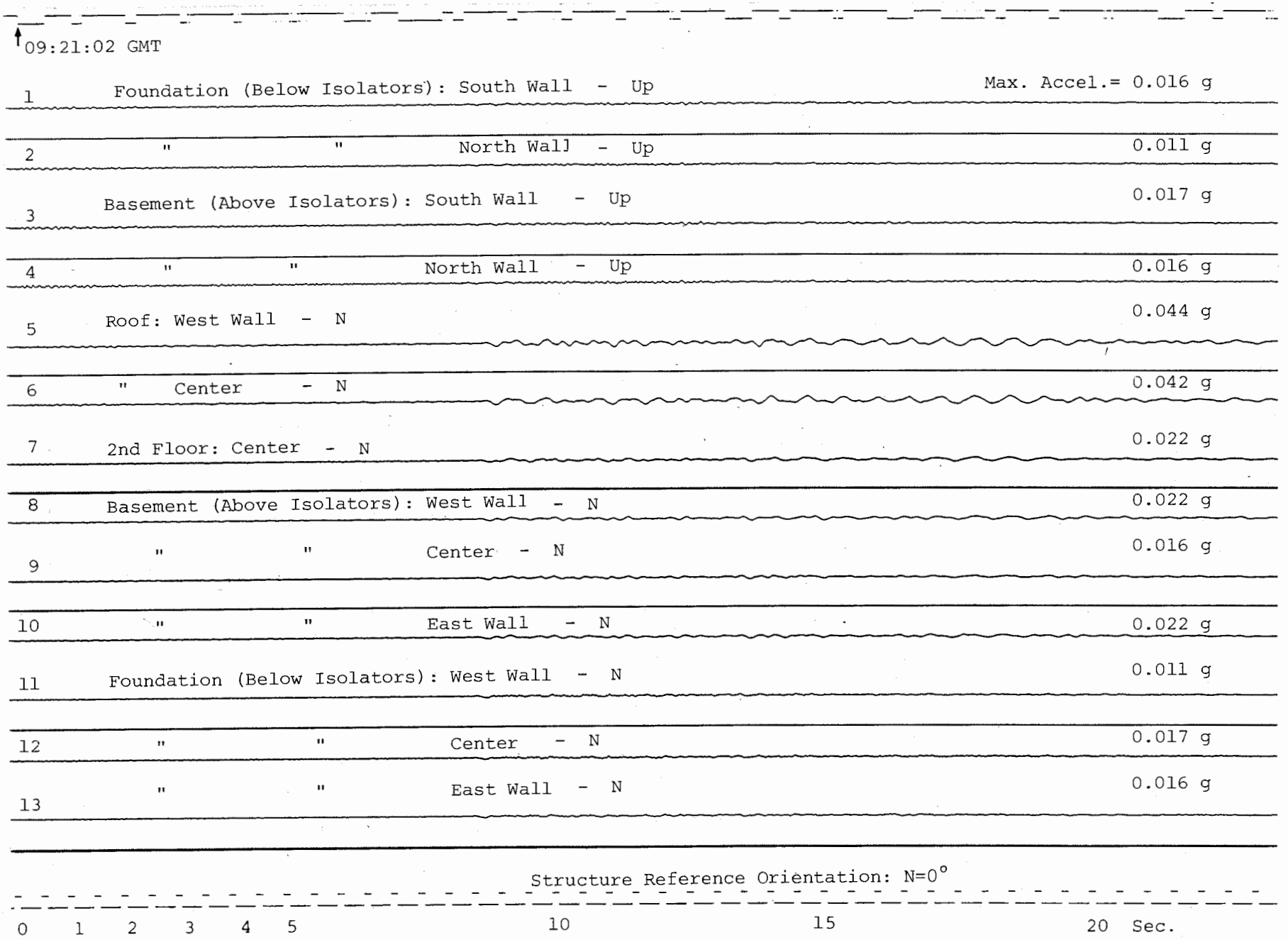


FOUNDATION PLAN



BASEMENT PLAN

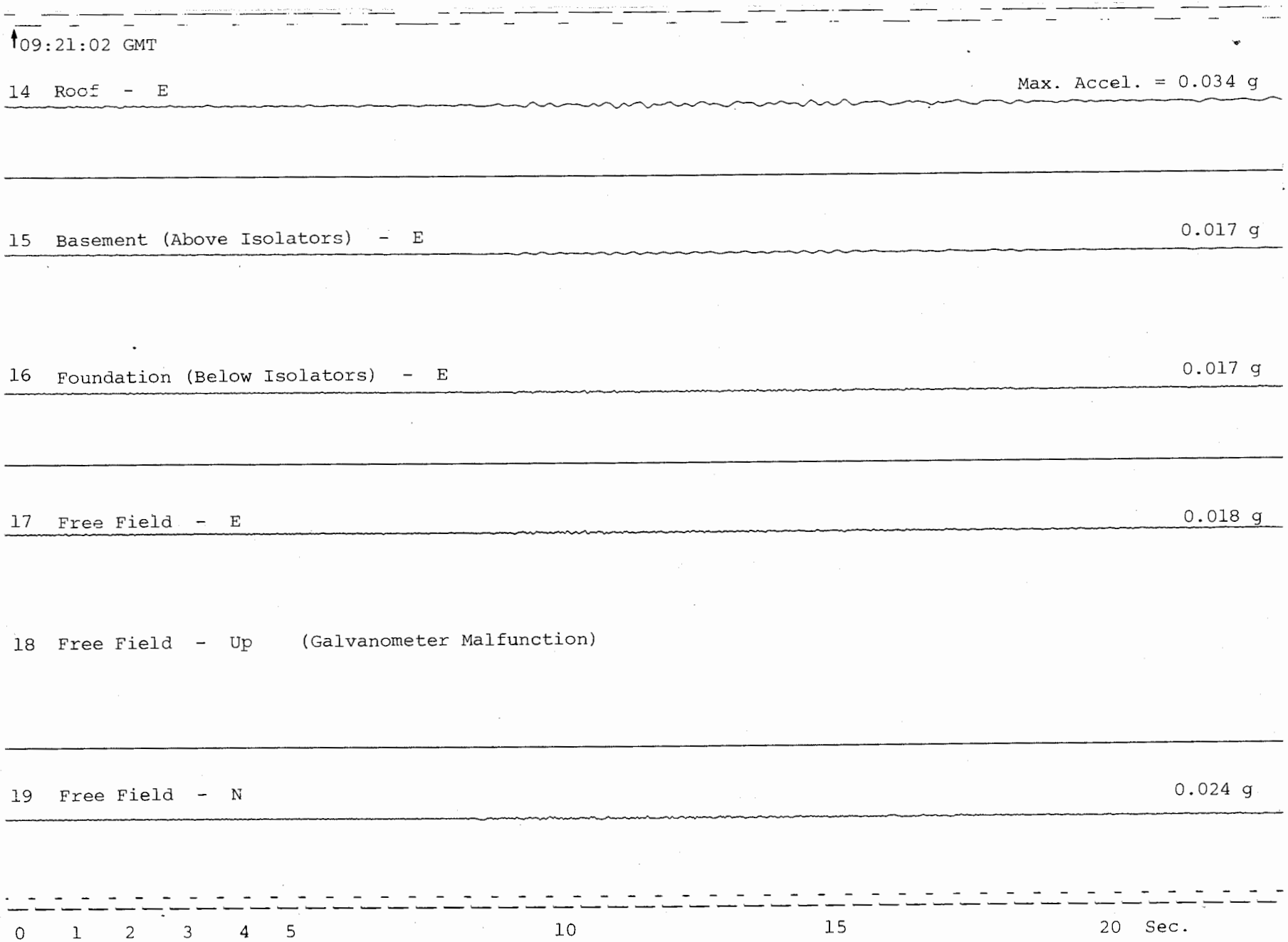



09:21:02 GMT
1 Foundation (Below Isolators): South Wall - Up
Max. Accel.= 0.016 g
2 " " North Wall - Up
0.011 g
3 Basement (Above Isolators): South Wall - Up
0.017 g
4 " " North Wall - Up
0.016 g
5 Roof: West Wall - N
0.044 g
6 " Center - N
0.042 g
7 2nd Floor: Center - N
0.022 g
8 Basement (Above Isolators): West Wall - N
0.022 g
9 " " Center - N
0.016 g
10 " " East Wall - N
0.022 g
11 Foundation (Below Isolators): West Wall - N
0.011 g
12 " " Center - N
0.017 g
13 " " East Wall - N
0.016 g
Structure Reference Orientation: N=0°
0 1 2 3 4 5 10 15 20 Sec.

Rancho Cucamonga - San Bernardino County Law & Justice Bldg.
(CSMIP Station No. 23497) Recorder No. 2, Channels 14-19

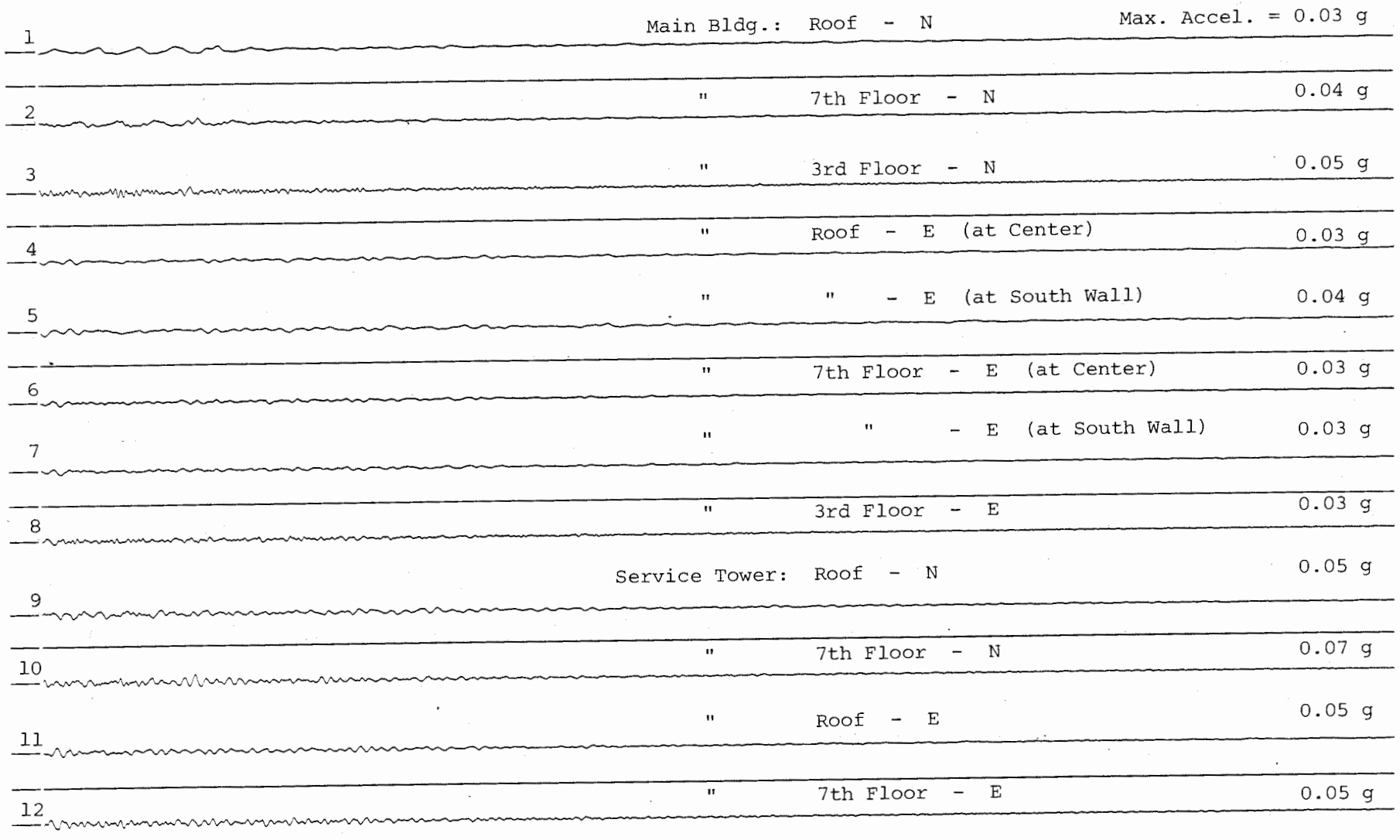
Record 23497-C0118-86189.01

09:21:02 GMT



Riverside - Riverside County Admin. Bldg.
(CSMIP Station No. 13312) Channels 1-12

Record 13312-C0153-86190.01

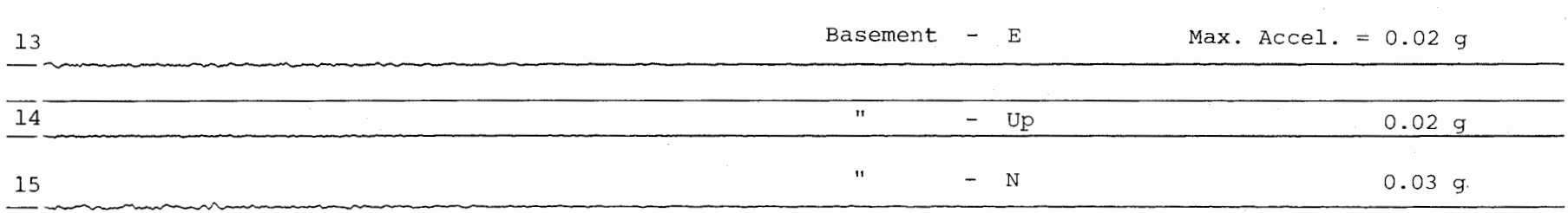


Structure Reference Orientation: N=29°

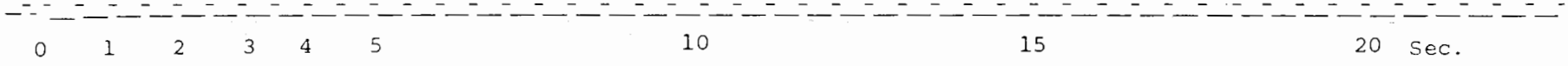
0 1 2 3 4 5 10 15 20 Sec.

Riverside - Riverside County Admin. Bldg.
(CSMIP Station No. 13312) Channels 13-15

Record 13312-S170l-86190.01



Structure Reference Orientation: N=29°



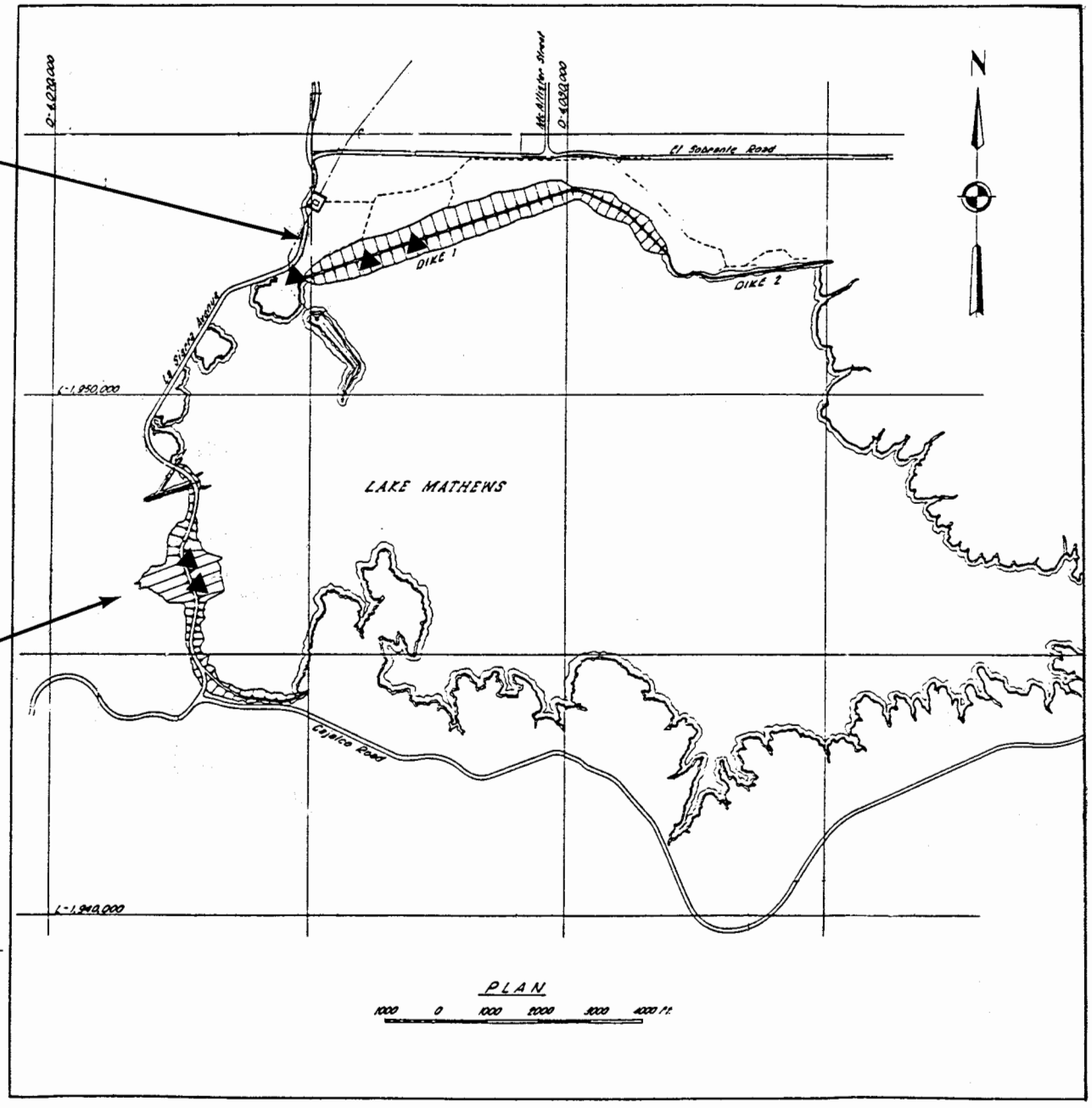
Main Bldg.: Exterior concrete wall and interior steel frame to 3rd floor; steel frame from 3rd floor to roof. (13-story, 174 x 100 ft)

Service Tower: Exterior concrete wall to 7th floor; braced frame from 7th floor to roof. (14-story, 52 x 37 ft)

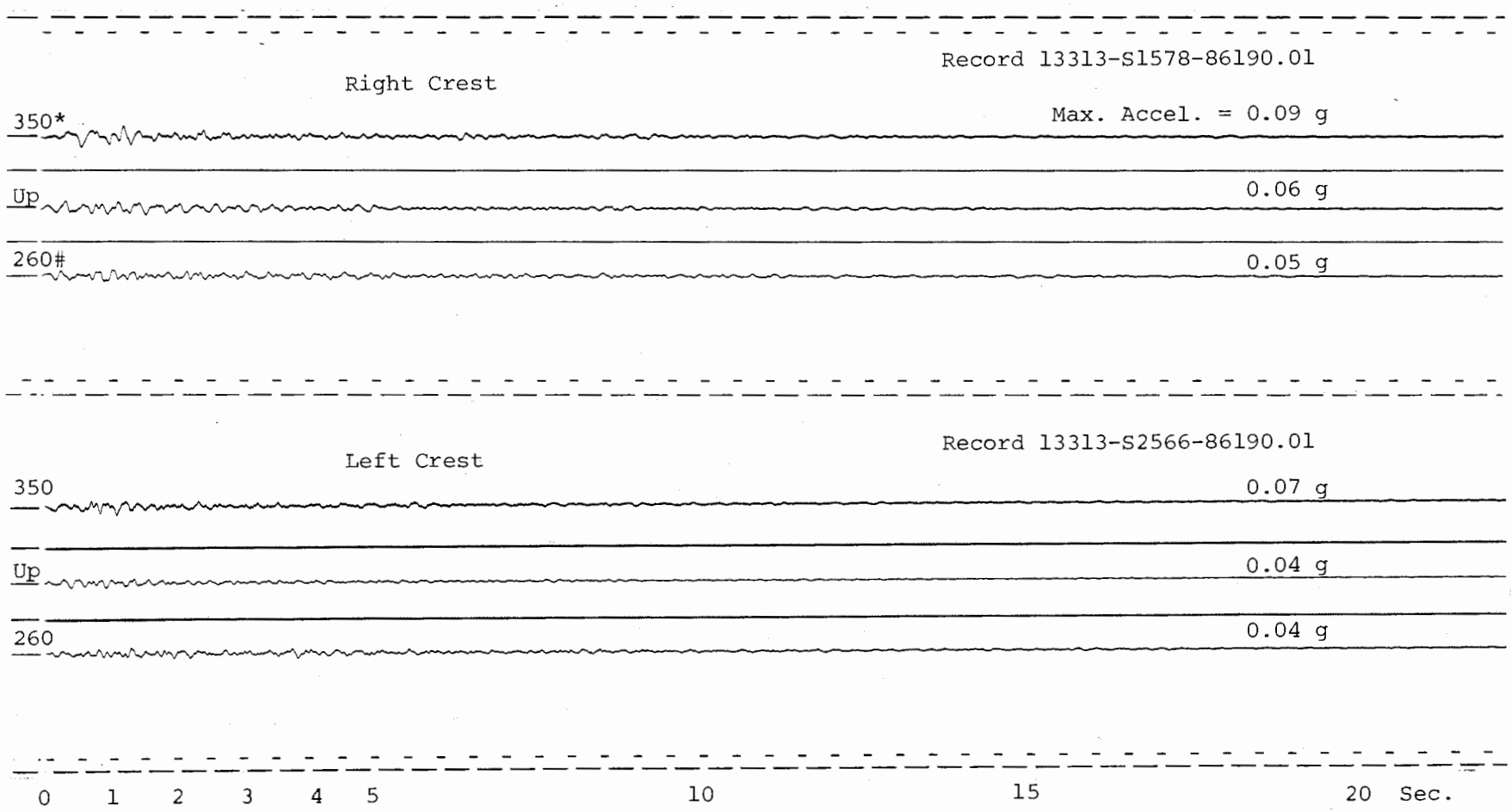
Lake Mathews - Dike 1
(CSMIP Station No. 13326)
3 triaxial accelerographs
Earthen dike, crest length
approximately 5700 feet,
height approx. 120 feet

Lake Mathews - Main Dam
(CSMIP Station No. 13313)
2 triaxial accelerographs
Earthen dam, crest length
approximately 1000 feet,
height approx. 200 feet

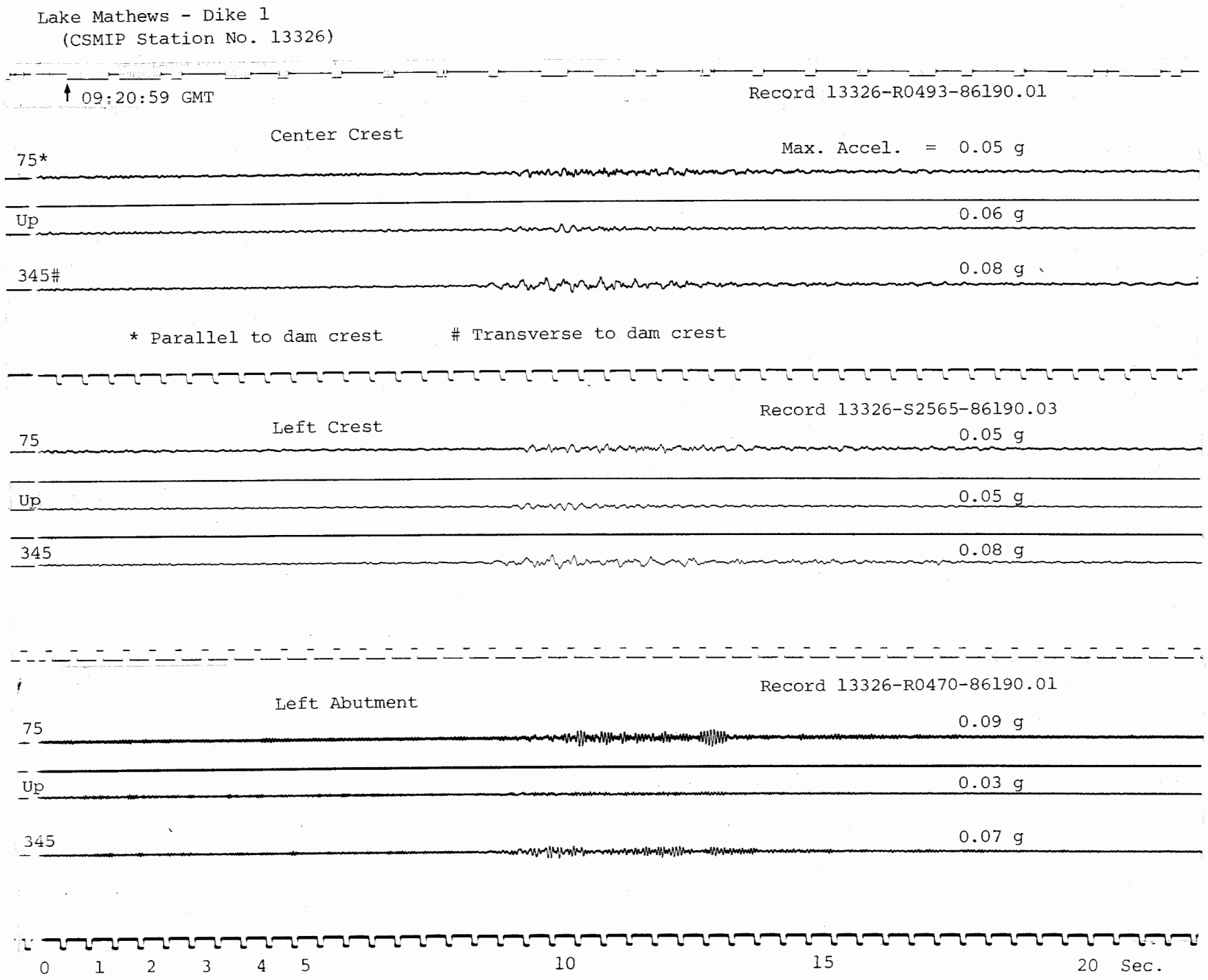
▲ - locations of triaxial
accelerographs



Lake Mathews - Main Dam
(CSMIP Station No. 13313)

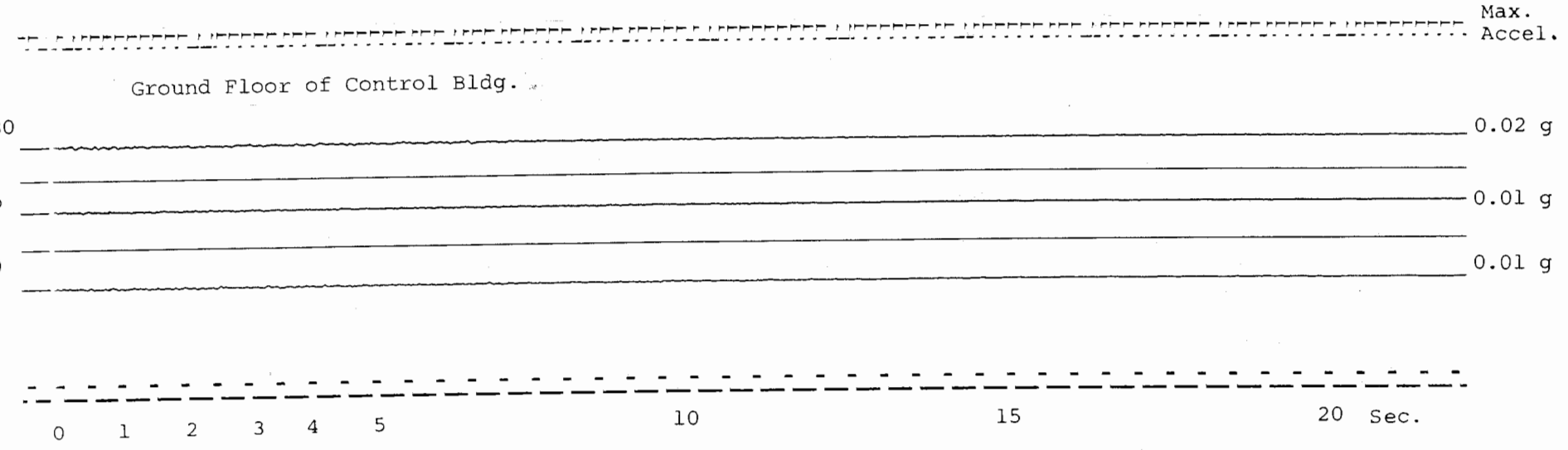


* Parallel to dam crest
\# Transverse to dam crest

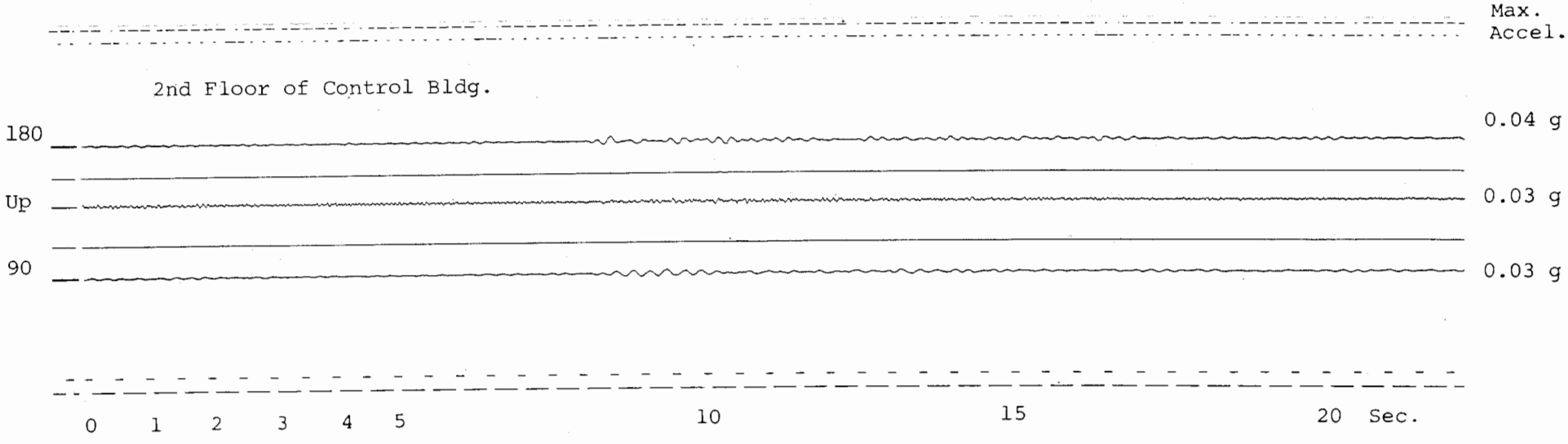

Lake Mathews - Dike 1
(CSMIP Station No. 13326)
09:20:59 GMT
Record 13326-R0493-86190.01
Center Crest
75*
Max. Accel. = 0.05 g
Up
0.06 g
345#
0.08 g
* Parallel to dam crest
# Transverse to dam crest
Record 13326-S2565-86190.03
Left Crest
75
0.05 g
Up
0.05 g
345
0.08 g
Record 13326-R0470-86190.01
Left Abutment
75
0.09 g
Up
0.03 g
345
0.07 g
0 1 2 3 4 5 10 15 20 Sec.

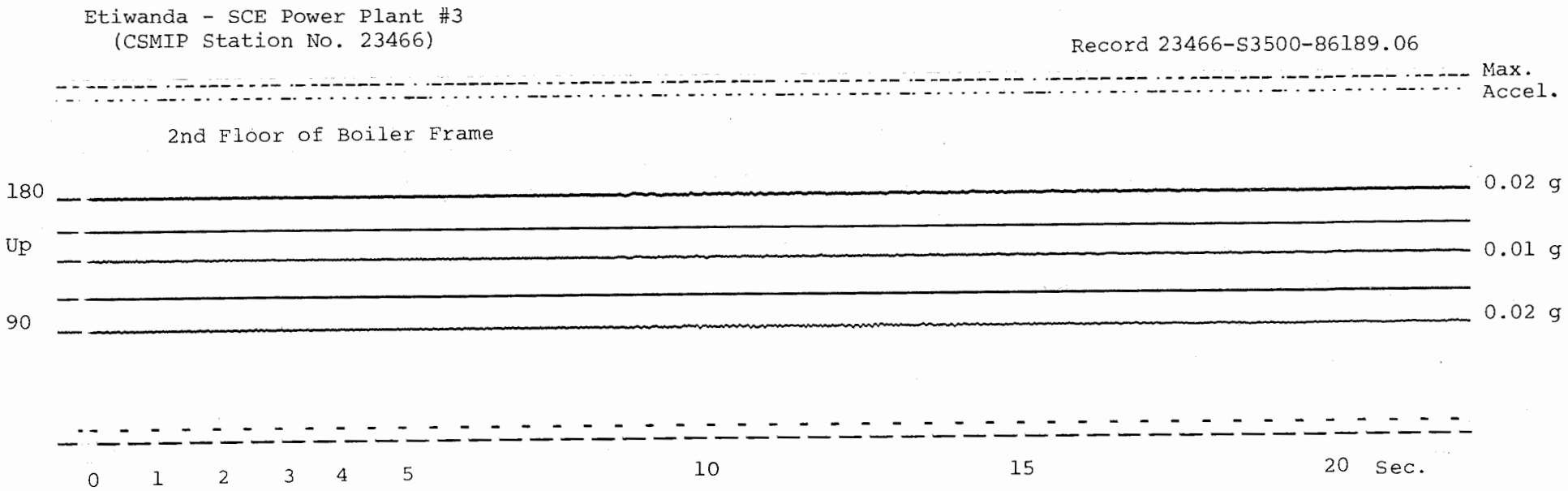
Etiwanda - SCE Power Plant #3
(CSMIP Station No. 23466)

Record 23466-S3494-86189.01



Record 23466-S3497-86189.04




Etiwanda - SCE Power Plant #3
(CSMIP Station No. 23466)
Record 23466-S3500-86189.06
Max.
Accel.
2nd Floor of Boiler Frame
180
0.02 g
Up
0.01 g
90
0.02 g
0
1
2
3
4
5
10
15
20
Sec.

LIST OF CSMIP REPORTS AND DATA TAPES

California Department of Conservation
Division of Mines and Geology
Office of Strong Motion Studies
California Strong Motion Instrumentation Program (CSMIP)

AVAILABLE REPORTS:

Title	Number
I. Earthquake Data Reports:	
Selected Accelerograms from the Redlands, California Earthquake of October 2, 1985 (Including first records from a Base-Isolated Building)	OSMS 85-02
CSMIP Strong-Motion Records from the Bishop, California Earthquake of 23 November 1984	OSMS 84-12
CDMG Strong-Motion Records from the Morgan Hill, California Earthquake of 24 April 1984	OSMS 84-7
Preliminary Summary of CDMG Strong-Motion Records from the 2 May 1983 Coalinga, California, Earthquake	OSMS 83-5.2
Strong-Motion Records from the Mammoth Lakes, California Earthquake of 6 January 1983	OSMS 83-1.1
Strong-Motion Records Recovered from the Mammoth Lakes, California, Earthquake of 30 September 1981	OSMS 81-10.1
Strong-Motion Records Recovered from the Westmorland, California, Earthquake of 25 April 1981	OSMS 81-5.1
Strong-Motion Records Recovered from the Trindad-Offshore, California, Earthquake of 8 November 1980	OSMS 80-11.1
Strong-Motion Records from the Livermore Earthquakes of 24 and 26 January 1980	PR 28
Strong-Motion Records from the Mammoth Lakes Earthquakes of May 1980	PR 27
Compilation of Strong-Motion Records and Preliminary Data from the Imperial Valley Earthquake of 15 October 1979	PR 26
Compilation of Strong-Motion Records from the Coyote Lake Earthquake of 6 August 1979	PR 25
Compilation of Strong-Motion Records Recovered from the Bishop, California, Earthquake of 4 October 1978	OSMS 78-7.1

Title	Number
Compilation of Strong-Motion Records Recovered from the Santa Barbara Earthquake of 13 August 1978	PR 22
Catalog of Strong Motion Accelerograph Records Recovered by Office of Strong Motion Studies During 1982	SR 154A
Catalog of Strong Motion Accelerograph Records Recovered by Office of Strong Motion Studies before January 1, 1982	SR 154
II. Processed Data Reports:	
Processed Data from the Strong-Motion Record Obtained at a Base-Isolated Building in Rancho Cucamonga, California during the Redlands Earthquake of 2 October 1985	OSMS 86-01
Processed Data from Strong-Motion Records of the Morgan Hill Earthquake of 24 April 1984: Part I Ground-Response Records	OSMS 85-04
Processed Data from Strong-Motion Records of the Morgan Hill Earthquake of 24 April 1984: Part II Structural-Response Records	OSMS 85-05
Processed Data from the Strong-Motion Records of the Imperial Valley Earthquake of 15 October 1979. Final Results	SP 65
Processed Data from the San Juan Bautista 101/156 Separation Bridge and the San Juan Bautista Freefield Records from the Coyote Lake Earthquake 6 August 1979	SP 64
Processed Data from the Gilroy Array and Coyote Creek Records, Coyote Lake, California, Earthquake 6 August 1979 (Note: Does not include San Juan Bautista records)	PR 24
Processed Data from the Strong-Motion Records of the Santa Barbara Earthquake of 13 August 1978. Final Results (in three volumes)	SR 144
III. Other Reports:	
Standard Tape Format of CSMIP Strong-Motion Data Tapes	OSMS 85-03
California Strong-Motion Instrumentation Program: Construction and Installation Notes for a Ground-Response Station.	OSMS 85-01

There is a nominal charge for these reports.

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AVAILABLE STRONG-MOTION DATA TAPES:

Tape Name	Description
SANTBARB78	Santa Barbara earthquake of 13 August 1978; Vol. 1, 2, and 3 data.
IMPERIAL79	Imperial Valley earthquake of 15 October 1979 (County Services Bldg. and other CSMIP stations); Vol. 1, 2, and 3 data.
COYOTE79A	Coyote Lake earthquake of 6 August 1979, Gilroy Array stations; Vol. 1, 2, and 3 data.
COYOTE79B	Coyote Lake earthquake of 6 August 1979, San Juan Bautista overpass and nearest free-field station; Vol. 1, 2, and 3 data.
COYOTE79C	Coyote Lake earthquake of 6 August 1979, Halls Valley station; Vol. 1, 2, and 3 data.
MAMMOTH80A	Mammoth Lakes earthquakes of 25 May 1980 at 09:34 and 09:49 PDT; Vol. 1, 2, and 3 data.
MAMMOTH80B	Mammoth Lakes earthquakes of 25 May 1980 at 12:45 and 13:36 PDT; Vol. 1, 2, and 3 data.
MAMMOTH80C	Mammoth Lakes earthquakes of 26 May 1980 at 11:58 PDT and 27 May 1980 at 07:51 PDT, Vol. 1, 2, and 3 data.
WESTMOR81	Westmorland earthquake of 26 April 1981; Vol. 1, 2, and 3 data.
COALINGA83	Coalinga earthquake of 2 May 1983, 16:43 PDT; Vol. 2 and 3 data for 47 records.
COALINGA83-IA	Coalinga earthquake of 2 May 1983, Vol. 1 data for first 22 records.
COALINGA83-IB	Coalinga earthquake of 2 May 1983, Vol. 1 data for remaining 25 records.
COALINGA83AS	Vol. 2 and 3 data for eight aftershocks of the Coalinga 2 May 1983 earthquake. The aftershocks occurred between 8 May and 11 September 1983, and were of magnitude (ML) 4.3 - 6.0.
COALINGA83AS-I	Uncorrected acceleration data (Vol. 1) for the Coalinga aftershock records included on the tape COALINGA83AS.
RIODEL8083	Processed data from the Highway 101 Overpass at Rio Dell for the earthquakes of: 8 Nov 1980 (6.9ML Trinidad-Offshore); 16 Dec 1982 (4.4ML Rio Dell) and 24 Aug 1983 (5.5ML Cape Mendicino Offshore); Vol. 1, 2, and 3 data.
MAMMOTH83	Mammoth Lakes earthquakes of 7 Jan 1983 at 01:38 and 03:24 GMT; Vol. 1, 2, and 3 data.

Tape Name	Description
MORGANHILL84-IG	Morgan Hill earthquake of 24 April 1984; Vol. 1 data for 19 ground-response records.
MORGANHILL84-G	Morgan Hill earthquake of 24 April 1984; Vol. 2 and 3 data for 19 ground-response records.
MORGANHILL84-IS	Morgan Hill earthquake of 24 April 1984; Vol. 1 data for 9 structural-response records.
MORGANHILL84-S	Morgan Hill earthquake of 24 April 1984; Vol. 2 and 3 data for 9 structural-response records.
REDLANDS85	Redlands earthquake of 2 October 1985; Vol. 1, 2 and 3 data for the Law & Justice Building at Rancho Cucamonga.

Footnotes:

Vol. 1 data - uncorrected accelerations.
Vol. 2 data - instrument and baseline-corrected acceleration, velocity, and displacement.
Vol. 3 data - Response and Fourier amplitude spectra.

The magnetic tapes are provided at cost. Included with each tape is a copy of either the processed data report (if available) or the plots of the data.

Requests for the reports and data tapes and/or for additional information should be addressed to:

Office of Strong Motion Studies
California Division of Mines and Geology
630 Bercut Drive
Sacramento, CA 95814

Phone: (916) 322-3105

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PROCESSED ACCELEROGRAMS ON CSMIP DATA TAPES:

Tape: SANTBARB78

Santa Barbara Earthquake of 13 Aug 1978, 15:54 PDT, ML=5.1(CIT)

UCSB Goleta Free Field, 3 channels
Santa Barbara - UCSB North Hall, 9 channels
Santa Barbara - Freitas Building, 9 channels
Ventura - Holiday Inn, 15 channels

Tape: IMPERIAL79

Imperial Valley Earthquake of 15 Oct 1979, 16:17 PDT, ML=6.6(CIT)

Niland, 3 channels
Westmorland, 3 channels
Westmorland, aftershock record, 3 channels
El Centro - Imperial County Services Bldg. Free Field, 3 channels
El Centro - Imperial County Services Building, 13 channels
El Centro - Highway 8/Meloland Road Overpass, 13 channels

Tape: COYOTE79A

Coyote Lake Earthquake of 6 Aug 1979, 10:05 PDT, ML=5.9(BRK)

Gilroy #1, 3 channels
Gilroy #2, 3 channels
Gilroy #3, 3 channels
Gilroy #4, 3 channels
Gilroy #6, 3 channels
Coyote Lake Dam (San Martin), 3 channels

Tape: COYOTE79B

Coyote Lake Earthquake of 6 Aug 1979, 10:05 PDT, ML=5.9(BRK)

San Juan Bautista - Fire Station, 3 channels
San Juan Bautista - Highway 101/156 Overpass, 12 channels

Tape: COYOTE79C

Coyote Lake Earthquake of 6 Aug 1979, 10:05 PDT, ML=5.9(BRK)

Halls Valley, 3 channels

Tape: MAMMOTH80A

Mammoth Lakes Earthquake of 25 May 1980, 09:34 PDT, ML=6.1(BRK),6.4(CIT)

Convict Creek, 3 channels
Long Valley Dam, 22 channels
Mammoth Lakes - High School Gym, 10 channels

Aftershock at 25 May 1980, 09:36 PDT, ML=unknown

Mammoth Lakes - High School Gym, 10 channels

Mammoth Lakes Earthquake of 25 May 1980, 09:49 PDT, ML=6.0(BRK),5.8(CIT)

Convict Creek, 3 channels
Long Valley Dam, 3 channels
Mammoth Lakes - High School Gym, 4 channels

Tape: MAMMOTH80B

Mammoth Lakes Earthquake of 25 May 1980, 12:45 PDT, ML=6.1(BRK),6.5(CIT)

Convict Creek, 3 channels
Long Valley Dam, 19 channels

Mammoth Lakes Earthquake of 25 May 1980, 13:36 PDT, ML=5.7(BRK),5.5(CIT)

Convict Creek, 3 channels
Long Valley Dam, 19 channels

Aftershock approx 58 seconds after 25 May 1980, 13:36 Event, ML=unknown

Convict Creek, 3 channels

Tape: MAMMOTH80C

Mammoth Lakes Earthquake of 26 May 1980, 11:58 PDT, ML=5.7(BRK),4.9(CIT)

Convict Creek, 3 channels
Long Valley Dam, 9 channels

Mammoth Lakes Earthquake of 27 May 1980, 07:51 PDT, ML=6.2(BRK),6.3(CIT)

Convict Creek, 3 channels
Long Valley Dam, 22 channels
Bishop - Paradise Lodge, 3 channels
Benton, 3 channels

Tape: WESTMOR81

Westmorland Earthquake of 26 Apr 1981, 05:09 PDT, ML=5.7(CIT),6.3(BRK)

Westmorland, 3 channels
Niland, 3 channels

Tapes: COALINGA83, COLINGA83-IA, COLINGA83-IB *

Coalinga Earthquake of 2 May 1983, 16:42 PDT, ML=6.5(BRK)

Cantua Creek School, 3 channels
Slack Canyon, 3 channels
Parkfield - Vineyard Canyon 2E, 3 channels
Parkfield - Vineyard Canyon 1E, 3 channels
Parkfield - Vineyard Canyon 1W, 3 channels
Parkfield - Vineyard Canyon 2W, 3 channels
Parkfield - Vineyard Canyon 3W, 3 channels
Parkfield - Vineyard Canyon 4W, 3 channels
Parkfield - Vineyard Canyon 5W, 3 channels
Parkfield - Vineyard Canyon 6W, 3 channels
Parkfield - Gold Hill 3E, 3 channels
Parkfield - Gold Hill 2E, 3 channels
Parkfield - Gold Hill 1W, 3 channels
Parkfield - Gold Hill 2W, 3 channels
Parkfield - Gold Hill 3W, 3 channels
Parkfield - Gold Hill 4W, 3 channels
Parkfield - Gold Hill 5W, 3 channels
Parkfield - Gold Hill 6W, 3 channels
Parkfield - Stone Corral 4E, 3 channels
Parkfield - Stone Corral 3E, 3 channels
Parkfield - Stone Corral 2E, 3 channels
Parkfield - Stone Corral 1E, 3 channels
Parkfield - Cholame 3E, 3 channels
Parkfield - Cholame 2E, 3 channels
Parkfield - Cholame 1E, 3 channels
Parkfield - Cholame 2WA, 3 channels
Parkfield - Cholame 3W, 3 channels
Parkfield - Cholame 4W, 3 channels
Parkfield - Cholame 4A W, 3 channels
Parkfield - Cholame 5W, 3 channels
Parkfield - Cholame 6W, 3 channels
Parkfield - Cholame 8W, 3 channels
Parkfield - Cholame 12W, 3 channels
Parkfield - Fault Zone 16, 3 channels
Parkfield - Fault Zone 15, 3 channels
Parkfield - Fault Zone 14, 3 channels
Parkfield - Fault Zone 12, 3 channels
Parkfield - Fault Zone 11, 3 channels
Parkfield - Fault Zone 10, 3 channels
Parkfield - Fault Zone 9, 3 channels
Parkfield - Fault Zone 8, 3 channels
Parkfield - Fault Zone 7, 3 channels
Parkfield - Fault Zone 6, 3 channels
Parkfield - Fault Zone 4, 3 channels
Parkfield - Fault Zone 3, 3 channels
Parkfield - Fault Zone 2, 3 channels
Parkfield - Fault Zone 1, 3 channels

* Tape COALINGA83 contains the Vol. 2 and 3 data for the listed accelerograms; the corresponding Vol. 1 data are on tapes COALINGA83-IA and COALINGA83-IB.

Tapes: COALINGA83AS, COLINGA83AS-I **

Records from 8 aftershocks of the Coalinga Earthquake of 2 May 1983

Event #2: 8 May 1983, 19:49 PDT, ML=5.1(BRK)

Coalinga - Sulphur Baths, 3 channels
Coalinga - CHP, 3 channels
Anticline Ridge - Palmer Ave., 3 channels
Oil Fields - Skunk Hollow, 3 channels
Harris Ranch, 3 channels

Event #3: 10 June 1983, 20:10 PDT, ML=5.1(BRK)
Event #4: 9 July 1983, 00:41 PDT, ML=5.3(BRK)
Event #5: 21 July 1983, 19:40 PDT, ML=6.0(BRK)
Event #6: 21 July 1983, 20:43 PDT, ML=5.0(BRK)
Event #7: 25 July 1983, 15:31 PDT, ML=5.1(BRK)
Event #8: 9 Sept 1983, 02:16 PDT, ML=5.3(BRK)
Event #9: 11 Sept 1983, 04:48 PDT, ML=4.3(BRK)

For each of events #3 through #9:

Coalinga - Sulphur Baths, 3 channels
Coalinga - CHP, 3 channels

** Vol. 1 data are on tape COALINGA83AS-I; Vol. 2 and 3 data are on tape COALINGA83AS.

Tape: RIODEL8083

Trinidad Offshore Earthquake of 8 Nov 1980, 02:27 PST, ML=6.9(BRK)

Rio Dell - Highway 101/Painter Street Overpass, 18 channels

Rio Dell Earthquake of 15 Dec 1982, 22:53 PST, ML=4.4(BRK)

Rio Dell - Highway 101/Painter Street Overpass, 15 channels

Cape Mendocino Offshore Earthquake of 24 Aug 1983, 06:36 PDT, ML=5.5(BRK)

Rio Dell - Highway 101/Painter Street Overpass, 15 channels

Tape: MAMMOTH83

Mammoth Lakes Earthquake of 6 Jan 1983, 17:38 PST, ML=5.2(BRK)

Convict Creek, 3 channels

Mammoth Lakes Earthquake of 6 Jan 1983, 19:24 PST, ML=5.4(BRK)

Convict Creek, 3 channels

Tapes: MORGANHILL84-G, MORGANHILL84-IG ***

Ground-response records from the Morgan Hill Earthquake of
24 Apr 1984, 13:15 PST, ML=6.2(BRK)

Halls Valley, 3 channels
Coyote Lake Dam (San Martin), 3 channels
Gilroy #7 - Mantelli Ranch, 3 channels
Gilroy #6, 3 channels
Gilroy #4, 3 channels
Gilroy #3, 3 channels
Gilroy #2, 3 channels
Gilroy #1, 3 channels
Gilroy - Gavilan College, 3 channels
Corralitos, 3 channels
Capitolas, 3 channels
Santa Cruz, 3 channels
San Juan Bautista - Fire Station, 3 channels
Los Banos, 3 channels
Agnews - State Hospital, 3 channels
Redwood City - APEEL #1, 3 channels
San Francisco - International Airport, 3 channels
Fremont - Mission San Jose, 3 channels
Hayward - APEEL #1E, 3 channels

Tapes: MORGANHILL84-S, MORGANHILL84-IS ***

Structural-response records from the Morgan Hill Earthquake of
24 Apr 1984, 13:15 PST, ML=6.2(BRK)

San Jose - Town Park Apartment Towers, 13 channels
San Jose - Great Western Savings Bldg., 13 channels
San Jose - Santa Clara County Bldg., 22 channels
Saratoga - West Valley College Gym, 11 channels
Watsonville - Telephone Bldg., 13 channels
Hollister - Glorietta Warehouse, 13 channels
South San Francisco - Kaiser Medical Center, 11 channels
San Juan Bautista - Highway 101/156 Overpass, 10 channels

*** Vol. 1 data are on tapes MORGANHILL84-IG and MORGANHILL84-IS; Vol. 2 and 3 data are on tapes MORGANHILL84-G and MORGANHILL84-S.

Tape: REDLANDS85

Redlands Earthquake of 2 Oct 1985, 16:44 PDT, ML=4.8(CIT)

Rancho Cucamonga - Law & Justice Building (base-isolated),
16 channels plus 3 free field channels