

SELECTED ACCELEROGRAMS FROM THE REDLANDS,
CALIFORNIA EARTHQUAKE OF OCTOBER 2, 1985
(INCLUDING FIRST RECORDS FROM A
BASE-ISOLATED BUILDING)

California Strong Motion Instrumentation Program
(Preliminary Data Report)

OSMS 85-02

8 October 1985

California Department of Conservation
Division of Mines and Geology
Office of Strong Motion Studies
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On October 2, 1985 an earthquake occurred approximately 8 kilometers (5 miles) southeast of San Bernardino near the community of Redlands, which is located about 110 km east of Los Angeles. According to the Associated Press, telephone service was disrupted for a few minutes and some plate glass windows were cracked in Redlands. High-rise buildings in Los Angeles and chandeliers in Palm Springs swayed during the earthquake. The earthquake may be associated with the San Jacinto fault zone. No known surface rupture was associated with the earthquake.

Strong-motion records were obtained at six stations instrumented by the California Strong Motion Instrumentation Program (CSMIP). This report presents copies of the analog records recovered as of October 5, 1985 and the instrumentation layout for each of the structures.

Perhaps the most noteworthy of the records obtained from this earthquake are those from the San Bernardino County Law and Justice Center in Rancho Cucamonga. This building incorporates a system of seismic isolators at the foundation level. Seismic sensors are attached both to the foundation slab and to the building above the isolators. Building instrumentation was completed by CSMIP only last month. Construction of the building itself is still underway. Although the records are of low amplitude (4% g), their uniqueness makes them important.

Preliminary hypocentral parameters determined at the California Institute of Technology (Hutton, personal communication) are:

Origin time:	2 October 1985, 23:44:15 GMT (16:44:15 PDT)
Epicenter:	34.03 N, 117.25 W
Depth:	15 km, approximate.
Magnitude:	4.9 ML

The approximate epicenter and station locations are shown on the map in Figure 1. The stations are also listed in Table 1.

Table 1 - Strong Motion Data From Redlands Earthquake

No.	Station Name	Structure Size, Type	Station Coords.	Epicentral Distance (km.)	Max. Grnd. Accel. (g)	Max. Struct. Accel. (g)
23497	Rancho Cucamonga San Bernardino County Law & Justice Center	4-story base-isolated steel frame bldg.	34.10 N 117.57 W	31	0.04	0.03
23495	Redlands Interstate Van Lines Warehouse	1-story precast concrete tilt-up	34.066N 117.214W	5	0.05	0.11
23481	Redlands Federal Savings Building	7-story steel frame bldg.	34.056N 117.178W	7	0.03 (0.09 Vert)	0.06
23285	San Bernardino State College Library	5-story reinforced concrete shear wall bldg.	34.183N 117.323W	18	0.03	0.15
13123	Riverside Airport	1-story bldg.	33.951N 117.446W	20	0.08	---
23466	Etiwanda SCE Power Plant #3	Steam generating plant	34.091N 117.527W	27	0.03	0.13

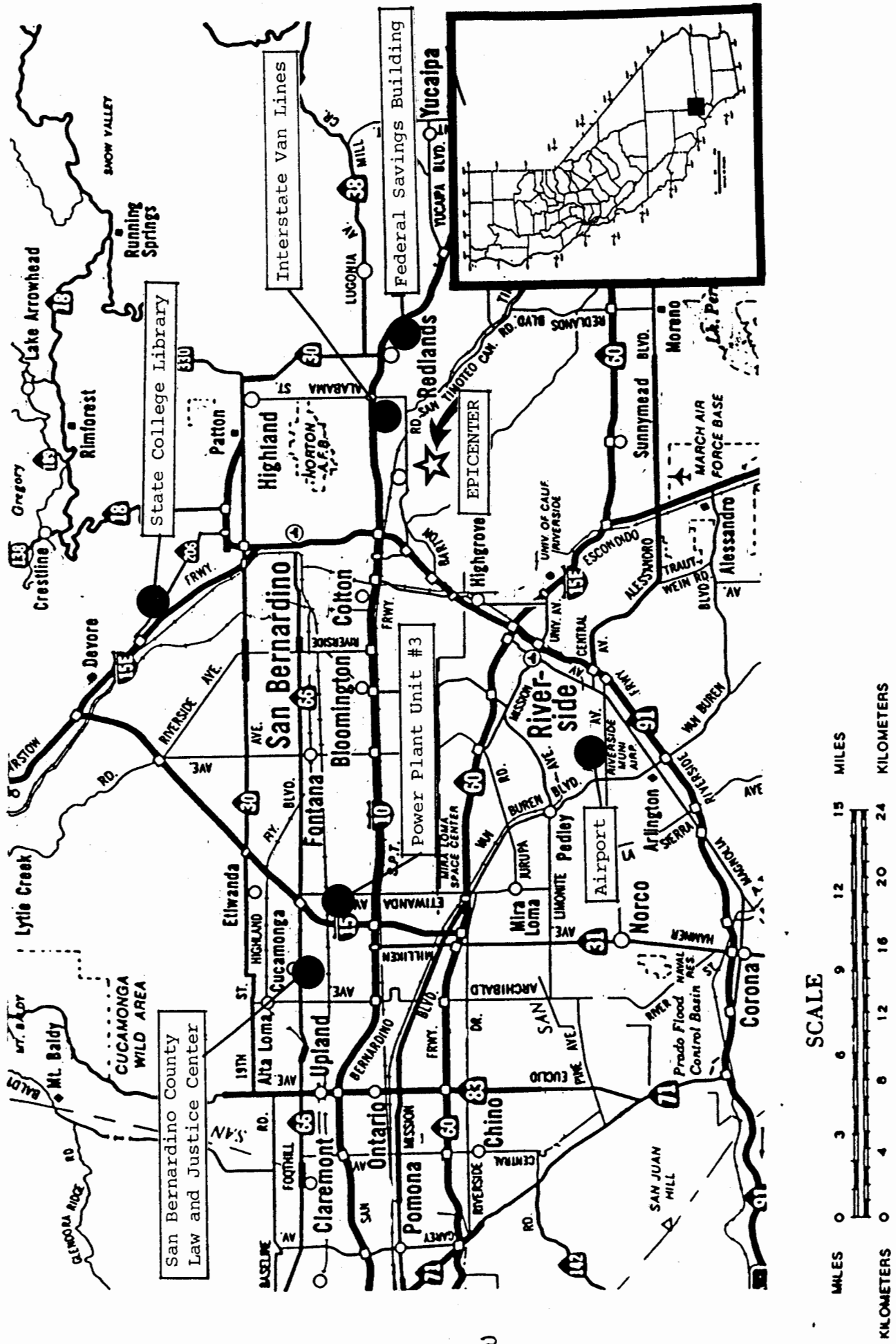
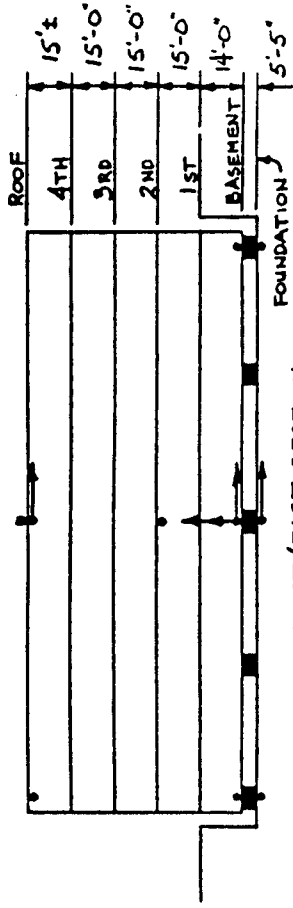
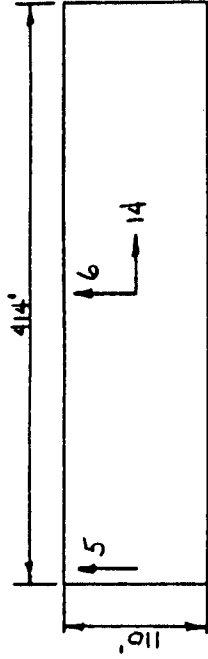


Figure 1. CSMIP strong-motion stations recording the October 2, 1985 Redlands, CA earthquake.

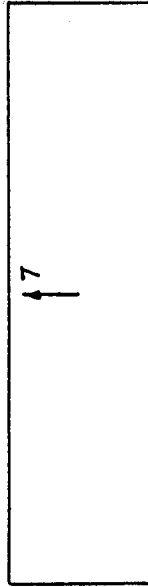
RANCHO CUCAMONGA
LAW AND JUSTICE CENTER



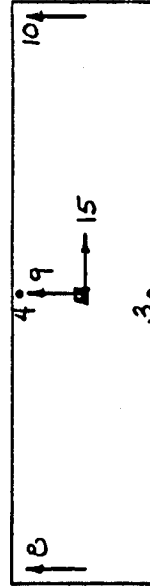
WEST/EAST SECTION



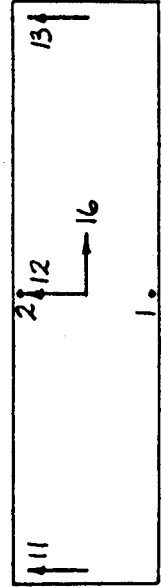
ROOF



2ND FLR



BASEMENT



FOUNDATION

Rancho Cucamonga - San Bernardino County Law + Justice Bldg.

23:44:19 GMT

① UP Foundation (Below Isolators)

② UP " " "

③ UP Basement (Above Isolators)

④ UP " " "

⑤ North Roof

⑥ North Roof

⑦ North 2nd Floor No. 03g

⑧ North Basement (Above Isolators)

⑨ North Basement " "

⑩ North Basement " "

⑪ North Foundation (Below Isolators)

⑫ North Foundation " "

⑬ North Foundation " "

1sec

Rancho Cucamonga - San Bernardino County Law + Justice Bldg.

23:44:19 GMT

14 East

Roof

15 East

Basement (Above isolators)

0.04g

16 East

Foundation (Below isolators)

17 North

Free Field

18 UP

Free Field

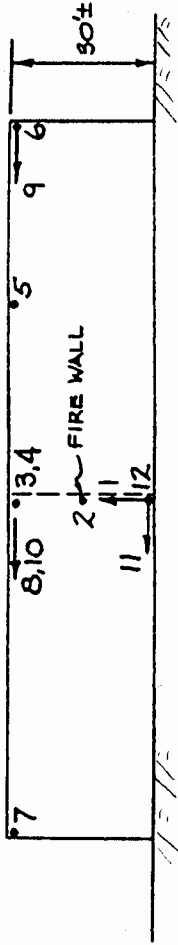
19 East

Free Field

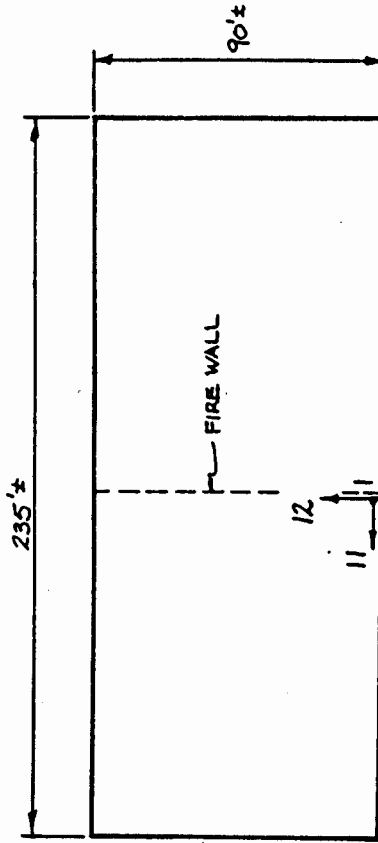
0.04g

1sec

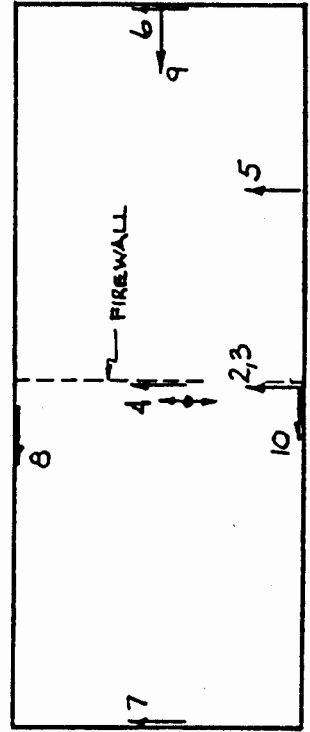
REDLANDS, CA
 INTERSTATE VAN LINES WAREHOUSE



WEST ELEVATION



GROUND



ROOF

Redlands - Interstate Van Lines Warehouse

23:44:16 GMT

① UP

Ground

② East

Mid-height on Wall

③ East

Roof, center of west wall

④ East

Roof, center

⑤ East

Roof, $\frac{1}{4}$ -length point of west wall

⑥ East

Roof, center of south wall

⑦ East

Roof, center of north wall

⑧ North

Roof, center of east wall

⑨ North

Roof, center of south wall

⑩ North

Roof, center of west wall

⑪ North

Ground

⑫ East

Ground

0.118

L23: 44:16 GMT

Redlands - Federal Savings

① Vert ↙ 0.098

② South

Roof

③ S

Roof

④ S

4th Floor

⑤ S

4th Floor

⑥ S

2nd Floor

H

⑦ S

2nd Floor

⑧ S

Basement

⑨ S

Basement

⑩ West

Roof

⑪ W

4th Floor

⑫ W

2nd Floor

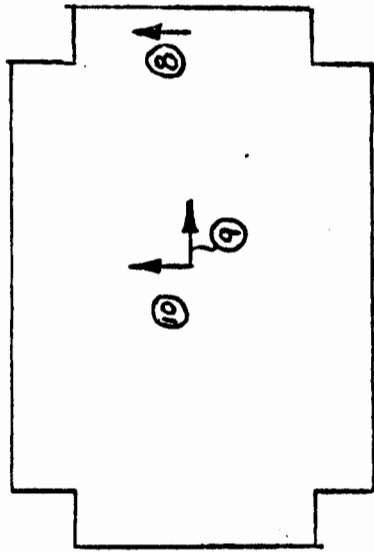
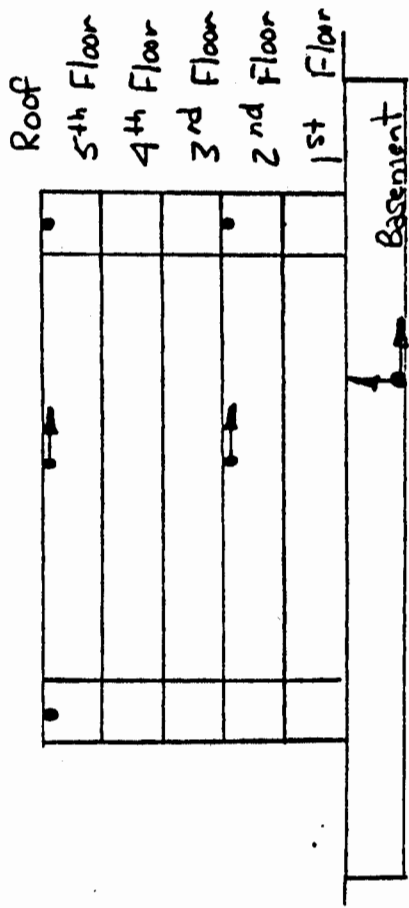
⑬ W

Basement

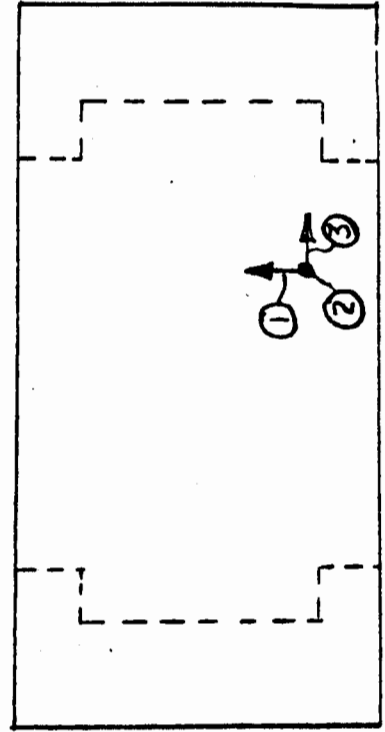
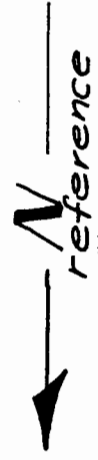
1.5 sec

San Bernardino - State College Library
 5500 College Parkway
 San Bernardino, Calif.

Strong-Motion Instrumentation Scheme

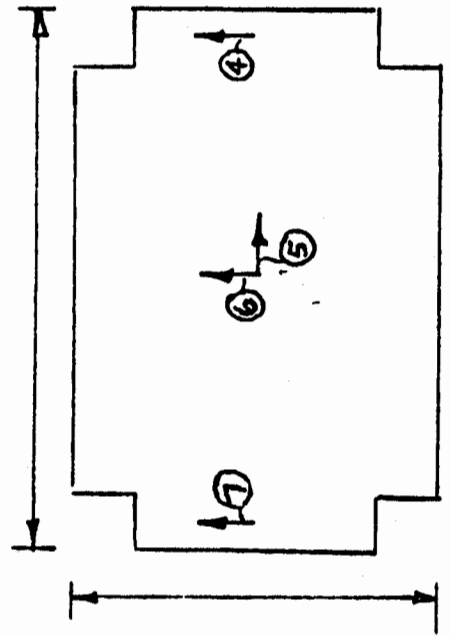


3rd Floor Plan



Basement Plan

N-S Section



Roof Plan

San Bernardino - State College Library

① East Basement

② Vert Basement

③ South Basement

④ East Roof

⑤ South 0.15g

⑥ East Roof

⑦ East Roof

⑧ East 3rd Floor

⑨ South 3rd Floor

⑩ East 3rd Floor

1 sec

Riverside - Airport

↑ 23:44:17 GMT

270°

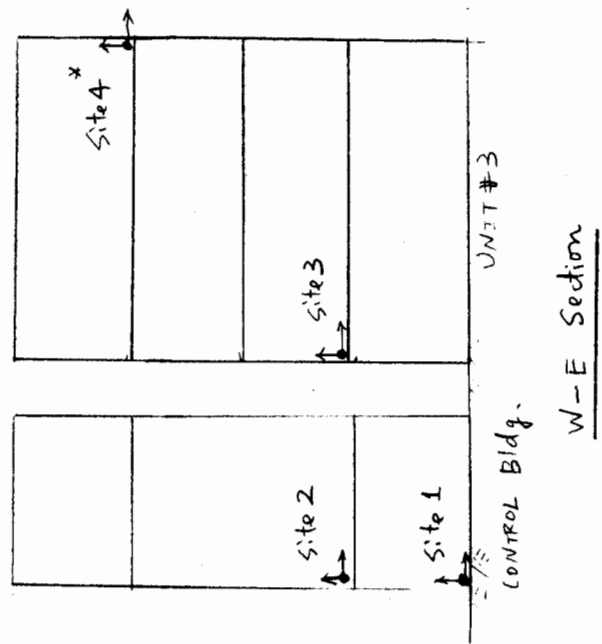
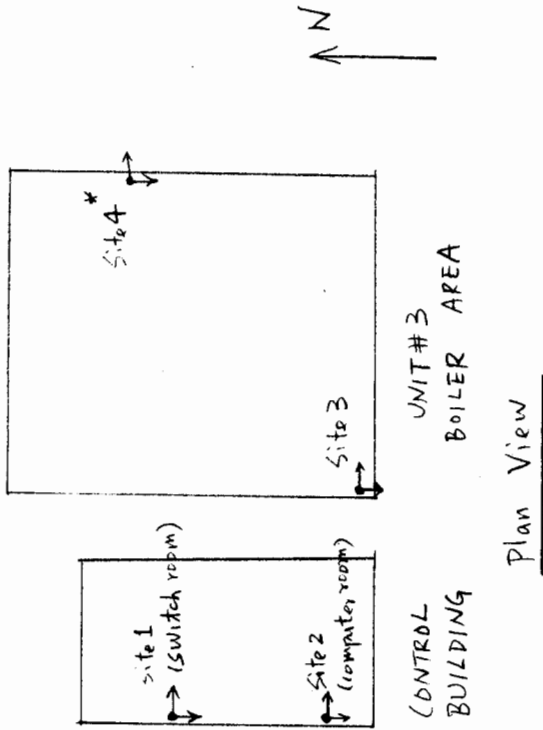
← 0.08g

Up

180°

1 sec

Etiwanda SCE Power Plant # 3



* Site 4 instrument not operational during this earthquake.

Etiwanda - SCE Power Plant Unit #3

Site 1, Ground Floor in Switch Room

23:44:21 GMT

180

VP

90

0.03g

1/second

17

Site 2, Second Floor in Computer Room

23:44:17 GMT

180

VP

90

0.07g

1/second

Etiwanda - SCE Power Plant Unit #3
Site 3, Second Floor of Boiler Frame

