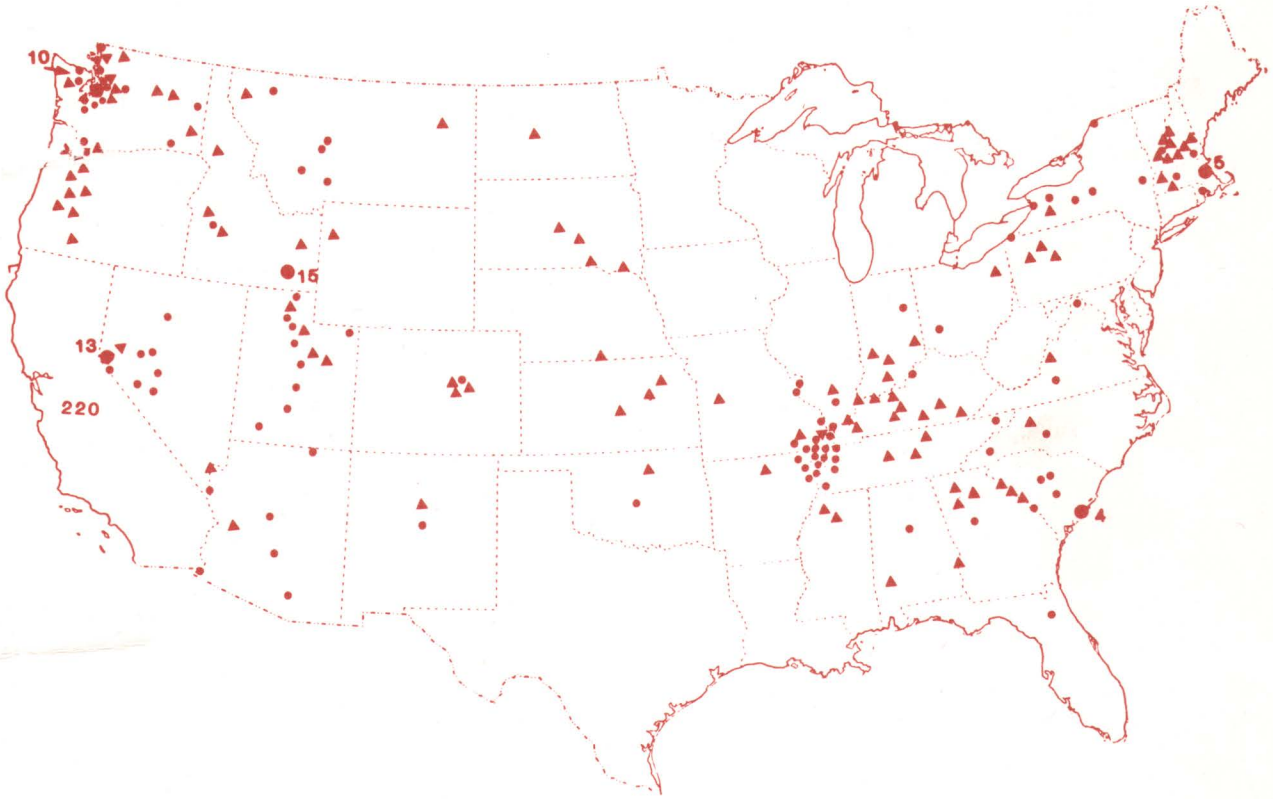
CIRC. 965

STRONG-MOTION PROGRAM REPORT, JANUARY - DECEMBER 1982



U. S. GEOLOGICAL SURVEY CIRCULAR 965

Strong-Motion Program Report, January - December 1982

U. S. GEOLOGICAL SURVEY CIRCULAR 965

1985

Department of the Interior
WILLIAM P. CLARK, *Secretary*

U.S. Geological Survey
Dallas L. Peck, *Director*

Library of Congress catalog-card No. 83-600616

Free on application to Distribution Branch, Text Products Section,
U.S. Geological Survey, 604 South Pickett Street, Alexandria, VA 22304

FOREWARD

Records of strong ground shaking obtained from damaging earthquakes provide the basis for improving earthquake-resistant design and for understanding the nature of seismogenic failure in the Earth's crust. Strong-motion data acquired from the national network operated by the U.S. Geological Survey form a national resource for scientific research, engineering design, siting of critical structures, and safety evaluations for large-scale structures such as dams and bridges.

This report series, first initiated by the late R. B. Matthiesen after the damaging San Fernando earthquake of February 9, 1971, is intended to provide a catalog of strong-motion records recovered from the U.S. national network as well as summaries of related topics of special interest to the international earthquake-engineering research community. The collation of information presented in table 1 of this report series provides a complete list of all strong-motion records obtained from the national network, including those of relatively small amplitude (less than 0.05 g peak acceleration) that generally would not be digitized or otherwise processed unless warranted by a special studies request. Publication deadlines for this catalog are necessarily determined by instrumentation maintenance intervals (6 months to 2 years), which in turn determine the recovery period for much of the small amplitude data.

Recent developments in relational data base technology and improvements in mini- and micro-computer technology have provided opportunities to develop and implement improvements in data-dissemination procedures. Some of these improvements have been incorporated into standard dissemination procedures and others are in the process of being incorporated. Standard procedures currently implemented include:

1) Publication of data reports presenting processed recordings of large and damaging earthquakes of special interest, initially in the Open-file series and subsequently in the Bulletin series of the U.S. Geological Survey;

2) Commercial distribution of digital copies of published data by the National Geophysical Data Center, Boulder, Colorado;

3) Automatic dissemination via computer terminal of information in the Strong-Motion Information Retrieval System (SMIRS) for access by any interested user; and

4) A continuation of the catalog of strong-motion data recovered from the National Network, published annually in this series.

Procedures that are presently being developed to further facilitate dissemination of strong-motion data are based on recently developed relational data base technology. These efforts are directed toward development of a user friendly environment that will extend the capabilities of SMIRS by providing computer access to the digital time series, catalogs such as those published in this series, and the capability to quickly retrieve data subsets on the basis of a wide variety of user specified parameters.

These efforts, in support of the National Strong-Motion Program operated by the U.S. Geological Survey, which has responsibility for the acquisition, processing, and dissemination of all strong-motion data collected on the national network, are intended to facilitate the use of a scarce national resource, by the earthquake engineering and scientific research communities.

Roger D. Borcherdt

PREFACE

This Strong-Motion Program report gives preliminary information on the nature and availability of strong-motion data recorded by the U.S. Geological Survey (USGS). The program is operated by the USGS in cooperation with numerous Federal, State, and local agencies and private organizations. Major objectives of the program are to record both strong ground motion and the response of various types of engineered structures during earthquakes and to disseminate this information and data to the international earthquake-engineering research and design community.

This report contains a summary of the accelerograms recovered from the USGS National Strong-Motion network during 1982, notes on the availability of digitized data, and general information related to the USGS and to other strong-motion programs. The data summary in table 1 contains information on those accelerograms recovered (although not necessarily recorded) during 1982.

Ronald L. Porcella, Editor
U.S. Geological Survey, MS 977
Menlo Park, California 94025

CONTENTS

STRONG-MOTION PROGRAM REPORT, JANUARY-DECEMBER 1982

1982 STRONG-MOTION RECORDS

By J. C. Switzer

Two hundred and fifteen records were recovered from the USGS National Strong-Motion Network during 1982, just two fewer records than the yearly average for the period 1972 to 1981 inclusive. Thirteen records were recovered from a magnitude 4.5 earthquake on January 19 that was felt over all of the New England states and in parts of Quebec and Ontario. The largest recorded acceleration was 0.52 g at the right abutment of Franklin Falls Dam at an epicentral distance of about 8 km.

Earthquakes triggered ten strong-motion stations on the Island of Hawaii during the period September 1981 to May 1982 and produced a total of 38 records. A maximum horizontal acceleration of 0.58 g was recorded at Kau Hospital in Pahala located on the southern part of the island.

On June 15 a magnitude 4.8 earthquake occurred near Anza in southern California; ten accelerographs were triggered and seven records exceeded 0.05 g with a maximum peak acceleration of 0.14 g at Anza fire station.

A swarm of nine earthquakes between August 10 and August 12 produced 30 records at the Bear Valley array southeast of Hollister, Calif. The magnitude 4.5 earthquake on August 10 produced a peak acceleration of 0.19 g at Bear Valley array station 12. During the magnitude 4.6 earthquake on August 11 a maximum acceleration of 0.27 g was recorded at the Bear Valley fire station.

In northern California a magnitude 4.6 earthquake on December 16 triggered four of six strong-motion recorders at the Eel River Valley array southeast of Eureka; the record from the Fortuna fire station showed a peak horizontal acceleration of 0.28 g.

Additional strong-motion records recovered during 1982 were recorded at stations located in Alaska, Arkansas, California, Nevada, South Carolina, South Dakota, and Utah (see table 1). Event information listed in table 1 was taken primarily from Preliminary Determination of Epicenters, published monthly by the U.S. Geological Survey.

THE IMPERIAL VALLEY, CALIFORNIA, EARTHQUAKE OF OCTOBER 15,1979

From U.S. Geological Survey Professional Paper 1254, the "Introduction," by Carl E. Johnson, Christopher Rojahn, and Robert V. Sharp.

On October 15, 1979, the largest earthquake in California in the past decade occurred on the Imperial fault near the United States-Mexico border. The moment-magnitude (M) 6.5 event, whose epicenter was located in northern Mexico, damaged structures in and near the town of El Centro, Calif., was felt from Las Vegas, Nev., to the Pacific Ocean, and was accompanied by surface movement on four fault zones. The earthquake caused an estimated $21.1 million in damage and injured 73 people, but no deaths were reported in the United States. The small number of injuries is indeed fortunate and is no doubt related to the fact that the areas of greatest population and number of manmade structures were not situated in the most strongly shaken area.

This volume contains 35 technical papers on the following topics relating to the October 15 earthquake: seismologic investigations, surface-faulting and other geologic investigations, damage and shaking-intensity studies, and strong-motion data and analyses. Depending on their subject matter, several papers are preliminary in nature, whereas others reflect indepth studies of a particular topic or data set.

Although the Imperial Valley is not densely developed, shaking-intensity studies using manmade structures as primary indicators of the intensity of ground shaking yielded some interesting, if not controversial, findings. Results of a regional investigation of the distribution of intensity, for example, suggest some significant differences between the pattern of strong ground shaking during the 1940 and 1979 Imperial Valley earthquakes. One study focused on the performance of structures very

close to the fault trace and another study concerned with the performance of a specific class of buildings prevalent throughout the valley both suggest that the intensity of ground shaking was not so severe as might have been expected on the basis of previously obtained data. The second study also shows a correlation between observed shaking effects and peak ground accelerations obtained from nearby strong-motion stations.

One of the primary difficulties in assessing the results from such shaking-intensity studies is, of course, that they are biased by the type of regional construction. Most existing structures in the heavily shaken area of the Imperial Valley, for example, were low-rise stiff buildings that respond predominantly to high-frequency ground motion; by contrast, there were few long-period structures (for example, mid- and high-rise buildings) that respond predominantly to longer period ground motions. Although the results from such studies should not be indiscriminately applied, they are nevertheless extremely valuable because they document the shaking effects on particular classes of structures during particular types and magnitudes of earthquakes.

With regard to the performance of engineered structures, the partial collapse of the six-story reinforced-concrete Imperial County Services Building in El Centro and the complete collapse of an elevated steel water tank south of Brawley are particularly noteworthy. The fact that the 9-year-old Imperial County Services Building was designed to resist earthquakes and was damaged so severely that it had to be demolished makes it an especially important case study for the structural-engineering community.

This earthquake generated the most comprehensive set of strong-motion-accelerograph data yet recorded during a damaging earthquake. These data are unprecedented because they include the first set of ground-motion records ever obtained close to fault traces that were activated during a moderately strong earthquake, as well as the first set of records from an extensive array in a severely damaged building and from an extensive array on a highway overpass bridge less than 1 km from the fault rupture.

Of particular importance to engineering seismology are the data obtained from the El Centro ground-motion array, a 13-accelerograph 45-km-long linear array oriented perpendicular to and crossing the Imperial fault near El Centro; and from the El Centro differential array, a six-accelerograph 300-m-long linear array designed to record differential ground motions due to horizontally propagating surface waves. Strong-motion data from the 45-km-long array provide information on the nature of shaking close to and at increasing distance from the fault rupture, whereas those from the differential array are particularly applicable to the study of earthquake-induced stresses in such extended structures as bridges, dams, pipelines, and large mat foundations for nuclear power stations. These data also include the largest ground acceleration yet recorded anywhere in the world.

From a structural-engineering point of view, the strong-motion data from the severely damaged six-story Imperial County Services Building in El Centro are undoubtedly the most significant obtained from this earthquake. Data from the building's 13-channel accelerograph system, designed specifically for acquiring information that could lead to improvements in engineering design practice, provide a complete description of building response before, during, and after the occurrence of severe structural damage. These data are exceptional because the time and mechanism of structural failure can be inferred directly from the recorded data. In conjunction with the records from a nearby free-field station, these data also provide important information on the extent of soil-structure interaction at the building site.

Overall, the strong-motion data recorded during the 1979 Imperial Valley earthquake and its aftershocks are expected to be of great value in many seismologic and earthquake-engineering studies. Such studies will undoubtedly provide more and better insights into the nature, causes, and effects of strong ground shaking.

Note: This publication is for sale by the U.S. Government Printing Office, Washington, D.C. 20402.

AVAILABILITY OF STRONG-MOTION DATA

U. S. GEOLOGICAL SURVEY DATA

By April Converse

Descriptions of strong-motion accelerograph records and the circumstances in which they were recorded are available to anyone involved in earthquake engineering through the computer-based Strong-Motion Information Retrieval System (SMIRS). SMIRS provides ready access to information about strong-motion records and the level of processing and analysis that has been performed on them. Information about earthquakes that generated recorded motion and about the sites at which the motion was recorded is also provided.

With an ordinary phone line and a keyboard terminal, a SMIRS user may review the information free of charge. Once accessed, SMIRS will offer a general introduction and will tell the user how to request more detailed instructions. The user also will be given an opportunity to request a copy of the printed user's manual.

SMIRS resides in one of the U.S. Geological Survey computers in Denver, Colorado. It can be accessed by telephoning the computer center

directly or by telephoning a local node in the TYMNET telecommunications network. The direct-dial telephone number for the Denver computer center is (303) 232-5309.

The TYMNET telecommunications network can be used to access SMIRS without incurring a long-distance telephone charge to Denver. TYMNET Corporation maintains local telephone numbers in many cities in the United States and in several foreign countries. TYMNET phone numbers can be obtained from TYMNET Corporation's Customer Support Group at (800) 366-0149.

Take the following steps to connect your terminal to SMIRS.

1) Set the switches, keys, or buttons on the terminal that allow a choice of operating modes:
   transmission speed = 300 baud (30 characters per second) or 1200 baud;
   on line;
   lower case ASCII characters; and
   full duplex (if you are going to dial a TYMNET number) or
   half duplex (if you are going to dial Denver directly).
2) Plug in and turn on the terminal; turn on the modem too if it is a separate device. Notice whether the modem uses an acoustic coupler or whether the modem is directly connected to a telephone. An acoustic coupler will have a cradle into which a telephone handset can be inserted. Look for a label or diagram on an acoustic coupler that will show you in which direction the telephone cord should go. A direct-connect modem will have a switch that can be set for voice or data transmission.
3) Telephone the USGS computer center in Denver or telephone the TYMNET number nearest you; wait for a high-pitched tone.
4) Place the telephone handset in the cradle on the acoustic coupler or set the direct-connect switch to "data." Wait for the "carrier detect" light to turn on; this indicates that the terminal is receiving a signal from the computer or from the TYMNET equipment.
5) If you telephoned the Denver computer center directly, skip this section, but if you telephoned a TYMNET number, the TYMNET prompts (shown underlined here) and your responses (shown in italics here) should proceed as follows:

   please type your terminal identifier
   please log in:

   The CR symbol represents the carriage-return key.

   The "gsbc1234" is what TYMNET refers to as a user name, the "2361" is a location identifier for the USGS computer center, and the "sandstone" is a password. Note that the "sandstone" will not be printed at your terminal while you type.

   Do not be alarmed if the first prompt comes at an odd speed.

   TYMNET will now connect your terminal to a computer selecting device in Denver. If the computer selector is operating, "GSDN is online" will be printed at your terminal.
6) Type the carriage return key. The computer selecting device will ask you to "enter class", to which you should answer "mult":

   enter class

   The selecting device will answer with several lines, something like "CONNECTING TO DENVER MULTICS" and "class mult start".
7) Type the line-feed key. The MULTICS computer will respond with several lines that will tell you which computer you have accessed, how many other users are connected, and so forth.
8a) If your terminal will transmit both upper and lowercase characters, type:

   The CR represents the carriage-return key and your_name is your own name typed without any embedded blanks. It is good practice for you to choose a version of your name that will probably be unique, and to use that version of your name every time you log onto SMIRS. That way, any messages sent to you through SMIRS will not be received by the wrong user.

   Note that the word "enter" is in lower case and "SMIRS" is in upper case.
8b) If your terminal has only uppercase characters, type:

   The "MAP" statement instructs the computer to interpret all the alphabetic characters you will subsequently type as though they were in lowercase, except those characters that follow a left slant ( ).
9) From now on, SMIRS will prompt you whenever it expects you to type something. All the prompt lines begin and end with two dashes; answer by typing a question mark if you do not know what is expected of you.

Do not be concerned if the computer does not respond immediately after you enter SMIRS. The response time may improve in the future, but it will always be fastest during nonworking hours (Denver time).

CALIFORNIA DIVISION OF MINES AND GEOLOGY STRONG-MOTION DATA

Processed strong-motion data from selected earthquakes are available from the California Division of Mines and Geology (CDMG). The data have been prepared by the interim CDMG strong-motion data processing system. This system is composed of a series of programs that have been developed by the California Institute of Technology, the USGS, and the CDMG, with special emphasis on the handling of long-duration film records from multiple-channel central recording instruments.

The data are grouped by phase:

Phase I	Uncorrected accelerations,
Phase II	Corrected accelerations, velocities, and displacements,
Phase III	Response spectra.

Each phase contains three-channel subgroups arranged by station. At the present time, data from the following earthquakes have been processed:

Santa Barbara earthquake of August 13, 1978

Station	Channels
UCSB Goleta	3
UCSB North Hall	9
Freitas Building	9

Imperial Valley earthquake of October 15, 1979

El Centro free-field	3
Imperial County Services Bldg.	13

The data are available on standard nine-track tapes, along with a microfiche copy of the tape contents. Interested parties should contact the CDMG Office of Strong-Motion Studies (see section "Data Sources").

It is the policy of the CDMG to make all strong-motion record data promptly available to the public in a manner consistent with good data management. Requests for copies of records, personal access to record or data files, and copies of data files should be made to the Chief, Office of Strong-Motion Studies (OSMS, see section "Data Sources") and should specify identity and medium of materials to be provided or reviewed. Desired access or delivery dates should be specific. When a request for copies of materials or personal access to files is received, OSMS staff will provide the requested material or will set an appointment time for personal review of files; the requestor will be notified immediately of any significant delay or other problems that prevent meeting the request. Charges for copying or other processing of materials will be based on the actual cost of producing and delivering the items, and OSMS will retain control of originals and master copies of all items.

FOREIGN STRONG-MOTION DATA

Because of the long history of close cooperation between the United States and the Central and South American strong-motion programs, much of the data from those programs are available from the same sources as the United States data (see below). Information about strong-motion data from the Western Hemisphere will be included in the Strong-Motion Information Retrieval System operated by the USGS.

The USGS does not attempt to obtain first-class copies of records from those foreign organizations that prepare data reports comparable to those prepared by the USGS. Abstracts of the data reports from such organizations are presented in this Strong-Motion Program Report series, and through informal arrangements, copies of the data and records are made available.

NOAA WORLDWIDE STRONG-MOTION DATA

A worldwide collection of strong-motion seismograms for dissemination to the scientific and engineering community is available from World Data Center A for Solid Earth Geophysics, National Geophysical Data Center (NGDC). Countries contributing to the strong-motion data base include Australia, Italy, Japan, New Zealand, Rumania, U.S.S.R., and Yugoslavia. The USGS has furnished records from its network of cooperative strong-motion stations, including those in Central and South America.

Copies of strong-motion records are available on 35-mm film, on 70-mm film chips, as paper copies, and as digitized data on punched cards or magnetic tape. A list of most records can be obtained from the World Data Center A publication "Catalog of Seismograms and Strong-motion Records," Report SE-6. This catalog can be ordered from NGDC (NOAA) for $3.00 (see section "Data Sources").

The most significant strong-motion records recorded in the United States and Latin America between 1931 and 1971 have been copied on seven reels of 35-mm film (x12 reduction) and 70-mm film chips (approximately x8 reduction). The film chips are available for $1.50 per chip; longer records are continued on additional chips. The 35-mm film copies can be purchased for $30 per reel, the complete set of reels for $180. There is a minimum charge of $10 per order. Check with the National Geophysical Data Center for current prices before placing an order.

Japan and Australia have supplied magnetic tapes of digitized data from stations located in the western Pacific Ocean (the Japanese Islands, New Guinea, and New Britain). A series of 400 United States strong-motion records (1933-71) were digitized by the California Institute of Technology and

are now available on six magnetic tapes. The USGS is digitizing post-1971 records from its network; they have generated 15 tapes of strong-motion records recorded from 1967 to 1981 in the United States, Chile, Nicaragua, San Salvador, and Mexico.

Other digitized data include punched cards containing strong-motion records from the March 4, 1977, earthquake in Rumania (recorded in Bucharest); the Gazli earthquake of May 17, 1976, in Uzbek, U.S.S.R.; and three earthquakes in the New Madrid seismic zone (located in midcontinental United States) in 1975 and 1976.

Recent acquisitions include a magnetic tape of strong-motion records triggered by a swarm of earthquakes that occurred in northern Italy near the town of Friuli in 1976; these were compiled by the National Commission for Nuclear Energy and have been given to the center for distribution. Other data include records obtained from California earthquakes near Santa Barbara in August 1978, Gilroy in August 1979, El Centro in October 1979, Livermore in January 1980, and Imperial Valley in April 1981.

A table listing all digitized strong-motion records available on magnetic tape may be obtained free of charge from NOAA. Digitized strong-motion records may be purchased either in punched card format (including all three instrument components) or in tape format.

Checks or money orders should be made payable to "Commerce/NOAA/NGDC"; inquiries should be addressed to NOAA (see section "Data Sources").

DATA SOURCES

For reports or information regarding strong-motion records and data, address inquiries to the appropriate agency listed below:

1. Branch of Distribution (804) 756-6141
   U.S. Geological Survey (FTS) 756-6141
   604 S. Pickett Street
   Alexandria, VA 22304

2. Earthquake Engineering (415) 848-0972
   Research Institute
   2620 Telegraph Avenue
   Berkeley, CA 94704

3. National Geophysical (303) 497-6764
   Data Center (D622) (FTS) 320-6764
   NOAA, Code E/GC11
   325 Broadway Street
   Boulder, CO 80303

4. National Technical (703) 487-4650
   Information Service (FTS) 737-4650
   5285 Port Royal Road
   U.S. Dept. of Commerce
   Springfield, VA 22161

5. NISEE/Computer Applications (415) 642-5113
   519 Davis Hall, UC Berkeley
   Berkeley, CA 94720.

6. Office of Strong-Motion (916) 322-3105
   Studies (FTS) 552-3105
   California Division of
   Mines and Geology
   2811 "O" Street
   Sacramento, CA 95816

7. Open-File Services Section (303) 234-5888
   Branch of Distribution (FTS) 234-5888
   U.S. Geological Survey
   Box 25425, Federal Center
   Denver, CO 80225

8. National Strong-Motion
   Program (415) 323-8111
   U.S. Geological Survey ext. 2881
   345 Middlefield Rd., MS 977 (FTS) 467-2881
   Menlo Park, CA 94025.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982*

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
19 January 1982	New Hampshire	43.447°N	*			
0014:42.0 UTC	Franklin Falls Dam	71.660°W	0.8			
N. New England	(ACOE)†					
43.5N, 71.6W						
Magnitude 4.5	Center crest			045°	0.09	-
				Up	.10	1-peak
				315°	.24	0.3
	Right abutment			045°	.28	.4
				Up	.17	.3
				315°	.52	1.3
	Downstream			225°	.12	.3
				Up	.20	1.1
				135°	.18	.5
	Vermont	43.63° N	*			
	White River Junc. Hosp. (VA)†	72.33° W	*			
	Basement				**	
	Vermont	43.604°N	*			
	North Hartland Dam (ACOE)†	72.361°W	*			
	Crest				**	
	Abutment				**	
	Vermont	43.12° N	*			
	Ball Mountain Dam (ACOE)†	72.78° W	*			
	Crest				**	
	Abutment				**	
	Vermont	43.338°N	*			
	North Springfield Dam (ACOE)†	72.511°W	*			
	Crest				**	
	Downstream				**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
19 January 1982 0014:42.0 UTC -continued-	Vermont Union Village Dam (ACOE)†	43.794°N 72.258°W	* *			
	Center crest				**	
	Left abutment				**	
	Downstream				**	
14 November 1979- 3 February 1982 Central California Epicenters and magnitudes unknown	Palo Alto City Hall 250 Hamilton Ave. (CPA/USGS)	37.44° N 122.16° W	* *			
	Basement - level C				**	
	Fourth floor				**	
	Ninth floor (roof)				**	
	Note: Two each additional records** recovered at basement, fourth floor, and ninth floor.					
4 February 1982 05?6:03 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	3.75 0.8		**	
	Note: WWVB time code incomplete.					
14 February 1982 2204 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	45.75 0.8		**	
24 June 1981- 24 February 1982 Central California Epicenter and magnitude unknown	Pleasant Valley Pumping Plant (USGS)	36.308°N 120.249°W	* *			
	Switchyard				**	
	Maricopa Array Station 3 (CDWR)	35.08° N 119.40° W	* *		**	
22 March 1982 0853:28.6 UTC Southern California 33.050N, 116.217W Magnitude 4.5	Borrego Springs Borrego Air Ranch (USGS)	33.19° N 116.28° W	32.1 1.8	315° Up 225°	0.06 .03 .05	- - -
	Ocotillo Wells Burro Bend Cafe (USGS)†	33.14° N 116.13° W	* 1.8		**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
13 April 1982 1102:12.2 UTC Southern California 34.050N, 118.967W Magnitude 3.9	Malibu Kilpatrick Boys School (USGS)	34.093°N 118.836°W	17.68 *		**	
15 September 1981- 22 April 1982 Alaska Epicenter and magnitude unknown	Talkeetna FAA-VOR Building (USGS)	62.30° N 150.10° W	* *		**	
	Note: Two additional records** recovered at Talkeetna.					
3 May 1982 1014:14.2 UTC SE Alaska 60.117N, 141.115W Magnitude 5.1	Icy Bay Guyot Hills (USGS)†	60.146°N 141.472°W	* *		**	
22 September 1981- 4 May 1982 Central California Epicenter and magnitude unknown	Hollister Damler Residence (UCB)	36.81° N 121.41° W	* *	096° Up 006°	0.19 .05 .16	1.1 - 1.2
5 May 1982 1949:54.3 UTC So. Alaska 61.252N, 149.748W Magnitude 4.8	Anchorage Westward Hotel (USGS)†	61.220°N 149.892°W				
	Basement		* 6.7	135° Up 045°	.05 .02 .05	- - -
	Roof		* 7.0	135° Up 045°	.07 .12 .09	- 1-peak -
	Note: One additional unknown record** recovered at basement.					
	Anchorage USGS Building (USGS)†	61.223°N 149.892°W	* 6.6			
	Basement			360° Up 270°	.04 .01 .07	- - -
	Anchorage Gould Hall, APU (USGS)†	61.189°N 149.801°W	* 5.5			
	1st floor				**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
5 May 1982 1949:54.3 UTC -continued-	Anchorage New Federal Building (USGS)†	61.216°N 149.883°W	* 6.6			
	Basement				**	
	Anchorage Alaska Hospital (USGS)†	61.21° N 149.82° W	* 6.3			
	1st floor				**	
	4th floor				**	
	7th floor				**	
4 September 1981- 6 May 1982 Central California Epicenter and magnitude unknown	Bear Valley Station 6 James Ranch (USGS)	36.504°N 121.101°W	* *		**	
	Bear Valley Station 14 Upper Butts Ranch (USGS)	36.569°N 121.043°W	* *		**	
28 September 1981- 6 May 1982 Central California Epicenter and magnitude unknown	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	* *		**	
16 April 1982 1105:28 UTC Central California Epicenters and magnitudes unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	28.25 0.7		**	
	Note: One additional record** recovered at Station 10.					
16 September 1981- 9 May 1982 Hawaii Epicenters and magnitudes unknown	Honokaa, Hawaii Fire Station (USGS)	20.080°N 155.465°W	* *	021° Up 291°	0.07 .07 .06	- - -
			* *	021° Up 291°	.05 .03 .08	- - -
	Note: Ten additional records** recovered at Honokaa.					
	Hawaii Nat'l Park, HI USGS Volcano Observ. (USGS)	19.423°N 155.291°W	* 0.4	360° Up 270°	.20 .11 .10	1.6 2-peaks 1-peak
	Note: Three additional records** recovered at Hawaii National Park.					

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
16 September 1981- 9 May 1982 -continued-	Mauna Kea, Hawaii St. Park Visitors Ctr. (USGS)	19.752°N 155.530°W	* *		**	
	Note: Three additional records** recovered at Mauna Kea State Park.					
	Mauna Loa, Hawaii NOAA Observatory (USGS)	19.539°N 155.580°W	* 3.2	030° Up 300°	0.08 .03 .09	- - -
	Note: Two additional records** recovered at Mauna Loa Observatory.					
	Kailua-Kona, Hawaii Fire Station (USGS)	19.649°N 155.966°W	* *		**	
	Waimea, Hawaii Fire Station (USGS)	20.03° N 155.66° W	* *		**	
	Note: One additional record** recovered at Waimea Fire Station.					
	Waiohinu, Hawaii K'au Baseyard (USGS)	19.070°N 155.615°W	* 1.9	065° Up 335°	.07 .04 .07	- - -
			* 1.4	065° Up 335°	.08 .07 .08	- - -
	Note: One additional record** recovered at Waiohinu.					
	Kealakekua, Hawaii Kona Hospital (USGS)	19.523°N 155.879°W	* 6.2		**	
	Note: Two additional records** recovered at Kealakekua.					
	Hilo, Hawaii US Fish & Wildlife (USGS)	19.731°N 155.100°W	* *	360° Up 270°	.19 .04 .06	1.0 - -
	Pahala, Hawaii Kau Hospital (USGS)	19.20° N 155.47° W	* 2.0	188° Up 098°	.58 .27 .30	3.0 1.8 2.7
			* 1.6	188° Up 098°	.24 .17 .34	4.0 4.8 2.7

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
16 September 1981-	Pahala, Hawaii		*	188°	0.10	1-peak
9 May 1982			1.6	Up	.03	-
-continued-				098°	.11	1-peak
	Note: Two additional records** recovered at Pahala.					
11 May 1982	Bear Valley Station 12	36.658°N	32.15	310°	.09	-
2237:29.8 UTC	Williams Ranch	121.249°W	2.0	Up	.04	-
Central California	(USGS)			220°	.03	-
36.620N, 121.295W						
Magnitude 3.6						
20 May 1982	Bear Valley Station 12	36.658°N	22.65		**	
0129 UTC	Williams Ranch	121.249°W	1.5			
Central California	(USGS)					
Epicenter and						
magnitude unknown						
24 May 1982	Richfield, Utah	38.758°N	*		**	
1213:27.0 UTC	(USGS)†	112.086°W	1.0			
Utah						
38.706N, 112.041W						
Magnitude 4.0						
12 November 1980-	Whittier, Alaska	60.774°N	*		**	
13 June 1982	Begich Towers	148.686°W	*			
So. Alaska	(USGS)					
Epicenter and						
magnitude unknown						
15 June 1982	Skinner Dam	33.58° N	*			
2349:21.3 UTC	Murrieta Hot Springs	117.07° W	4.4			
Southern California	(MWD)†					
33.550N, 116.667W						
Magnitude 4.8	Abutment			178°	.05	-
				Up	.03	-
				088°	.05	-
	Thousand Palms	33.82° N	*		**	
	Post Office	116.40° W	4.3			
	(USGS)†					
	Rancho de Anza	33.35° N	*	135°	.04	-
	(USGS)†	116.40° W	*	Up	.03	-
				045°	.06	-
	Terwilliger Valley	33.48° N	24.40	135°	.11	1-peak
	Snodgrass Residence	116.59° W	1.6	Up	.04	-
	(USGS)			045°	.09	-

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
15 June 1982 2349:21.3 UTC -continued-	North Palm Springs Post Office (USGS)†	33.92° N 166.54° W	* 5.6		**	
	Hurkey Creek Park (USGS)†	33.67° N 116.68° W	* 1.5	135° Up 045°	0.06 .03 .08	- - -
	Cranston Forest Station (USGS)†	33.74° N 116.84° W	* 3.4	135° Up 045°	.06 .03 .04	- - -
	Collins Valley (USGS)†	33.42° N 116.47° W	* 2.9		**	
	Anza Fire Station (USGS)†	33.556°N 116.673°W	* 1.2	315° Up 225°	.14 .08 .13	1.2 - 0.3
	Pinyon Flats Observ. (USGS)	33.61° N 116.46° W	25.80 2.4	135° Up 045°	.04 .04 .05	- - -
19 June 1982 1017:33.6 UTC Central California 36.530N, 121.073W Magnitude 4.0	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	36.25 1.9		**	
	Bear Valley Station 1 Fire Station (USGS)†	36.573°N 121.184°W	* 0.6		**	
	Bear Valley Station 11 Wilkinson Ranch (USGS)	36.608°N 121.109°W	39.65 *		**	
	Bear Valley Station 6 James Ranch (USGS)	36.504°N 121.101°W	36.52 1.1		**	
	Bear Valley Station 14 Upper Butts Ranch (USGS)	36.569°N 121.043°W	38.08 *		**	
20 June 1982 0457 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	16.0 0.7		**	
	Bear Valley Station 1 Fire Station (USGS)†	36.573°N 121.184°W	* *		**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
12 January 1982- 22 June 1982 South Carolina Epicenters and magnitudes unknown	Monticello Dam (USGS)	34.304°N 81.333°W	* *			
	Shared abutment (Center crest)				**	
	Downstream			180° Up 090°	0.08 .14 .11	- 1-peak 1-peak
	Note: Two additional records** recovered at shared abutment.					
5 July 1982 0413:49.7 UTC Arkansas 35.20N, 92.25W Magnitude 3.8	Enola, Arkansas (USGS/TEIC)†	35.185°N 92.232°W	* *	360° Up 270°	.19 .07 .57	0.9 - 1.7
5 July 1982 0902:37.1 UTC Central California 36.667N, 121.357W Magnitude 3.2	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	39.70 *		**	
20 March 1981- 6 August 1982 Nevada Epicenter and magnitude unknown	Mina, Nevada (USGS)	38.434°N 118.154°W	* *		**	
7 August 1982 0837:25.8 UTC Southeast Alaska 60.212N, 139.540W Magnitude 4.7	Yakutat Bay Bancas Point (USGS)	59.953°N 139.635°W	33.48 *		**	
10 August 1982 0211:29.6 UTC Central California 36.597N, 121.242W Magnitude 4.5	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	32.62 2.5	310° Up 220°	.19 .08 .12	0.5 - 0.2
	Bear Valley Station 11 Wilkinson Ranch (USGS)	36.608°N 121.109°W	32.65 *		**	
	Bear Valley Station 2 Stone Canyon West (USGS)	36.636°N 121.234°W	32.85 *		**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max acc[4] (g)	Duration[5] (s)
10 August 1982 0211:29.6 UTC -continued-	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	32.50 1.6		**	
	Bear Valley Station 1 Fire Station (USGS)	36.573°N 121.184°W	* 1.1	310° Up 220°	0.09 .04 .10	- - 1-peak
	Bear Valley Station 14 Upper Butts Ranch (USGS)†	36.569°N 121.043°W	* *		**	
10 August 1982 0211:43 UTC (approx) Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	46.4 *		**	
	Bear Valley Station 1 Fire Station (USGS)†	36.573°N 121.184°W	* *		**	
10 August 1982 0212:08 UTC (approx) Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	11.5 (2.0)		**	
	Bear Valley Station 12 Williams Ranch (USGS)†	36.658°N 121.249°W	* (2.3)		**	
	Bear Valley Station 11 Wilkinson Ranch (USGS)	36.608°N 121.109°W	11.65 (2.5)		**	
	Bear Valley Station 1 Fire Station (USGS)†	36.573°N 121.184°W	* (1.2)	310° Up 220°	.11 .04 .15	1-peak - 0.3
10 August 1982 0212:20 UTC (approx) Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	23.5 (1.9)		**	
	Bear Valley Station 11 Wilkinson Ranch (USGS)	36.608°N 121.109°W	23.80 *		**	
	Bear Valley Station 1 Fire Station (USGS)†	36.573°N 121.184°W	* (1.2)		**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
10 August 1982 0212:28 UTC (approx) Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	31.2 (1.9)		**	
	Bear Valley Station 11 Wilkinson Ranch (USGS)	36.608°N 121.109°W	31.45 *		**	
	Bear Valley Station 1 Fire Station (USGS)†	36.573°N 121.184°W	* *		**	
10 August 1982 0224:00.3 UTC Central California 36.598N, 121.258W Magnitude 3.5	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	2.80 2.2		**	
10 August 1982 0229 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	12.25 *		**	
	Bear Valley Station 1 Fire Station (USGS)†	36.573°N 121.184°W	* *		**	
10 August 1982 1837:04.2 UTC So. California 32.917N, 115.533W Magnitude 3.6	El Centro Array Sta. 6 551 Huston Rd. (USGS)	32.839°N 115.487°W	07.2 3.2	230° Up 140°	0.09 .02 .07	- - -
11 August 1982 0746:43.2 UTC Central California 36.638N, 121.308W Magnitude 4.6	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	47.08 2.8	310° Up 220°	.13 .07 .14	1.3 - 1.7
	Bear Valley Station 6 James Ranch (USGS)	36.504°N 121.101°W	49.58 2.0		**	
	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	46.15 1.9	310° Up 220°	.11 .06 .08	1-peak - -
	Bear Valley Station 14 Upper Butts Ranch (USGS)	36.569°N 121.043°W	48.45 3.7	310° Up 220°	.13 .12 .15	2-peaks 2-peaks 1.0

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
11 August 1982 0746:43.2 UTC -continued-	Bear Valley Station 11 Wilkinson Ranch (USGS)	36.608°N 121.109°W	47.15 3.0	130° Up 040°	0.16 .09 .14	2-peaks - 1-peak
	Bear Valley Station 1 Fire Station (USGS)†	36.573°N 121.184°W	* 1.9	310° Up 220°	.16 .07 .27	0.5 - 0.4
	Bear Valley Station 7 Pinnacles Nat'l Mon. (USGS)	36.483°N 121.180°W	49.42 0.2	310° Up 220°	.04 .04 .09	- - -
	Bear Valley Station 2 Stone Canyon West (USGS)	36.636°N 121.234°W	47.55 *		**	
	Hollister City Hall 339 Fifth Street (USGS) Digital	36.85° N 121.40° W	48.93 *		**	
12 August 1982 0653:05.8 UTC Central California 36.628N, 121.300W Magnitude 3.4	Bear Valley Station 11 Wilkinson Ranch (USGS)	36.608°N 121.109°W	9.62 *		**	
4 May 1982- 16 August 1982 Central California Epicenter and magnitude unknown	Hollister City Hall Annex (USGS)	36.85° N 121.40° W	* *			
	Basement				**	
25 August 1982 1505:17.8 UTC SE Alaska 60.204N, 139.512W Magnitude 5.1	Yakutat Bay Bancas Point (USGS)	59.953°N 139.635°W	25.26 *	360° Up 270°	.09 .01 .01	- - -
25 August 1982 1750 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	28.9 1.8		**	
31 August 1982 0311:07.8 UTC Central California 36.648N, 121.325W Magnitude 4.0	Bear Valley Station 5 Callens Ranch (USGS)	36.673°N 121.195°W	11.25 1.9		**	
	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	11.98 *		**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
31 August 1982 0311:07.8 UTC -continued-	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	10.34 1.9	310° Up 220°	0.10 .03 .06	1-peak - -
15 March 1982- 3 September 1982 Central California Epicenter and magnitude unknown	Palo Alto VA Hospital Bldg 1 (VA)	37.40° N 122.14° W	* *			
	Basement				**	
	Roof				**	
5 September 1982 0521:26.6 UTC So. California 32.933N, 115.850W Magnitude 4.4	Superstition Mountain Camera Site (USGS)	32.955°N 115.823°W	27.75 1.0	135° Up 045°	.16 .12 .07	0.8 1-peak -
6 September 1982 1512:09.6 UTC So. California 32.933N, 115.850W Magnitude 3.3	Superstition Mountain Camera Site (USGS)	32.955°N 115.823°W	11.55 *	135° Up 045°	.07 .03 .03	- - -
8 September 1982 1154:57.9 UTC Central California 36.67N, 121.29W Magnitude 3.3	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	0.9 2.0		**	
8 September 1982 1211:37.4 UTC Central California 36.653N, 121.298W Magnitude 3.4	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	40.6 2.1		**	
11 April 1982- 23 September 1982 Alaska Epicenter and magnitude unknown	Talkeetna FAA VOR Building (USGS)	62.30° N 150.10° W	* *		**	
9 September 1982- 23 September 1982 Central California Epicenter and magnitude unknown	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	* 1.7	310° Up 220°	.06 .02 .03	- - -

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
24 September 1982 0805:55.4 UTC Central California 36.728N, 121.335W Magnitude 3.9	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	57.9 2.1	310° Up 220°	0.09 .03 .06	- - -
	Bear Valley Station 5 Callens Ranch (USGS)	36.673°N 121.195°W	59.8 *		**	
25 September 1982 0420:04.8 UTC Central California 36.673N, 121.330W Magnitude 3.9	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	7.6 *		**	
25 September 1982 0424 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	51.0 2.0		**	
25 September 1982 0425 - 2100 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 12 Williams Ranch (USGS)†	36.658°N 121.249°W	* 2.4		**	
25 September 1982 2101:22.3 UTC Central California 36.658N, 121.337W Magnitude 3.2	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	24.9 2.2		**	
22 October 1982 0059 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 10 Webb Residence (USGS)	36.532°N 121.143°W	3.59 1.7		**	
24 October 1982 1834:45.8 UTC Central California 36.640N, 121.240W Magnitude 3.0	Bear Valley Station 10 Webb Residence (USGS)	36.352°N 121.143°W	49.85 2.4		**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
25 October 1982	Pleasant Valley	36.308° N				
2226:04.4 UTC	Pumping Plant	120.249° W				
Coalinga, California	(USBR)†					
36.322N, 120.508W						
Magnitude 5.4	Basement		*	135°	0.06	-
			3.5	Up	.03	-
				045°	.08	-
	1st floor		*	135°	.07	-
			3.5	Up	.03	-
				045°	.09	-
	Switchyard		*	225°	.09	-
			0.7	Up	.05	-
				135°	.11	1-peak
	Note: One additional unknown record** recovered at switchyard.					
	Bear Valley Station 6	36.504°N	25.7		**	
	James Ranch	121.101°W	*			
	(USGS)					
	Terminus Dam	36.42° N	*			
	(ACOE)†	119.00° W	*			
	Main crest				**	
	Auxiliary crest				**	
	Lake Success Dam	36.062°N	*			
	(ACOE)†	118.924°W	*			
	Left abutment				**	
	Right abutment				**	
	Downstream				**	
	Slope				**	
	Right crest				**	
	Left crest				**	

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
10 November 1982 1121:25.7 UTC So. California 34.050N, 116.667W Magnitude 3.9	Forest Falls Post Office (USGS)†	34.09° N 116.92° W	* *		**	
	Morongo Valley Fire Station (USGS)	34.05° N 116.58° W	27.92 1.8		**	
	Note: Two additional unknown records** recovered at Morongo Valley Fire Station.					
	Cabazon Post Office (USGS)	33.92° N 116.78° W	32.00 *		**	
	Whitewater Canyon Trout Farm (USGS)†	33.99° N 116.66° W	* *		**	
	Note: One additional unknown record** recovered at Whitewater Canyon Trout Farm.					
15 November 1982 0258:22.9 UTC South Dakota 43.007N, 97.850W Magnitude 4.3	South Dakota Gavins Point Dam (ACOE)†	42.846°N 97.482°W	* 4.1			
	Crest				**	
	Downstream				**	
23 March 1982- 21 November 1982 So. California Epicenter and magnitude unknown	Imperial Valley Plaster City (USGS)	32.79° N 115.86° W	* 2.6		**	
28 January 1981- 29 November 1982 So. California Epicenters and magnitudes unknown	Los Angeles 2029 Century Park E. (CLA)	34.060°N 118.413°W	* *			
	30th floor				**	
	43rd floor				**	
	Note: Two each additional records** at 30th and 43rd floors.					

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max acc[4] (g)	Duration[5] (s)
28 April 1982- 8 December 1982 Central California Epicenter and magnitude unknown	New Melones Dam (USBR)	37.949°N 120.524°W	* *			
	Downstream				**	
	Left Crest				**	
	Left abutment				**	
	Middam (slope)				**	
	Right abutment				**	
	Center crest				**	
29 April 1982- 10 December 1982 So. Nevada Epicenter and magnitude unknown	Hoover Dam, Nevada (USBR)	36.02° N 114.74° W	* *			
	Intake tower			315° Up 225°	0.07 .05 .13	- - 1-peak
	Gallery				**	
	Right abutment				**	
8 June 1982- 15 December 1982 Central California Epicenter and magnitude unknown	Diemer Filter Plant (MWD)	33.91° N 117.82° W	* 1.1			
	Basement				**	
	Reservoir roof				**	
16 December 1982 0653:01.3 UTC Northern California 40.372N, 124.055W Magnitude 4.6	College of the Redwoods Eel River Valley Array (USGS)†	40.699°N 124.200°W	* 4.3		**	
	Fortuna Fire Station Eel River Valley Array (USGS)†	40.599°N 124.154°W	* 3.2	360° Up 270°	.28 .04 .23	1.6 - 1.2
	Bunker Hill FAA Eel River Valley Array (USGS)	40.498°N 124.294°W	05.25 3.1	360° Up 270°	.04 .03 .12	- - 1-peak
	Centerville Beach Eel River Valley Array (USGS)†	40.563°N 124.348°W	* 4.0	360° Up 270°	.09 .03 .11	- - 1-peak

See footnotes at end of table.

Table 1. - *Summary of U.S. accelerograph records recovered during 1982* - continued

Event	Station name (owner)[1]	Station coord.	TT[2], S-t (s)	Direction[3]	Max accl[4] (g)	Duration[5] (s)
25 September 1982- 30 December 1982 Central California Epicenter and magnitude unknown	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	* 2.6		**	
	Note: May be related to event of October 25, 2226:04.4 UTC.					
30 December 1982 2319 UTC Central California Epicenter and magnitude unknown	Bear Valley Station 12 Williams Ranch (USGS)	36.658°N 121.249°W	30.54 1.6	310° Up 220°	.09 .02 .03	- - -

[1]Station owner code:
ACOE - U.S. Army Corps of Engineers.
CDWR - California Department of Water Resources.
CPA - City of Palo Alto.
CLA - City of Los Angeles.
MWD - Metropolitan Water District of Southern California.
TEIC - Tennessee Earthquake Information Center.
UCB - University of California, Berkeley.
USBR - U.S. Bureau of Reclamation.
USGS - U.S. Geological Survey.
VA - Veterans Administration.
† - WWVB time code not legible or instrument not equipped with a radio receiver; correlation of accelerogram with event may be questionable.

[2] TT - Trigger time of accelerograph (in seconds, after minute (or following minute) listed in event column).
S-t - S-wave arrival minus trigger time (S - t) interval (S-P times given in parentheses).
* TT and/or S-t time is questionable or cannot be determined.

[3]Direction of case acceleration for upward trace deflection on accelerogram. Horizontal components are listed as azimuth in degrees clockwise from north. Vertical components are listed as "Up" or "Down."

[4]Peak acceleration recorded at ground level on one vertical and two orthogonal horizontal components unless otherwise noted.
** Denotes maximum acceleration is less than 0.05 g at ground level or less than 0.10 g at non ground-level stations.

[5]Duration between first and last peaks of acceleration greater than 0.10 g.

GPO 587-044/10021